CHAPTER 10

Landscape and Visual Amenity

CALVERT TO KAGARU ENVIRONMENTAL IMPACT STATEMENT

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

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10.1 Scope of chapter

The key objectives of this Landscape and Visual Impact Assessment (LVIA) for the Calvert to Kagaru Project (the Project) are:

- To undertake a baseline assessment describing existing environmental aspects and their values of the LVIA study area with respect to landscape character and visual amenity including scenic viewpoints
- To describe the existing landscape, with 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 construction and operation during day and night
- To describe any Project modifications or management techniques that can mitigate identified landscape and visual impacts
- To illustrate the visual impacts using visualisation techniques to assist members of the public in understanding potential impacts.

10.2 Terms of Reference requirements

This chapter has been prepared to address sections 10.10 (p) and 11.86 to 11.89 of the Terms of Reference (ToR) for the Project EIS, as depicted in Table 10.1, which also contains the relevant sections within this chapter that address each of the requirements.

These sections are also addressed in more detail in Section 2.1 of Appendix I: Landscape and Visual Impact Assessment Technical Report.

Appendix B: Terms of Reference Compliance Table provides a cross-reference for each ToR against relevant sections in this EIS.

TABLE 10.1: TERMS OF REFERENCE COMPLIANCE TABLE—LANDSCAPE AND VISUAL AMENITY

Terms of Reference requirements		Where addressed
Proposed construction and operations		
10.10	Describe the following information about the proposed Project: (p) landscaping and the rehabilitation of affected areas after construction and during operation.	Section 10.7 Appendix I: Landscape and Visual Impact Assessment Technical Report, Section 6 and Section 11
Landscape and visual amenity		
Existing environment		
11.86	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.	Sections 10.3 and 10.5 Appendix I: Landscape and Visual Impact Assessment Technical Report, Sections 5, 7 and 8
Impact assessment		
11.87	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.	Sections 10.6.1.1, 10.6.1.2 and 10.6.2 Appendix I: Landscape and Visual Impact Assessment Technical Report, Section 8 and Appendix 1 and 2
11.88	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)	Sections 10.3, 10.5.1.4 and 10.8 Appendix I: Landscape and Visual Impact Assessment Technical Report, Section 3 and Section 7
Mitigation measures		
11.89	Describe any proposed measures to avoid, minimise or mitigate potential impacts on landscape character and visual amenity.	Section 10.7 Appendix I: Landscape and Visual Impact Assessment Technical Report, Section 11

10.3 Legislation, policies, standards and guidelines

Table 10.2 identifies and discusses the relevance of any legislative or policy objectives and standards (whether qualitative or quantitative) in relation to the protection or management of landscape and visual values in the context of the Project. An overarching and broad discussion of legislation, policies, standards and guidelines is available in Appendix I: Landscape and Visual Impact Assessment Technical Report.

TABLE 10.2: REGULATORY CONTEXT

Legislation, policy, guideline or standards	Relevance to the Project
National	
AS4282-1997 Control of the obtrusive effects of outdoor lighting (1997)	This standard sets out guidelines for the control of the obtrusive effects of outdoor lighting and gives 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. Lighting is discussed in Section 10.6. This standard is also required for consideration as part of the Dis-5 Light Pollution credit in the Infrastructure Sustainability (IS) Rating Scheme. This rating scheme is discussed in Chapter 7: Sustainability.
AS4970-2009 Protection of trees on development sites	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.
Disability (Access to Premises —Buildings) Standards 2010	This is a legislative standard that provides a nationally applicable set of provisions that detail what must be done to provide for non-discriminatory access to public buildings for people with disability. The Project is mostly located in a rural area within freehold land 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 alignment passes through settlements and in recreational areas or adjacent to recreation trails and walkways where people may be present close to the alignment.
Queensland (QLD)	
Road Landscape Manual (2nd edition, 2013a)	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. The Project requires the realignment and redesign of numerous local and State-controlled roads (refer Section 10.6 for details).
Crime Prevention through Environmental Design (CPTED) (2007)	The CPTED Guidelines for Queensland (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. The Project is mostly located in a rural area within privately owned land with restricted accessibility to the general public limiting the applicability of the CPTED guidelines. However, CPTED needs to be considered where the alignment passes through settlements and in recreational areas or adjacent to recreation trails and walkways where people may be present close to the alignment.

Legislation, policy, guideline or standards	Relevance to the Project
Bromelton State Development Area Development Scheme (2017)	The Bromelton State Development Area (SDA) was declared in 2008 with an area of approximately 15,610 hectares (ha) and is located within the Scenic Rim Regional Council (SRRC). The *Bromelton SDA Development Scheme* is the regulatory instrument that controls development to which it applies within the Bromelton SDA. The Project traverses the northern area of the Bromelton SDA at Kagaru. Section 2.3 of the *Bromelton SDA Development Scheme* states that development within the Bromelton SDA will avoid adverse impacts on environmental, cultural heritage and community values, or minimise and mitigate impacts where they cannot be reasonably avoided and be located, designed and constructed in accordance with best practice principles. Section 2.5 of the *Bromelton SDA Development Scheme* outlines the SDA-wide assessment criteria and includes a section on character and amenity, which states that visual impacts of development are minimised through building design, materials and landscaping when viewed from a significant, publicly accessible viewpoint such as major roads. It also includes a section on landscaping that states that development provides landscaping that: ▸ Minimises the visual impacts of the development ▸ Incorporates at least 50 per cent local species ▸ Is low maintenance.
Greater Flagstone Priority Development Area Development Scheme (2011)	The Greater Flagstone Priority Development Area (PDA) was declared in October 2010 and covers an area of 7,188 ha. Once developed, the Greater Flagstone PDA is anticipated to provide approximately 50,000 dwellings to house a population of up to 120,000 people. The *Greater Flagstone PDA Development Scheme* is the planning instrument that assists with planning, carrying out, promoting, coordinating and controlling the development of land within the Greater Flagstone PDA. Section 3.3.8 Natural and Cultural Values of the scheme identifies several significant environmental features and states that the design, siting and layout of the development: ▸ Incorporates landscaping with endemic species that contribute to the bushland character, flora and fauna habitat, and fauna movement ▸ Minimises adverse impacts on natural landforms and the visual amenity of the site.
QLD (regional Level)	
South East Queensland Regional Plan (2017) (also known as *ShapingSEQ*)	*ShapingSEQ* is the regional plan for the South East Queensland (SEQ) region. It was given effect on 11 August 2017. The region includes the following local government areas (LGAs) through which the Project passes: Ipswich City Council (ICC), Logan City Council (LCC), and SRRC. The plan provides a regional framework for growth management, and sets planning direction for sustainable growth, global economic competitiveness and high-quality living 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 Project passes through a large area of SEQ. *ShapingSEQ* sets out the vision and strategy for planning in this region. The 'Prosper' and 'Connect' elements of the plan support investment in upgrades and new infrastructure, including the Melbourne to Brisbane Inland Rail that '*will reinforce SEQ as the apex of Australia's strategic freight network*' and '*allows for long-term intent for an improved passenger rail connection between Brisbane and Toowoomba*'.
South East Queensland Regional Plan Implementation Guideline No. 8: Identifying and protecting scenic amenity values (2007)	This guideline was developed to assist SEQ local governments to determine a framework for the protection of regional landscape values (Office of Urban Management, 2007). It was developed to support the (now superseded) Scenic Amenity policies of the *QLD Regional Plan 2009–2031*, but is still referenced as the SEQ Regional Amenity Methodology in the current regional plan *ShapingSEQ*. The guideline establishes a voluntary methodology that centres around several key concepts relevant to LVIA including, scenic amenity and preferences, views and viewpoints. Further information is contained in Appendix I: Landscape and Visual Impact Assessment Technical Report.

Legislation, policy, guideline or standards	Relevance to the Project
QLD (local level)	
Ipswich Planning Scheme 2006	The Project alignment passes through the *Ipswich Planning Scheme 2006* area. The consolidated *Ipswich Planning Scheme 2006* covers the entire Ipswich City LGA. The scheme divides the LGA into zones, with character places overlays and development constraint overlays with associated codes. Implementation guidelines are also included for specific topics.
Scenic Rim Planning Scheme 2020	The *Scenic Rim Planning Scheme 2020* is the primary planning document within the SRRC LGA. The *Scenic Rim Planning Scheme 2020* sets out SRRC's intention for future development within the LGA over the next 20 years. The Project is located within part of the SRRC LGA.

In accordance with Schedule 6, Part 5, Section 26(2) of the Planning Regulation 2017, development for the construction of transport infrastructure, where the infrastructure is government supported transport infrastructure, cannot be made assessable development under the relevant local categorising instruments. Consequently, the provisions of the planning schemes listed in Table 10.2 do not apply to the Project. Notwithstanding this, the zoning intent for these areas as determined by the planning schemes have been taken into consideration when determining impacts of the Project on landscape and visual amenity in the area.

The following documents that apply to New South Wales (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:

- *Beyond the Pavement: RTA urban design policy, procedures and design principles*, NSW Roads and Maritime Services (2014)
- *Guideline for landscape character and visual impact assessment—Environmental impact assessment practice note EIA-N04*, NSW Road and Maritime Services (2018)
- *Bridge Aesthetics: Design guidelines to improve the appearance of bridges in NSW*, NSW Road and Maritime Services (2012)
- *NSW Sustainable Design Guidelines Version 3.0*, Transport for NSW (2013)
- *Crime prevention and the assessment of development applications*, NSW Department of Urban Affairs and Planning (2001).

10.4 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*, Australian Institute of Landscape Architects QLD (2018)
- *Guidelines for Landscape and Visual Impact Assessment*, Third Edition, The Landscape Institute and the Institute of Environmental Management and Assessment (2013) and Second Edition (2002)
- *South East Queensland Regional Plan Implementation Guideline No. 8*: Identifying and protecting scenic amenity values, QLD Government (Office of Urban Management 2007)
- *Landscape Institute Advice Note 01/09: Use of photography and photomontage in landscape and visual assessment*, The Landscape Institute (2011)
- *Landscape Institute Technical Guidance Note: Photography and Photomontage in Landscape and Visual Impact Assessment, Public Consultation Draft*, The Landscape Institute (2018)
- *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* (1997).

The LVIA methodology is a significance assessment as described in Chapter 4: Assessment Methodology of the EIS. The significance assessment method has been applied to environmental aspects that will be impacted by the Project where impacts cannot be quantified. The LVIA methodology has defined its own thresholds for sensitivity and magnitude that are based on the principles, but differ from the criteria defined in Chapter 4: Assessment Methodology and follow criteria more widely used for the assessment of landscape and visual impacts (refer Section 10.4.2).

Table 10.3 provides a summary of the LVIA methodology, which is discussed further in Appendix I: Landscape and Visual Impact Assessment Technical Report.

TABLE 10.3: LANDSCAPE AND VISUAL IMPACT ASSESSMENT METHODOLOGY

Method	Description
Desktop assessment	A desktop analysis of existing landscape character and visual amenity for the LVIA study area was undertaken to inform this assessment.
Field survey	A field assessment of the LVIA study area was carried out to ground truth the findings of the desktop assessment and to assess landscape character and visual amenity, including identifying sensitive viewpoints requiring further assessment.
Stakeholder and community consultation inputs	Relevant feedback from preliminary consultation activities undertaken by others (including as part of the Social Impact Assessment, refer Appendix R: Social Impact Assessment Technical Report) has informed the landscape and visual amenity assessment, where appropriate.
Identification of potential Project impacts	This task included describing infrastructure that is likely to be associated with the Project, such as the presence of embankments, bridges, cuttings, fencing, noise barriers and level crossings. Potential impacts were then considered in the landscape and visual assessments.
Landscape assessment	A landscape assessment was carried out 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. The landscape impact assessment defined the sensitivity of the landscape as well as the magnitude of change to the landscape. The significance of the potential impacts on the landscape character was then rated based on an evaluation of the sensitivity of the existing landscape to change and the magnitude of change that is likely to occur.
Visual assessment	A visual assessment was undertaken based on 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. Viewpoints and the visual receptor audiences they represent were defined and then rated for their sensitivity. Following this, the magnitude of change to views and visual amenity were determined. The magnitude of change is dependent 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 the overall potential impacts on visual amenity was then determined based on the sensitivity of existing views to change and the magnitude of change that is likely to occur.
Preparation of visualisations	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 are illustrations/photomontages that aim to represent an observer's view of a proposed development.
Lighting assessment	A lighting assessment was carried out based on an analysis of representative views identified through the visual assessment. Lighting impacts were considered during both construction and operation phases of the Project. The sensitivity of the viewpoints with respect to changes in after-dark lighting conditions were defined based on elements such as proximity of the viewpoint to a lighting source associated with the Project and the accessibility of the viewpoint to viewers at night. The assessment determined 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 considered any change to the backdrop to, or outlook from, the representative viewpoint. The significance of lighting impact in each representative viewpoint was then made by considering the sensitivity of each representative night-time viewpoint and the magnitude of change that is likely to occur.
Impacts mitigation	Following identification of impacts, consideration was given to how impacts can be mitigated. This included modification of the design (horizontal or vertical alignment and materiality), vegetation screening and, if necessary, liaison with landholders. Proposed mitigation measures listed in Section 10.7.3 were considered in the assessment and further landscape and additional visual mitigation opportunities have been proposed where appropriate.
Residual impact assessment	A residual impact assessment is determined using the same process described above, to reassesses the significance level after the proposed mitigation measures were applied. The initial significance levels were compared to the residual significance levels to assess the effectiveness of the proposed mitigation measures. For further details refer Section 10.8.5.

10.4.1 Landscape and visual impact assessment study area

For the purposes of the assessment, the LVIA study area has been defined as the area illustrated in Figure 10.1, which aims to establish the area within which the Project has potential to influence landscape and/or visual values and receptors. This is based on:

- Horizontal and vertical alignment of the Project
- Visibility analysis mapping (VAM), which establishes the theoretical viewshed of the Project based on landform
- Assumptions regarding the likely extent of visibility of projects of this nature. 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, the Project connects to the adjacent Helidon to Calvert (H2C) and Kagaru to Acacia Ridge and Bromelton (K2ARB) Inland Rail projects
- Refinement during the field survey stage.

10.4.2 Significance assessment criteria

The significance of a potential impact is assessed in terms of the sensitivity or vulnerability of the environmental aspect, and the magnitude of the potential impact. As previously noted, the LVIA methodology has defined its own thresholds for sensitivity and magnitude that are based on the principles of, but differ from, the criteria defined in Chapter 4: Assessment Methodology and follow criteria more widely used for the assessment of landscape and visual impacts.

The following sensitivity criteria (refer Table 10.4), magnitude criteria (refer Table 10.5) and significance criteria (refer Table 10.6) were used to determine potential impacts relating to the LVIA.

10.4.2.1 Sensitivity to change

The sensitivity categories used in this assessment are defined in Table 10.4. Separate definitions are provided for the sensitivity of:

- Landscape
- Viewpoint, and the visual receptor audiences it represents
- Representative viewpoint to changes in after-dark lighting conditions.

TABLE 10.4: DEFINITIONS OF SENSITIVITY

Sensitivity	Aspect	Attributes of categories
High	Landscape	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.
	Visual sensitivity	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 focused on the landscape, for example a national park.
	Sensitivity to lighting	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	Landscape	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.
	Visual sensitivity	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.
	Sensitivity to lighting	Relatively accessible at night with medium numbers of viewers and close to the site or easily accessible with propriety interest but located some distance (typically up to 500 m) from the light source.

Sensitivity	Aspect	Attributes of categories
Low	Landscape	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.
	Visual sensitivity	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 focused on the landscape, for example, workers, commuters, truck drivers.
	Sensitivity to lighting	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	Landscape	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.
	Visual sensitivity	Very occasional numbers of viewers with a passing interest in their surroundings, for example, those travelling along minor roads and views from the air.
	Sensitivity to lighting	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.

10.4.2.2 Magnitude of change

The magnitude of change categories used in this assessment are defined in Table 10.5. Separate definitions are provided for the magnitude of change to:

- Landscape
- Viewpoint, and the visual receptor audiences it represents
- Representative viewpoint to changes in after-dark lighting conditions.

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.

TABLE 10.5: DEFINITIONS OF MAGNITUDE OF CHANGE

Magnitude	Aspect	Attributes of categories
High	Landscape	Dominant change: 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.
	Visual	Dominant change: 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.
	Lighting	Dominant change: Occurs when an intrinsically dark landscape becomes brightly lit.
Moderate	Landscape	Considerable change: A considerable change in landscape characteristics, frequent or continuous and over a wide area or a clearly evident change, but over a restricted area.
	Visual	Considerable change: 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 to 1.0 km) to the nearest Project infrastructure.
	Lighting	Considerable change: Occurs when an intrinsically dark landscape becomes predominantly lit or a predominantly dark landscape becomes brightly lit.

Magnitude	Aspect	Attributes of categories
Low	Landscape	Noticeable change: 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.
	Visual	Noticeable change: 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 1.0 to 2.5 km to the nearest Project infrastructure).
	Lighting	Noticeable change: Occurs when an intrinsically dark landscape become predominantly dark, a predominantly dark landscape becomes predominantly lit or a predominantly lit landscape becomes brightly lit.
Negligible	Landscape	Barely perceptible change: An imperceptible, barely or rarely perceptible change in landscape characteristics.
	Visual	Barely perceptible change: Change that 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.
	Lighting	Barely perceptible change: Occurs when a landscape experiences negligible changes from the existing lighting conditions to the proposed lighting conditions.
No impact	Landscape, visual and lighting	No change in landscape, visual or lighting characteristics.

10.4.2.3 Significance of impact

An evaluation of overall potential effect has been based on a combination of the sensitivity to change and the magnitude of change that is likely to occur and has been determined using the matrix in Table 10.6. As described in Sections 10.4 and 10.4.2, the LVIA significance matrix has been modified from the criteria defined in Chapter 4: Assessment Methodology.

TABLE 10.6: SIGNIFICANCE OF IMPACT MATRIX

		Magnitude of change			
Level of effect		High (dominant change)	Moderate (considerable change)	Low (noticeable change)	Negligible (barely perceptible change)
Sensitivity	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, visual amenity or light are anticipated, a judgement of 'no impact' is recorded.

10.5 Existing environment

10.5.1 Regional landscape context

The LVIA study area is located south-west of Ipswich City and includes areas within ICC, LCC and SRRC LGAs. A small part of the LVIA study area falls within the Lockyer Valley LGA; however, the proposed alignment does not pass through this area. The eastern part of the LVIA study area falls within the Scenic Rim, a popular tourist destination recognised for its scenic beauty and includes the upland ranges of Flinders Peak, juxtaposed against the western part of the LVIA study area, which comprises cleared pasture and arable floodplains with isolated rural settlements. The Project and the LVIA study area are illustrated in Figure 10.1.

10.5.1.1 Settlement

The alignment traverses a broad range of landscapes, from isolated rural settlements, open woodland, pastoral and agricultural landscapes to the undulating and vegetated foothills of the Teviot Range. Extensive

areas within the LVIA study area have been cleared for agricultural purposes and for the development of residential communities.

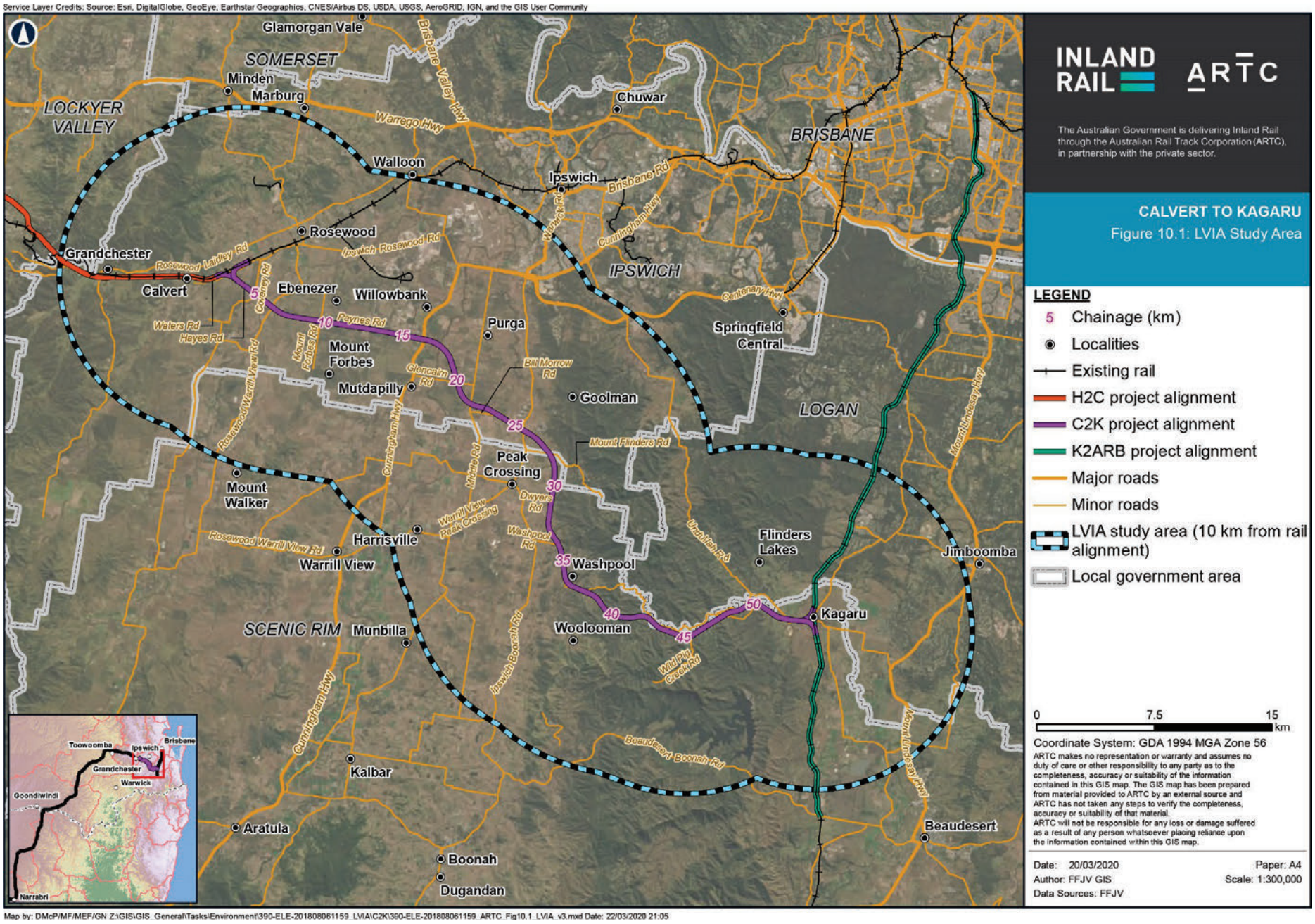
The nearest major town is Rosewood, situated 17 km west of Ipswich. The Rosewood State Suburb, relating to the township and surrounding area, is the most populous at 2,835 people (Australian Bureau of Statistics (ABS) 2016a). The rural settlements of Grandchester, Calvert, Harrisville and Peak Crossing are also within the LVIA study area and have State Suburb populations of 501, 310, 427 and 972 respectively (ABS, 2016b). Other rural residential developments within the LVIA study area include Deebing Heights, Yamanto, Thagoona and Willowbank. Typically, views from these areas are limited due to either their distance from the alignment, or separation from the alignment by dense remnant vegetation.

The Bromelton SDA and Flagstone PDA are both located in the far eastern extent of the LVIA study area. The Project passes the northern part of the Bromelton SDA, through land identified within the 'Rural Precinct' of the Bromelton SDA Development Scheme, which is to provide for low-impact rural and agricultural activities. The future development of Flagstone PDA is situated north of the proposed alignment and is estimated to provide approximately 50,000 new dwellings over the next 30 to 40 years. Proposed residential communities within these areas lie close to the alignment, with the proposed town centre and future residential neighbourhoods of the Flinders Precinct situated approximately 500 m from the Project. The current structure plan includes a 50 m wide biodiversity corridor along Woollaman Creek, district recreation and sports parks and outdoor recreation uses along this boundary that will provide a visual buffer.

10.5.1.2 Geology, landform and hydrology

The geology underlying the LVIA study area is largely volcanic in origin with large areas of sedimentary deposits, and is characterised by flat to gently undulating lowlands, through to ranges on metamorphic, sedimentary and igneous rocks. Accordingly, landform across the LVIA study area varies greatly and is characterised by craggy volcanic peaks rising above the scenic, cultivated landscapes of the fertile Fassifern Valley.

The most notable landscape feature within the LVIA study area is the Teviot Range, located in the east, which includes a number of local peaks including Mount Blaine, Mount Goolman, Mount Wilbraham, Mount Joyce and Ivorys Knob. The most distinctive of these is Flinders Peak, which reaches 679 m above Australian Height Datum (AHD) at the summit. To the south of the Teviot Range lies the Dugandan Range, which includes Mount Juberra, Mount Crumpet and Mount Moy.


Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Glamorgan Vale
SOMERSET
Minden
Marburg
LOCKYER VALLEY
Brisbane Valley Hwy
Warrego Hwy
Chuwar
BRISBANE
Walloon
Ipswich
Brisbane Rd
Cunningham Hwy
Warwick Rd
Rosewood
Ipswich Rosewood Rd
Grandchester
Rosewood Laidley Rd
Calvert
Ebenezer
Willowbank
IPSWICH
Centenary Hwy
Springfield Central
Waters Rd
Hayes Rd
Cooneys Rd
Paynes Rd
Purga
Mount Forbes Rd
Mount Forbes
Glencalm Rd
Bill Morrow Rd
Mutdapilly
Goolman
LOGAN
Mount Lindesay Hwy
Rosewood Warrill View Rd
Cunningham Hwy
Middle Rd
Mount Flinders Rd
Peak Crossing
Mount Walker
Dwyers Rd
Warrill View
Peak Crossing
Washpool Rd
Harrisville
Rosewood Warrill View Rd
Warrill View
Washpool
Flinders Lakes
Jimboomba
Urchilla Rd
Kagaru
SCENIC RIM
Munbilla
Wooloman
Ipswich Boonah Rd
Wild Pig Creek Rd
Beaudesert Boonah Rd
Kalbar
Aratula
Boonah
Dugandan
Beaudesert
5
10
15
20
25
30
35
40
45
50
Toowoomba
Ipswich
Brisbane
Grandchester
Warwick
Goondiwindi
Narrabri
INLAND RAIL
ARTC
The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.
CALVERT TO KAGARU
Figure 10.1: LVIA Study Area
LEGEND
5 Chainage (km)
Localities
Existing rail
H2C project alignment
C2K project alignment
K2ARB project alignment
Major roads
Minor roads
LVIA study area (10 km from rail alignment)
Local government area
0
7.5
15
km
Coordinate System: GDA 1994 MGA Zone 56
ARTC makes no representation or warranty and assumes no duty of care or other responsibility to any party as to the completeness, accuracy or suitability of the information contained in this GIS map. The GIS map has been prepared from material provided to ARTC by an external source and ARTC has not taken any steps to verify the completeness, accuracy or suitability of that material.
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Paper: A4
Author: FFJV GIS
Scale: 1:300,000
Data Sources: FFJV
Map by: DMcP/MF/MEF/GN Z:\GIS\GIS_General\Tasks\Environment\390-ELE-201808061159_LVIA\C2K\390-ELE-201808061159_ARTC_Fig10.1_LVIA_v3.mxd Date: 22/03/2020 21:05

The Little Liverpool Range forms a distinctive landform element in the west of the LVIA study area near Grandchester. This includes Mount Grandchester at 390 m AHD. Another smaller outlying elevated area of land lies extending into the centre of the LVIA study area around Mount Walker (just beyond the LVIA study area).

The LVIA study area falls within the Bremer and Logan River Catchments. The Teviot Range drains into the Bremer River Basin (sub-basin of the Brisbane River Basin) to the west and into the Logan River Basin (sub-basin of Logan–Albert River basin) to the east. Several waterways intersect the alignment and flow throughout the LVIA study area, including (from west to east) Western Creek, the Bremer River, Mount Walker Creek, Purga Creek, Sandy Creek, Wild Pig Creek and Teviot Brook, a major tributary of the Logan River that also supplies water to Wyaralong Dam. The alignment follows Purga Creek and Wild Pig Creek for some distance.

10.5.1.3 Soils, vegetation and land use

Existing land use within and adjacent to the LVIA study area is largely characterised by rural activities on a variety of allotment sizes, which typically range between 1 ha and 20 ha.

To the east of the Teviot Range, the landscape is characterised by densely vegetated mountainous areas (including Flinders Peak and Mount Perry Conservation Park) with reserves and National Parks), rural land uses and agriculture in low-lying areas with more fertile soils.

To the west of the Teviot Range, the Fassifern Valley is renowned for its fertile and productive agricultural landscapes and rugged volcanic peaks. The most productive soils 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. Agricultural production has also developed on small areas of Brigalow scrub soils and has extended into some other marginal soils. These productive landscapes are surrounded by dryland cropping and cattle grazing, predominately beef cattle, on the less productive foothills.

A diverse range of other land uses are found in the LVIA study area, including urban development, industry, rural residential and more localised specialist land uses including the Rosewood wastewater centre, Jeebropilly and Ebenezer coal mines, Ipswich Motorsport Precinct (including Willowbank Raceway), Warrill Park lawn cemetery, RAAF Base Amberley, Santrev poultry (fertilised egg) farm, Gibb Brothers farming operations, Purga Quarry and Ivory's Rock Conventions and Events Centre.

There are no national parks within the LVIA study area. However, the LVIA study area does encompass conservation areas that are known to attract recreational visitors. The Flinders–Goolman Conservation Estate covers 2,200 ha and forms part of the regionally significant Flinders–Karawatha Corridor, which has a total area of over 56,350 ha and is recognised as one of QLD's most important biodiversity corridors (refer Figure 10.3). In addition, it supports scenic amenity, outdoor recreation and landscape heritage values of regional significance (EHP, 2014). The estate has two picnic areas and a large range of recreational trails that provide elevated views over the distinctive valleys and peaks of the Scenic Rim and towards Brisbane and the Moreton Bay islands.

10.5.1.4 South East Queensland Regional Plan regional landscape values

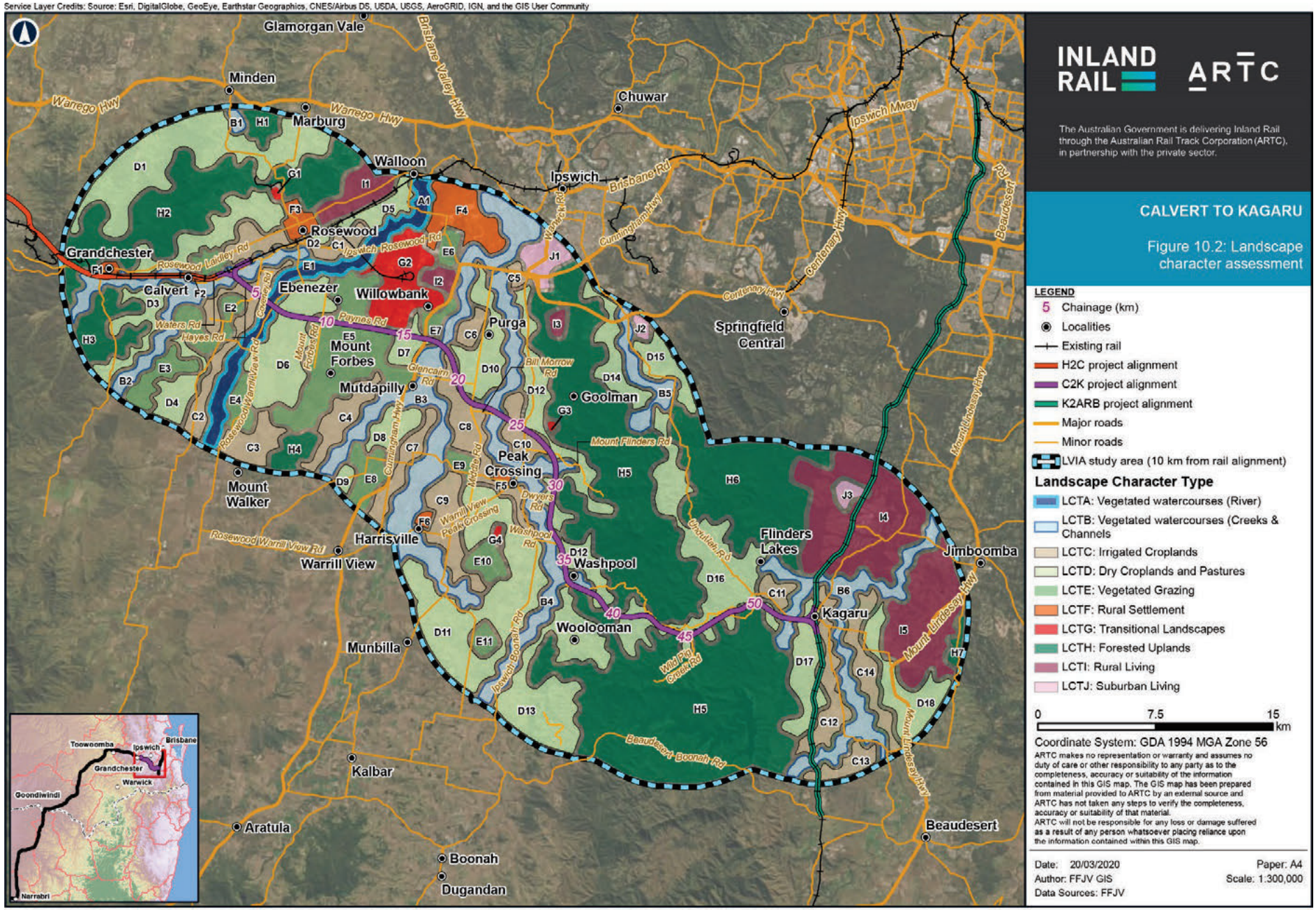
ShapingSEQ (DILGP, 2017b) includes mapping of areas of 'regionally significant scenic amenity' on 'Map 5c Sustain—regional landscape values'. This is based on the SEQ regional amenity methodology identified in the *SEQRP Implementation Guideline No 8—Identifying and protecting scenic amenity values* (QLD Government, 2007b).

The following four key areas (shown on Figure 10.3) within and around the LVIA study area are identified as being regionally significant:

- Teviot Range: encompassing the area of the Flinders–Karawatha corridor around Flinders Peak, Mount Blaine and Mount Goolman (north of the alignment), and Ivorys Knob and Mount Joyce (south of the alignment)
- Dugandan Range: encompassing the area around Mount Crumpet and Mount Juberra
- Little Liverpool Range: encompassing the area around Mount Grandchester down to Mount Beau Brumell
- Area around Mount Walker.

10.5.2 Landscape character assessment

The identified landscape character types (LCTs) and landscape character areas (LCAs) areas falling within the LVIA study area are shown on Figure 10.2 and summarised in Table 10.7. Full descriptions of each LCT are provided in Appendix I: Landscape and Visual Impact Assessment Technical Report.


Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Glamorgan Vale
Minden
Warrego Hwy
Marburg
Brisbane Valley Hwy
Chuwar
Ipswich Mway
Walloon
Ipswich
Brisbane Rd
Cunningham Hwy
Gentenary Hwy
Beaudesert Rd
Rosewood
Grandchester
Rosewood Laidley Rd
Ipswich Rosewood Rd
Calvert
Ebenezer
Willowbank
Springfield Central
Waters Rd
Hayes Rd
Paynes Rd
Mount Forbes
Purga
Bill Morrow Rd
Mutdapilly
Goolman
Glencairn Rd
Mount Flinders Rd
Peak Crossing
Mount Walker
Dwyers Rd
Warrill View
Peak Crossing
Harrisville
Washpool Rd
Flinders Lakes
Jimboomba
Rosewood Warrill View Rd
Warrill View
Washpool
Choutleh Rd
Kagaru
Woolooman
Munbilla
Wild Pig Creek Rd
Ipswich Boonah Rd
Mount Lindesay Hwy
Kalbar
Beaudesert Boonah Rd
Aratula
Beaudesert
Boonah
Dugandan
5
10
15
20
25
30
35
40
45
50
Toowoomba
Ipswich
Brisbane
Grandchester
Warwick
Goondiwindi
Narrabri
INLAND RAIL
ARTC
The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.
CALVERT TO KAGARU
Figure 10.2: Landscape character assessment
LEGEND
5 Chainage (km)
Localities
Existing rail
H2C project alignment
C2K project alignment
K2ARB project alignment
Major roads
Minor roads
LVIA study area (10 km from rail alignment)
Landscape Character Type
LCTA: Vegetated watercourses (River)
LCTB: Vegetated watercourses (Creeks & Channels
LCTC: Irrigated Croplands
LCTD: Dry Croplands and Pastures
LCTE: Vegetated Grazing
LCTF: Rural Settlement
LCTG: Transitional Landscapes
LCTH: Forested Uplands
LCTI: Rural Living
LCTJ: Suburban Living
0
7.5
15
km
Coordinate System: GDA 1994 MGA Zone 56
ARTC makes no representation or warranty and assumes no duty of care or other responsibility to any party as to the completeness, accuracy or suitability of the information contained in this GIS map. The GIS map has been prepared from material provided to ARTC by an external source and ARTC has not taken any steps to verify the completeness, accuracy or suitability of that material.
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Date: 20/03/2020
Paper: A4
Author: FFJV GIS
Scale: 1:300,000
Data Sources: FFJV
Map by: DMcP/MF/MEF/GN Z:\GIS\GIS_General\Tasks\Environment\390-ELE-201808061159_LVIA\C2K\390-ELE-201808061159_ARTC_Fig10.2_LandChar_C2K_v2.mxd Date: 22/03/2020 21:06

TABLE 10.7: LANDSCAPE CHARACTER TYPES AND AREAS

Landscape character type	Associated LCAs
LCT A: Vegetated Watercourses—Rivers	▸ Bremer River Vegetated Watercourse (LCA A1)
LCT B: Vegetated Watercourses—Creeks and Channels	▸ Plain Creek Vegetated Watercourse (LCA B1) ▸ Western Creek Vegetated Watercourse (LCA B2) ▸ Warrill Creek Vegetated Watercourse (LCA B3) ▸ Purga Creek Vegetated Watercourse (LCA B4) ▸ Bundamba Creek Vegetated Watercourse (LCA B5) ▸ Teviot Brook Vegetated Watercourse (LCA B6)
LCT C: Irrigated Croplands	▸ Rosewood Irrigated Croplands (LCA C1) ▸ Bremer River Irrigated Croplands (LCA C2) ▸ Mount Walker Irrigated Croplands (LCA C3) ▸ Warrill View Irrigated Croplands (LCA C4) ▸ Yamanto Irrigated Croplands (LCA C5) ▸ Willowbank Irrigated Croplands (LCA C6) ▸ Warrill Creek West Irrigated Croplands (LCA C7) ▸ Peak Crossing Irrigated Croplands (LCA C8) ▸ Warrill Creek East Irrigated Croplands (LCA C9) ▸ Hillside Irrigated Croplands (LCA C10) ▸ Teviot Brook Irrigated Croplands (LCA C11) ▸ Logan River West Croplands (LCA C12) ▸ Gleneagle Irrigated Croplands (LCA C13) ▸ Logan River East Croplands (LCA 1C4)
LCT D: Dry Croplands and Pastures	▸ Summerholm Dry Croplands and Pastures (LCA D1) ▸ Ashwell Dry Croplands and Pastures (LCA D2) ▸ Cottonvale Dry Croplands and Pastures (LCA D3) ▸ Lower Mount Walker Dry Croplands and Pastures (LCA D4) ▸ Thagoona Dry Croplands and Pastures (LCA D5) ▸ Mount Forbes Dry Croplands and Pastures (LCA D6) ▸ Willowbank Dry Croplands and Pastures (LCA D7) ▸ Mutdapilly Dry Croplands and Pastures (LCA D8) ▸ Warrill View Dry Croplands and Pastures (LCA D9) ▸ Purga Dry Croplands and Pastures (LCA D10) ▸ Limestone Ridges Dry Croplands and Pastures LCA D11) ▸ Goolman Dry Croplands and Pastures (LCA D12) ▸ Wyaralong Dry Croplands and Pastures (LCA D13) ▸ Deebing Heights Dry Croplands and Pastures (LCA D14) ▸ South Ripley Dry Croplands and Pastures (LCA D15) ▸ Undullah Road Dry Croplands and Pastures (LCA D16) ▸ Allenview Dry Croplands and Pastures (LCA D17) ▸ Veresdale Dry Croplands and Pastures (LCA D18)
LCT E: Vegetated Grazing	▸ Calvert Vegetated Grazing (LCA E1) ▸ Lower Mount Walker Vegetated Grazing (LCA E2) ▸ Mount Mort Vegetated Grazing (LCA E3) ▸ Mount Walker Vegetated Grazing (LCA E4) ▸ Mount Forbes Vegetated Grazing (LCA E5) ▸ Amberley Vegetated Grazing (LCA E6) ▸ Willowbank Vegetated Grazing (LCA E7) ▸ Mutdapilly Vegetated Grazing (LCA E8) ▸ Peak Crossing Vegetated Grazing (LCA E9) ▸ Limestone Ridges Vegetated Grazing (LCA E10) ▸ Milbong Vegetated Grazing (LCA E11)

Landscape character type	Associated LCAs
LCT F: Rural Settlement	▸ Grandchester (LCA F1) ▸ Calvert (LCA F2) ▸ Rosewood (LCA F3) ▸ RAAF Base Amberley (LCA F4) ▸ Peak Crossing (LCA F5) ▸ Harrisville (LCA F6)
LCT G: Transitional Landscapes	▸ New Oakleigh Coal Mine (LCA G1) ▸ Willowbank (LCA G2) ▸ Purga Quarry (LCA G3) ▸ Limestone Hills (LCA G4)
LCT H: Forested Uplands	▸ Marburg Range Forested Uplands (LCA H1) ▸ Little Liverpool Range Forested Uplands (LCA H2) ▸ Mount Mort Forested Uplands (LCA H3) ▸ Mount Walker Forested Uplands (LCA H4) ▸ Teviot Range Forested Uplands (LCA H5) ▸ Spring Mountain Forested Uplands (LCA H6) ▸ Cedar Vale Forested Uplands (LCA H7)
LCT I: Rural Living	▸ Thagoona Rural Living (LCA I1) ▸ Willowbank Rural Living (LCA I2) ▸ Deebing Heights Rural Living (LCA I3) ▸ Flagstone Rural Living (LCA I4) ▸ Cedar Grove Rural Living (LCA I5)
LCT J: Suburban Living	▸ Yamanto Urban Living (LCA J1) ▸ Ripley Valley Urban Living (LCA J2) ▸ Flagstone Urban Living (LCA J3).

10.5.3 Visual assessment

10.5.3.1 Viewpoint selection and visual audiences and receptors

Representative viewpoints were selected to provide a representative assessment of the potential landscape and visual impacts of the Project on a range of visual audiences and landscape settings at a range of distances from the alignment within the LVIA study area, including, but not limited, to the views experienced by the following:

- Local residents and workers in towns and rural settlements (including Rosewood, Calvert, Grandchester, Peak Crossing and Harrisville)
- 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
- Tourists on the 'Westlander' train
- Recreational users of the landscape, including those using walking trails within the Flinders–Goolman Conservation Estate and other nature reserves.

Twelve viewpoints have been selected to represent potential visual impacts across the LVIA study area. The selected viewpoints are summarised in Table 10.8 and shown on Figure 10.4. These are discussed further in Appendix I: Landscape and Visual Impact Assessment Technical Report.

TABLE 10.8: VIEWPOINT SELECTION

Viewpoint name	Anticipated approximate distance to alignment	Key visual receptors
Viewpoint 1: Rosewood–Warrill View Road, looking north-east	Alignment is approximately 100 m north-east of this viewpoint	Residents, visitors, workers and tourists travelling along Rosewood–Warrill View Road
Viewpoint 2: Paynes Road looking south	This viewpoint is approximately 60 m to the south of this viewpoint	Residents, visitors, workers and tourists travelling along Paynes Road
Viewpoint 3: Cunningham Highway, looking south-east to Flinders Peak	Alignment is approximately 400 m to the east of this viewpoint	Residents, visitors, workers and tourists travelling south along the Cunningham Highway
Viewpoint 4: Middle Road, looking north	Alignment is approximately 500 m to the west of this viewpoint and 1 km to the north	Residents, visitors, workers and tourists travelling Middle Road
Viewpoint 5: Ipswich–Boonah Road looking north-east, near properties 276 and 288	Alignment is approximately 170 m to the north-east of this viewpoint	Residents, visitors, workers and tourists travelling Ipswich–Boonah Road
Viewpoint 6: Peak Mountain View Park, near Peak Crossing State School and Peak Crossing township	Alignment is approximately 2.25 km east of this viewpoint	School patrons, residents of Peak Crossing and visitors, workers and tourists travelling Ipswich–Boonah Road and utilising the facilities (playground, amenities and barbeque/picnic facilities) at Peak Mountain View Park
Viewpoint 7: Ipswich–Boonah Road near Flinders Peak Winery	Alignment is approximately 1.65 km to the east of this viewpoint	Residents, visitors and guests of Flinders Peak Winery and visitors, workers and tourists travelling Ipswich– Boonah Road
Viewpoint 8: Cunningham Lookout off Rosewood–Warrill View Road east looking towards Flinders Peak	Alignment is approximately 17 km to the east of this viewpoint	Visitors to Cunningham Lookout and visitors, workers and tourists travelling Rosewood–Warrill View Road
Viewpoint 9: Flinders Peak	Alignment is approximately 4.70 km to the southwest of this viewpoint	Typical views of those walking the Flinders Peak trail in Flinders–Goolman Conservation Estate
Viewpoint 10: Washpool Road near rural properties 456–463	Alignment is approximately 300 m to the north of this viewpoint	Residents, visitors, and workers travelling Washpool Road
Viewpoint 11: Wild Pig Creek Road near rural properties 717–722	Alignment is approximately 100 m to the north-east of this viewpoint	Residents, visitors, and workers travelling Wild Pig Creek Road
Viewpoint 12: Undullah Road near 'Brooklands' rural property	Alignment is approximately 150 m to the north-east of this viewpoint	Residents, visitors, and workers travelling Undullah Road.

10.6 Potential impacts

The following sections include a summary of the potential landscape and visual amenity impacts that are associated with the Project and provides indicative imagery (e.g. from other similar projects) to represent potential Project infrastructure and construction activities. Further details are included in Appendix I: Landscape and Visual Impact Assessment Technical Report.

10.6.1 Project phases

10.6.1.1 Construction phase

The construction activities that will create a potential impact are detailed in Table 10.9, along with indicative imagery (e.g. from other similar projects) to represent potential Project infrastructure and construction activities of the Project.

TABLE 10.9: POTENTIAL LANDSCAPE AND VISUAL IMPACTS DURING CONSTRUCTION PHASE

Construction activities and infrastructure	Indicative imagery
Road and rail construction The construction of new haul roads and railway infrastructure within the Project site would convey construction traffic to and within the construction areas resulting in short-term impacts on landscape and visual values.	 Source: Lat27
Bridge construction Bridges, culverts and viaducts will be constructed over creeks, rivers, floodplains and existing road corridors. The construction of new infrastructure would convey construction traffic to and within the construction areas resulting in short-term impacts on landscape and visual values.	 Source: ARTC
Vegetation clearing and associated earthworks Much of the landscape is already cleared for agricultural purposes. 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 ballast from the rail corridor, rail tracks, and soil from cut and fill sites.	 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 rail corridor, where they will be stored prior to use. This includes clean ballast, soil stockpiles and rail materials including tracks and sleepers.	 Source: ARTC
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 activities and infrastructure	Indicative imagery
Construction workers The workforce on site for Project is estimated to peak at 620 full-time equivalents at around week 70. No construction camp is proposed as part of the Project.	 Source: ARTC
Construction traffic movement There will be increased traffic movement on existing State-controlled roads and side 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. 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 used 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: FFJV
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. The presence of these may result in short-term impacts on landscape and visual values.	 Source: FFJV
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, as follows: ▸ LDN004.8: Coventry Road—Satellite Offices ▸ LDN012.1: Paynes Road—Satellite Offices ▸ LDN021.8: Middle Road—Satellite Offices ▸ LDN026.0: Ipswich-Boonah Road—Satellite Offices ▸ LDN036.6: Washpool Road—Satellite Offices ▸ LDN045.5: Wild Pig Creek Road—Satellite Offices ▸ LDN053.8: Undullah Road—Site Offices and potential flash butt welding facility or batch plant 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. No worker accommodation camps are required.	 Source: FFJV

Construction activities and infrastructure	Indicative imagery
Drainage infrastructure including concrete piping Temporary and permanent drainage infrastructure will be present, including areas in close proximity to existing road corridors.	 Source: FFJV
Signage A large number of signs will be displayed around construction sites, especially where existing road corridors are in close proximity to the proposed rail corridor. Signage will include speed signs, stop signs, and safety signs and construction signage such as truck access signage.	 Source: FFJV

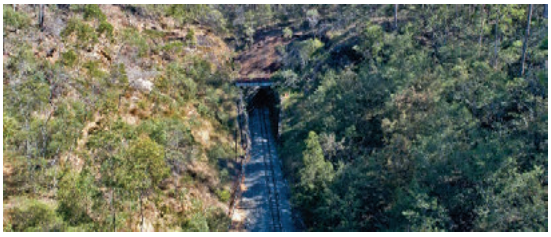
10.6.1.2 Operation phase

The operation activities that will create a potential impact, along with indicative imagery (e.g. from other similar projects) to represent potential permanent Project infrastructure are detailed in Table 10.10.

TABLE 10.10: POTENTIAL LANDSCAPE AND VISUAL IMPACTS DURING OPERATION PHASE

Operation activities and infrastructure	Indicative imagery
Lighting infrastructure Permanent lighting infrastructure will comprise security lighting in key locations including tunnel portals. There will also be standard flashing lights located at all public level crossings. Emergency lighting will also be provided to rail tunnels in accordance with AS 2293.1, including adjacent to the egress walkway and exit signs. Street lighting will be provided to comply with road design standards.	 Source: ARTC
Freight trains Trains will, at times, be visible in the landscape from existing roads and residential properties. The current assumption is that there will be on average 33 services per day in 2026 (expected to increase up to 47 train services 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 subject to further approvals. It is expected to take between one and approximately 2.5 minutes for a train to pass. The train will have headlights. *Note: this assessment is based on the allowance for 1,800 m long trains, including double stacking. The provision of 3,600 m trains will be subject to a future approval process.*	 Source: ARTC  Source: ARTC

Operation activities and infrastructure	Indicative imagery
Road and rail bridges These bridges are an obvious built landmark for motorists and are will occur over rivers, creeks, rail tracks and roads. The Project proposes 27 bridges including: ▸ 16 rail bridges over waterways ▸ 3 rail bridges over road ▸ 5 bridges over waterways and roads ▸ 3 road bridges over rail. These are typically proposed as single track, Super-T girder type structures. Key rail bridges are proposed to be: ▸ Western Creek #1 Rail Bridge: 966 m long ▸ Western Creek #2 Rail Bridge: 782 m long ▸ Bremer River Rail Bridge: 684 m long ▸ Upper Tributary Ebenezer Creek Rail Bridge: 207 m long ▸ Warrill Creek Rail Bridge: 713 m long ▸ Purga Creek #1 Rail Bridge: 621 m long ▸ Purga Creek #2 Rail Bridge: 759 m long ▸ Ipswich–Boonah Road Rail Bridge: 88 m long ▸ Mount Flinders Road Rail Bridge: 69 m long ▸ Sandy Creek Rail Bridge: 115 m long ▸ Upper Tributary #1 Purga Creek Rail Bridge: 115 m long ▸ Upper Tributary #2 Purga Creek Rail Bridge: 138 m long ▸ Washpool Road Rail Bridge: 69 m long ▸ Upper Tributary #3 Purga Creek Rail Bridge: 98 m long ▸ Upper Tributary #4 Purga Creek Rail Bridge: 299 m long ▸ Upper Tributary #3 Dugandan Creek Rail Bridge: 184 m long ▸ Upper Tributary #1 Dugandan Creek Rail Bridge: 138 m long ▸ Dugandan Creek #1 Rail Bridge: 161m long ▸ Dugandan Creek #2 Rail Bridge: 230 m long ▸ Wild Pig Creek Rail Bridge: 115 m long ▸ Upper Tributary #2 Dugandan Creek Rail Bridge: 161 m long ▸ Upper Tributary #1 Woollaman Creek Rail Bridge: 207 m ▸ Upper Tributary #2 Woollaman Creek Rail Bridge: 230 m ▸ Teviot Brook Rail Bridge: 722 m long. Key road bridges are proposed to be: ▸ Mount Forbes Road Bridge: 72 m long ▸ Cunningham Highway Bridge: 53 m long ▸ Undullah Road Bridge: 70 m long.	**Road bridge over rail**  Source: Lat27 (Visualisation) **Rail bridge over road**  Source: Lat27 (Visualisation) **Rail bridge over waterway**  Source: Lat27 (Visualisation)
Level crossings Crossings occur where the rail alignment intersects a road. Infrastructure includes rail tracks, crossing protection measures (as required) and signage. The Project has eight level crossings on formed (public) roads, one of which (at M Hines Road) is passive and seven are active (with lights and barriers) level crossings. Active level crossings are located at: ▸ Hayes Road at approx. Ch 4.4 km ▸ Middle Road at approx. Ch 21.8 km ▸ Dwyers Road at approx. Ch 32.3 km ▸ Glencairn Road at approx. Ch 20.0 km ▸ Washpool Road at approx. Ch 34.4 km ▸ Wild Pig Creek Road at approx. Ch 45.5 km ▸ Wild Pig Creek Road at approx. Ch 50.0 km. The final number of occupational (private) crossings within private property will be determined during the detailed design phase.	**Passive level crossing**  Source: FFJV **Active level crossing**  Source: FFJV

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 waterway crossing. These comprise: ▸ 69 reinforced concrete pipes and 10 reinforced concrete box culverts along the rail alignment ▸ 46 reinforced concrete pipes and 7 reinforced concrete box culverts along roadways ▸ 2 existing culverts are to be extended.	 Source: ARTC
Embankments, abutments and retaining walls Embankments and mounding will be created to accommodate the proposed rail infrastructure, this includes: ▸ 30 fill sections totalling approximately 28.32 km, ranging from around 10 m to 1,620 m in length with maximum fill depths of up to 25 m and average fill depths of 9 m.	 Source: Lat27
Cuttings with associated retaining walls Cuts will be created through areas of elevated landform, for example in the Teviot Range, to accommodate the proposed rail infrastructure, this includes: ▸ 30 cuttings totalling approximately 18.88 km, varying in length from 120 m up to 1,900 m; maximum cut depths of up to 42.95 m. A range of treatments may be used across the Project for the stabilisation of cut slopes including shotcrete (where batter 1V:1H, that is, the height of the slope is equal to the length of the slope); 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
Tunnel with associated tunnel portals and service buildings A 1,015 m tunnel will be created through the Teviot Range to accommodate the proposed rail infrastructure. At each tunnel entry, a portal will be created. It is also noted that venting will occur at this point with potential to create an exhaust plume. Service buildings will be located at both portals. No ventilation stacks are proposed within the Project. Tunnel infrastructure has the potential to impact on landscape and visual values.	 Source: ARTC

Operation activities and infrastructure	Indicative imagery
Fencing Fencing will be provided along the rail corridor, where required. The alignment will be fenced with 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. The Project includes five fauna crossings for locations where bridge crossings will be constructed over waterways. A dedicated fauna corridor crossing will also be constructed as a canopy bridge and will require koala fencing to funnel fauna, including koalas, towards the crossing. Further information about potential impacts on flora and fauna is provided in EIS Appendix J: Terrestrial and Aquatic Ecology Technical Report.	  Source: FFJV

10.6.2 Landscape, visual and lighting impacts

The following sections include a summary of the impact assessment for landscape and visual amenity associated with the Project (refer Section 10.4.2). Further details are included in Appendix I: Landscape and Visual Impact Assessment Technical Report.

10.6.2.1 Landscape

Ten LCTs have been identified within the LVIA study area. Eight LCTs are intersected by the alignment:

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

Two other LCTs are present in the LVIA study area that are not directly intersected by and lie at some distance from the alignment; as such, no meaningful impacts are anticipated, and they are not considered further:

- LCT I: Rural Living
- LCT J: Suburban Living.

The eight LCTs intersected by the Project are described in Table 10.11 to Table 10.18. 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 consequent likely significance of that effect on landscape amenity. The location of these LCTs in relation to the viewpoints discussed in Section 10.5.3.1 and shown on Figure 10.2.

Construction impacts on landscape character are temporary and result from things such as the removal of vegetation, which persist into the operational phase. 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.

Landscape character type A

TABLE 10.11: LANDSCAPE IMPACT ASSESSMENT OF LCT A: VEGETATED WATERCOURSES—RIVERS

Type A: Vegetated Watercourses—Rivers

Landscape baseline assessment	
Location and boundaries	This landscape type is located in the north-western extent of the LVIA study area, associated with the Bremer River. There is one LCA of this type in the LVIA study area—the *Bremer River Vegetated Watercourse* (LCA A1).
Typical character images	
	     
Key characteristics	▸ The majority of the Bremer River system exists on a gently undulating landscape. ▸ The alignment crosses the Bremer River where it meanders through a large alluvial floodplain. The river channel has a slight slope, so water movement is usually quite slow. ▸ The alluvial plain surrounding the mid-reaches of the Bremer River receives large volumes of surface water run-off from surrounding steep ranges during rainfall events, so waters can rise rapidly. ▸ Low-lying areas contain numerous freshwater wetlands scattered throughout the floodplain. ▸ Typically, well-vegetated riverbanks with mature Forest Red Gums (*Eucalyptus tereticornis*) and Paperbark (*Melaleuca spp.*) fringing woodland creating a visually interesting natural character. ▸ Not the subject of any landscape planning designations but likely to be valued locally for scenic amenity.
Precedent modifications and infrastructure elements	▸ Natural landscape with few built infrastructure elements. ▸ Some areas of the Upper Bremer River have levees to enable expansion of agricultural production. ▸ Existing rail and road bridge crossings across the river allowing views of the river.
Landscape character sensitivity assessment	▸ High degree of perceived naturalness, with little evidence of human uses and waterway modifications. ▸ Significant fringing vegetation on the riverbanks and floodplains contain views to and from the waterways, reducing the sensitivity. ▸ 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 (due to limited availability of publicly accessible land e.g. parks along the Bremer River), so is largely valued at the local level. Additionally, localised parts of the LCT are already affected by the presence of road and rail infrastructure (albeit some of which is disused) so it is considered to have capacity to accommodate further change.

Type A: Vegetated Watercourses—Rivers

Impact assessment	
Magnitude of change assessment	▸ The proposed alignment will cross the Bremer River (LCA A1), approximately 4.5 km southwest of Rosewood. ▸ Construction of new bridge and railway infrastructure will result in highly localised removal of vegetation. ▸ During operation the intrusion of built infrastructure within what is currently a relatively un-developed riparian landscape will be noticeable. ▸ This location and the river crossing will only be visible from Rosewood–Warrill View Road, primarily impacting local rural residents. ▸ The overall magnitude of change is predicted to be **moderate**.
Significance of effect	▸ The effect of the Project on LCT A: Vegetated Watercourses—Rivers is **low**.

Landscape character type B

TABLE 10.12: LANDSCAPE IMPACT ASSESSMENT OF LCT B: VEGETATED WATERCOURSES—CREEKS AND CHANNELS

Type B: Vegetated Watercourses—Creeks and Channels

Landscape baseline assessment	
Location and boundaries	This landscape type is located throughout many parts of the LVIA study area, associated with the numerous small tributaries of the Bremer River and Logan River. There are six LCAs of this type—the Plain Creek Vegetated Watercourse (LCA B1); Western Creek Vegetated Watercourse (LCA B2); Warrill Creek Vegetated Watercourse (LCA B3); Purga Creek Vegetated Watercourse (LCA B4); Bundamba Creek Vegetated Watercourse (LCA B5); and Teviot Brook Vegetated Watercourse (LCA B6).
Typical character images:	
     	
Key characteristics	▸ LCT B Includes creeks and low-lying effluent channels that form part of Bremer River and Logan River catchments, conveying large amounts of runoff away from the steep surrounding ranges in rainfall events. ▸ Remnant areas of flood-dependent forest/woodlands and wetlands.
Precedent modifications and infrastructure elements	▸ Relatively natural landscape with minimal infrastructure, comprising road and existing rail bridges over the main creek channels. ▸ Generally, fringing vegetation has been retained and creates a buffer between adjacent agricultural areas. ▸ Telecommunication infrastructure, including telegraph poles, typically follows road alignments through these landscapes.

Type B: Vegetated Watercourses—Creeks and Channels	
Landscape character sensitivity assessment	▸ **Moderate** degree of perceived naturalness, with some instances of evidence of human uses and modifications to the waterways. ▸ Significant fringing vegetation contains views to and from creek lines. ▸ 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 which is disused) so it is considered to have capacity to accommodate further change.
Impact assessment	
Magnitude of change assessment	▸ The proposed alignment traverses rural and grazing lands, introducing new rail infrastructure into the rural setting and will include 21 creek crossings, where the alignment crosses Western Creek (in B2), Ebenezer and Warrill Creeks (B3) Purga and upper tributary Purga Creek (B4), Sandy, Dugandan and Wild Pig Creeks and Teviot Brook (Ickkaybin) (B6). ▸ New bridge and railway infrastructure, as well as associated drainage infrastructure (e.g. culverts) will result in localised removal of vegetation and introduction of built elements into the natural landscape. ▸ Views to creek and floodplain infrastructure within these LCTs will be evident from Waters Road, Coveny Road, Rosewood–Warrill View Road, the Cunningham Highway, Glencairn Road, Ipswich–Boonah Road, Mount Flinders Road, Washpool Road, Wild Pig Creek Road and Undullah Road. ▸ The overall magnitude of change is predicted to be **moderate** due to the number of incursions into this landscape over the LVIA study area.
Significance of effect	▸ The effect of the Project on LCT B: Vegetated Watercourses—Creeks and Channels is **low**.

Landscape character type C

TABLE 10.13: LANDSCAPE IMPACT ASSESSMENT OF LCT C: IRRIGATED CROPLANDS

Type C: Irrigated Croplands

Landscape baseline assessment	
Location and boundaries	This landscape type is located within the alluvial valleys and fertile floodplains of the Bremer River and Logan River catchments. There are 14 LCAs of this type located across the LVIA study area—the Rosewood Irrigated Croplands (LCA C1); Bremer River Irrigated Croplands (LCA C2); Mount Walker Irrigated Croplands (LCA C3); Warrill View Irrigated Croplands (LCA C4); Yamanto Irrigated Croplands (LCA C5); Willowbank Irrigated Croplands (LCA C6); Warrill Creek West Irrigated Croplands (LCA C7); Peak Crossing Irrigated Croplands (LCA C8); Warrill Creek East Irrigated Croplands (LCA C9); Hillside Irrigated Croplands (LCA C10); Teviot Brook Irrigated Croplands (LCA C11); Logan River West Croplands (LCA 12); Gleneagle Irrigated Croplands (LCA 13); Logan River East Croplands (LCA 14). These 14 LCAs are typically located in areas with highly fertile vertosol soils.
Typical character images	
	
Key characteristics	▸ Extensively developed agricultural areas. ▸ Irrigation channels occur in flatter areas, particularly around the areas of Radford, Harrisville and Warrill View. ▸ Typically located in areas with highly fertile vertosol soils. ▸ The vertosols are typically cracking clay soils with high nutrient levels that can support intensive agriculture. ▸ Extensive large and relatively flat open fields of irrigated cropland with a verdant character contrasting with adjoining dryland areas. ▸ Landscape substantially cleared of vegetation, except at the periphery, along creek-lines (LCT B) on the skyline and local roads. ▸ In addition to irrigated production, current land use activities include grazing, dryland farming, irrigated and intensive industries such as feedlots, forestry and recreation. ▸ LCT F: Rural Settlement lying adjacent to and strongly associated with this landscape type.
Precedent modifications and infrastructure elements	▸ To enhance agricultural productivity, works have been built on the floodplain to improve land used for grazing, dryland cropping and irrigated cropping. ▸ Typically, works such as channels have been constructed to manage and store irrigation and domestic water. These channels are particularly evident along Warrill Creek near Radford, Harrisville and Kalbar.

Type C: Irrigated Croplands	
Landscape character sensitivity assessment	▸ LCT C is predominantly visually open, with a sparsely settled rural character (farmsteads and agricultural buildings) 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 adjacent waterways. ▸ 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 where new rail infrastructure is being introduced will be on private land. ▸ Four areas of this landscape type will be affected by the alignment: C2 (Bremer River); C8 (Peak Crossing); C10 (Hillside); and C11 (Teviot Brook). ▸ Due to the transient nature of views from the roads, the landholders of affected properties will be most affected. ▸ Impact on private land and valuable irrigated areas will be most evident near Peak Crossing, where the alignment crosses C8: Peak Crossing and C10: Hillside. Several residential properties will be resumed in these areas. ▸ During construction, these areas will be affected by the presence of plant and associated earthworks. Vegetation clearance will be limited as much of this landscape has already been extensively cleared. ▸ During operation the new earthwork infrastructure within this landscape will contrast with the current open landscape character introducing embankments of up to and over 10 m into the open landscape with associated permanent rail infrastructure. ▸ The overall magnitude of change is predicted to be **high**.
Significance of effect	▸ The effect of the Project on LCT C: Irrigated Croplands is **moderate**.

Landscape character type D

TABLE 10.14: LANDSCAPE IMPACT ASSESSMENT OF LCT D: DRY CROPLANDS AND PASTURES

Type D: Dry Croplands and Pastures

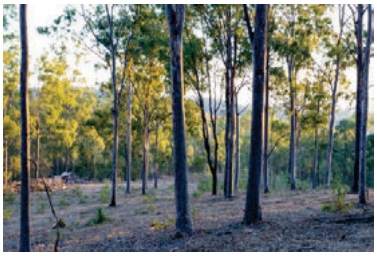
Landscape baseline assessment	
Location and boundaries	This landscape type is found across the LVIA study area and is largely defined by extensively cleared, often undulating, open rural areas utilised for agriculture and livestock production. There are 18 LCAs: the Summerholm Dry Croplands and Pastures (LCA D1); Ashwell Dry Croplands and Pastures (LCA D2); Cottonvale Dry Croplands and Pastures (LCA D3); Lower Mount Walker Dry Croplands and Pastures (LCA D4); Thagoona Dry Croplands and Pastures (LCA D5); Mount Forbes Dry Croplands and Pastures (LCA D6); Willowbank Dry Croplands and Pastures (LCA D7); Mutdapilly Dry Croplands and Pastures (LCA D8); Warrill View Dry Croplands and Pastures (LCA D9); Purga Dry Croplands and Pastures (LCA D10); Limestone Ridges Dry Croplands and Pastures LCA D11); Goolman Dry Croplands and Pastures (LCA D12); Wyaralong Dry Croplands and Pastures (LCA D13); Deebing Heights Dry Croplands and Pastures (LCA D14); South Ripley Dry Croplands and Pastures (LCA D15); Undullah Road Dry Croplands and Pastures (LCA D16); Allenview Dry Croplands and Pastures (LCA D17); and the Veresdale Dry Croplands and Pastures (LCA D18).
Typical character images	
     	
Key characteristics	▸ Land use is predominately rural, characterised by dryland cropping and pastoral properties for livestock production on elevated undulating land with localised irrigated cropping on low-lying alluvial valleys associated with ephemeral branching creek lines; these include the upper reaches of Western Creek, the Bremer River, Purga Creek, Sandy Creek, Wild Pig Creek and Teviot Brook. ▸ Mixed soils including sodosols, dermosols, tenosols and kurosols resulting in localised variations in character. ▸ Sodosols have a gravelly, sandy character, often exposed in areas and vulnerable to tunnel and gully erosion. ▸ Tenosols have generally shallow, stony soils with low fertility and low water-holding capacity. ▸ Dermosols are associated with previous volcanic activity and are found in higher rainfall regions here they are used for intensive crop production. ▸ Kurosols are strongly acidic and occur predominately in upland regions with higher rainfall. ▸ LCT D is typically undulating occupying the land lying between the low-lying alluvial floodplains in valleys and the steep Little Liverpool and Teviot Ranges to the west and east of the LVIA study area respectively.

Type D: Dry Croplands and Pastures	
Key characteristics (continued)	▸ Views are contained by landform and vegetation in adjacent LCTs with particularly strong skylines created against LCT H: Forested Uplands except where views are contained by roadside or creek-side vegetation. ▸ Sparsely settled landscape, with only homesteads and cottages. ▸ Harmonious, but fairly typical rural character, which is valued at a local level by local communities and visitors.
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	▸ LCT D 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**.
Impact assessment	
Magnitude of change assessment	▸ Impact on private land, including agricultural and pastoral areas will be evident in the vicinity of Ebenezer, Willowbank, Washpool, Undullah and Kagaru (LCA D6, D7, D12, D16 and D17). The Project will be introducing new infrastructure into what is a relatively intact rural environment. ▸ Impacts within this LCT will be due to localised vegetation removal, major earthworks including significant cuts and embankments of up to 10 m and proposed road and creek bridges. ▸ Overall, therefore, the impact on this LCT is up to **high**.
Significance of effect	▸ The effect of the Project on LCT D: Dry Croplands and Pastures is **moderate**.

Landscape character type E

TABLE 10.15: LANDSCAPE IMPACT ASSESSMENT OF LCT E: VEGETATED GRAZING

Type E: 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 11 LCAs of this type in the LVIA study area: the Calvert Vegetated Grazing (LCA E1); Lower Mount Walker Vegetated Grazing (LCA E2); Mount Mort Vegetated Grazing (LCA E3); Mount Walker Vegetated Grazing (LCA E4); Mount Forbes Vegetated Grazing (LCA E5); Amberley Vegetated Grazing (LCA E6); Willowbank Vegetated Grazing (LCA E7); Mutdapilly Vegetated Grazing (LCA E8); Peak Crossing Vegetated Grazing (LCA E9); Limestone Ridges Vegetated Grazing (LCA E10); and the Milbong Vegetated Grazing (LCA E11).
Typical character images	
  	
Key characteristics	▸ Very sparsely settled landscape with large land holdings (stations) and scattered farmsteads. ▸ Comprises pastureland with broad areas of open wooded remnant and regrowth vegetation, typically denser along creek and drainage lines and hill tops. ▸ Roads are typically straight in character and unsealed gravel. Views are usually contained by roadside shelter belts. ▸ Harmonious, but fairly typical rural character.
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	▸ LCT E is predominantly visually contained, with a sparsely settled rural character and little large-scale infrastructure. ▸ Long-distance 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	▸ Only one area of this LCT is directly affected by the alignment E5: Ebenezer. ▸ The Project will be introducing new infrastructure into what is a relatively intact rural environment. Impact on private land, including vegetated pastoral areas will be evident near Ebenezer (E5). ▸ Impacts during construction will be due to vegetation removal, major earthworks (e.g. cuts and embankments) and proposed road and creek bridges. ▸ Overall, therefore, the impact on this LCT is **high**.
Significance of effect	▸ The effect of the Project on LCT E: Vegetated Grazing is **moderate**.

Landscape character type F

TABLE 10.16: LANDSCAPE IMPACT ASSESSMENT OF LCT F: RURAL SETTLEMENT

Type F: Rural Settlement

Landscape baseline assessment	
Location and boundaries	Six rural settlements are located within the LVIA study area. They include the towns of Grandchester, Rosewood, Peak Crossing and Harrisville, the small settlement of Calvert and RAAF Base Amberley. Accordingly, there are six associated LCAs: ▸ Grandchester (LCA F1) ▸ Calvert (LCA F2) ▸ Rosewood (LCA F3) ▸ RAAF Base Amberley (LCA F4) ▸ Peak Crossing (LCA F5) ▸ Harrisville (LCA F6). Note: While Grandchester is located within the LVIA study area, it lies closest to the H2C alignment so the impact on this LCT is primarily considered in the H2C LVIA.
Typical character images	
	     
Key characteristics	▸ Small rural towns, villages and communities comprise low-scale built form with limited services. ▸ Typically, single-storey buildings of varying ages and variable condition. ▸ Larger settlements (Rosewood, Peak Crossing and Harrisville) have social infrastructure including parks, public schools and sport facilities. ▸ Remnants of the historic railway are located throughout the LVIA study area, most evident in LCT F. ▸ Grandchester (LCA F1) is a small rural town located southwest of Rosewood. The existing Main Line runs through the centre of town. The historic Grandchester Station is a local tourist destination. ▸ Calvert (LCA F2) is a small rural community. The existing railway line runs alongside the town to the north of the rural residential properties. ▸ Rosewood (LCA F3) is a small town with services including three schools, located in the northern extent of the LVIA study area. Rosewood is the terminus of the Ipswich and Rosewood railway line, providing commuter services to Ipswich and Brisbane. ▸ RAAF Base Amberley (LCA F4) is located on the outskirts of Ipswich and employs over 5,000 people. ▸ Peak Crossing (LCA F5) is a small rural town located 20 km south of Ipswich. ▸ Harrisville (LCA F6) is a small rural town 7 km southwest of Peak Crossing.
Precedent modifications and infrastructure elements	▸ Highly modified for urban land uses, including clearing of remnant vegetation and levelling of land for construction. ▸ Presence of extensive areas of residential buildings and support buildings. ▸ Roads, railways and bridges, including infrastructure associated with the Fassifern Branch of the Dugandan railway. ▸ Telecommunication infrastructure including telegraph poles.

Type F: Rural Settlement	
Landscape character sensitivity assessment	▸ LCT F is predominantly enclosed, with a settled rural character. Smaller rural communities such as Calvert are very sparsely settled with no services. ▸ Street trees, remnant vegetation and planting in gardens provide some screening effect. ▸ The landscape sensitivity of these settlements is considered to be **moderate**. While not valued within planning schemes for their landscape or scenic amenity, these settlements have a distinctive character with some elements of interest (such as heritage 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 alignment does not pass directly through any of these settlements; however, it does pass alongside Calvert within the existing railway corridor. ▸ Rural residents of Calvert are situated close to existing railway infrastructure and will be affected by the Project. ▸ Rosewood is approximately 4.0 km from the alignment and will not be impacted. ▸ RAAF Base Amberley is approximately 6.8 km from the alignment, and it is considered there will be no impact due to its distance from the alignment. ▸ Distant views to the alignment may be possible from Peak Crossing; however, these views are limited due to the screening vegetation of Purga Creek. ▸ Harrisville is approximately 8.0 km from the alignment, and it is considered there will be no impact due to its distance from the alignment. ▸ Grandchester is located 6.0 km from the alignment. As the H2C project passes directly through the town of Grandchester, impacts on Grandchester have been assessed as part of the H2C Project EIS. ▸ The impact on this LCT would be indirect is considered to be **negligible**.
Significance of effect	▸ The effect of the Project on LCT F: Rural Settlement is **low**.

Landscape character type G

TABLE 10.17: LANDSCAPE IMPACT ASSESSMENT OF LCT G: TRANSITIONAL LANDSCAPES

Type G: Transitional Landscapes

Landscape baseline assessment	
Location and boundaries	This landscape is found in discrete areas across the LVIA study area, typically in locations where there are natural extractive resources (coal and limestone). The boundary is largely defined by land use changes (extensively cleared, open cut mines and industrial precincts) and areas zoned for longer-term changes. There are four LCAs of this type: the New Oakleigh Coal Mine (LCA G1); Willowbank (LCA G2); Purga Quarry (LCA G3); and Limestone Hills (LCA G4).
Typical character images	
	  
Key characteristics	▸ Landscapes that are undergoing modification either as a result of extractive processes or due to zoning for future redevelopment. ▸ Mining is a visually prominent landscape type including for coal (G1: New Oakleigh Mine (New Hope Coal), sand and gravel (G3: Purga Quarry) or Flinders dolomite (G4: Limestone Hills). ▸ This landscape has been subjected to intensive mining activities that have significantly changed the visual character of the landscape. ▸ Presence of structures associated with land use, including power lines. ▸ Generally, the most visible aspects of this landscape are the spoil dumps, the rehabilitated mounds and the associated infrastructure. ▸ Access into this landscape is generally restricted to workers with security fencing around site boundaries. ▸ Views within and into the mined areas are typically restricted by the boundary landform and vegetation. ▸ Other parts of this landscape currently appear as other adjoining rural land uses but have been included in this category because of zoning for future industrial development i.e. LCT G2: Willowbank.
Precedent modifications and infrastructure elements	▸ Significant modification to topography with large cut areas bounded by large spoil dumps. ▸ Removal of vegetation, although remnant vegetation stands remain within and around site boundaries and along road corridors.

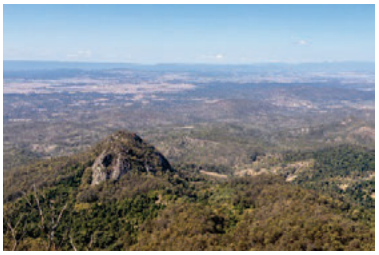
Landscape character sensitivity assessment	▸ The overall sensitivity of this landscape is considered to be **negligible**. This is because:
	  ▸ The landscape a highly modified and is not valued for its scenic quality
	  ▸ The LCA that would be affected by the alignment is G2: Willowbank, which largely falls within the Ebenezer Regional Industrial Area, an industrial area of regional, State and national significance
	  ▸ These areas typically fall within zones allocated for mining leases, potential key resource areas and mineral development licences/extractive resources
	  ▸ Modification within this area is consistent with the transient character of the landscape and could readily accommodate additional change.

Impact assessment	
Magnitude of change assessment	▸ The alignment runs through land within the Ebenezer Regional Industrial Precinct and close to the Purga Quarry. ▸ Impacts within this LCT will be due to localised vegetation removal, major earthworks (e.g. cuts and embankments) and proposed road and creek bridges. ▸ Overall, therefore, the impact on this LCT is **moderate**.
Significance of effect	▸ The effect of the Project on LCT G: Transitional Landscapes is **low**.

Landscape character type H

TABLE 10.18: LANDSCAPE IMPACT ASSESSMENT OF LCT H: FORESTED UPLANDS

Type H: Forested Uplands

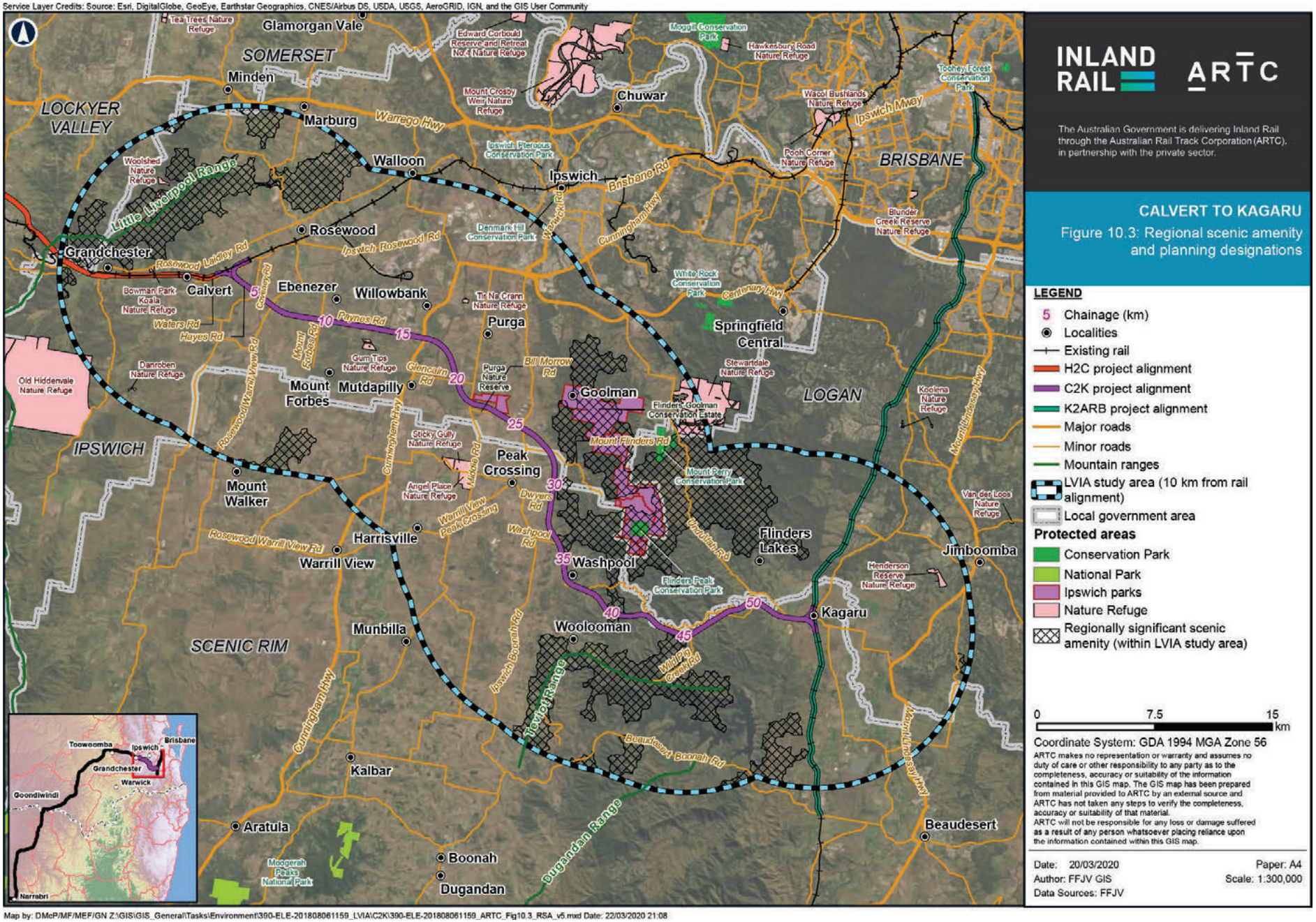
Landscape baseline assessment	
Location and boundaries	This LCT comprises large tracts of elevated, undulating areas primarily associated with the Teviot Range in the east, Little Liverpool Range in the west and Mount Walker in the centre of the LVIA study area. There are seven LCAs of this type: the Marburg Range Forested Uplands (LCA H1); Little Liverpool Range Forested Uplands (LCA H2); Mount Mort Forested Uplands (LCA H3); Mount Walker Forested Uplands (LCA H4); Teviot Range Forested Uplands (LCA H5); Spring Mountain Forested Uplands (LCA H6); and the Cedar Vale Forested Uplands (LCA H7).
Typical character images	     
Key characteristics	▸ Elevated and undulating topography, typically above 100 m AHD. ▸ Areas of very steep slopes. ▸ Distinctive landform including characteristic mountain peaks, such as Flinders Peak, Mount Walker, Mount Blaine and other prominent volcanic extrusions in the Teviot Range and ridgelines, such as the Little Liverpool Range. ▸ Flinders Peak is the highest point within the Teviot Range at 679 m AHD. ▸ Incised dry creek valleys are evident where waterways drain the elevated area. ▸ Typically, eucalyptus woodland or forest but microclimatic variation includes areas of other vegetation including rainforest fragments. ▸ Generally, an enclosed landscape but where vegetation has been cleared or where rock outcrops are present extensive views out can be achieved, particularly at the summit of Flinders Peak from which extensive 360-degree panoramic views can be obtained across Brisbane, Logan and the Fassifern Valley. ▸ Highly visible landscape type throughout the LVIA study area forming a distinctive backdrop to the adjoining rural landscape. ▸ Much of this LCT (including peaks of the Teviot Range, Little Liverpool Range and Mount Walker) are considered to have high scenic amenity and are included on the Regional Significant Scenic Amenity overlay (as shown in Figure 10.3). ▸ The alignment transects land within the regionally significant Flinders–Karawatha wildlife corridor parts of which were listed on the Register of the National Estate (noting this is now a non-statutory archive). This corridor is recognised as one of QLD's most important biodiversity corridors, connecting Mount Barney National Park to Karawatha Forest via Knapp Creek, Flinders Peak and Mount Perry Conservation Parks.

Type H: Forested Uplands	
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. ▸ Some telecommunications towers and powerlines in elevated locations.
Landscape character sensitivity assessment	▸ LCT H has little capacity to accommodate development as this would require vegetation clearance and earthworks to level the ground, 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 regionally significant, being recognised for their scenic amenity values in *ShapingSEQ* (peaks of Teviot Range, Little Liverpool Range and Mount Walker). ▸ Therefore, the landscape sensitivity of LCT H is considered to be **high**.
Impact assessment	
Magnitude of change assessment	▸ The alignment transects and runs adjacent to LCA H5: Teviot Range Forested Uplands, including land within the Flinders–Karawatha biodiversity corridor. No other LCAs of this type are directly affected. ▸ The key impact on this landscape type will be as a result of clearing due to proposed earthworks to facilitate the construction of the railway corridor, embankments and tunnels. ▸ A portion of the alignment within the Teviot Range and the biodiversity corridor will be tunnelled, so will not directly affect the surface reducing the impact of the Project locally. However, during construction the presence of plant in the area undertaking tunnel boring and other earthworks will intrude on the natural scenic and perceptual qualities of the landscape. ▸ Following construction, the key impacts would result from the presence of tunnel portals and treatment of the cut batters leading to the tunnel as well as localised cut and fill (embankment). The introduction of significant rail infrastructure into this natural landscape would be an important change, albeit over a relatively localised area at the southern boundary of this LCT. ▸ Elsewhere this landscape type is not within proximity to the alignment; therefore, the impacts on this landscape type would be indirect/not applicable to other LCAs. ▸ Due to tunnelling under the ground level, it is considered that impacts on this landscape have been minimised. While the impacts on character will be noticeable from elevated vantage points such as Flinders Peak, the railway will eventually become another element in the rural landscape. This results in a **moderate** magnitude of change.
Significance of effect	▸ The effect of the Project on LCT H: Forested Uplands is **high**.

10.6.2.2 Visual

Viewpoint assessment

Twelve viewpoints have been selected within the LVIA study area to represent potential visual impacts across the LVIA study area. The identified viewpoints are shown on Figure 10.4 and the assessment of each is described in Table 10.19 to Table 10.34.


Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
INLAND RAIL
ARTC
The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.
CALVERT TO KAGARU
Figure 10.3: Regional scenic amenity and planning designations
LEGEND
5 Chainage (km)
Localities
Existing rail
H2C project alignment
C2K project alignment
K2ARB project alignment
Major roads
Minor roads
Mountain ranges
LVIA study area (10 km from rail alignment)
Local government area
Protected areas
Conservation Park
National Park
Ipswich parks
Nature Refuge
Regionally significant scenic amenity (within LVIA study area)
0 7.5 15 km
Coordinate System: GDA 1994 MGA Zone 56
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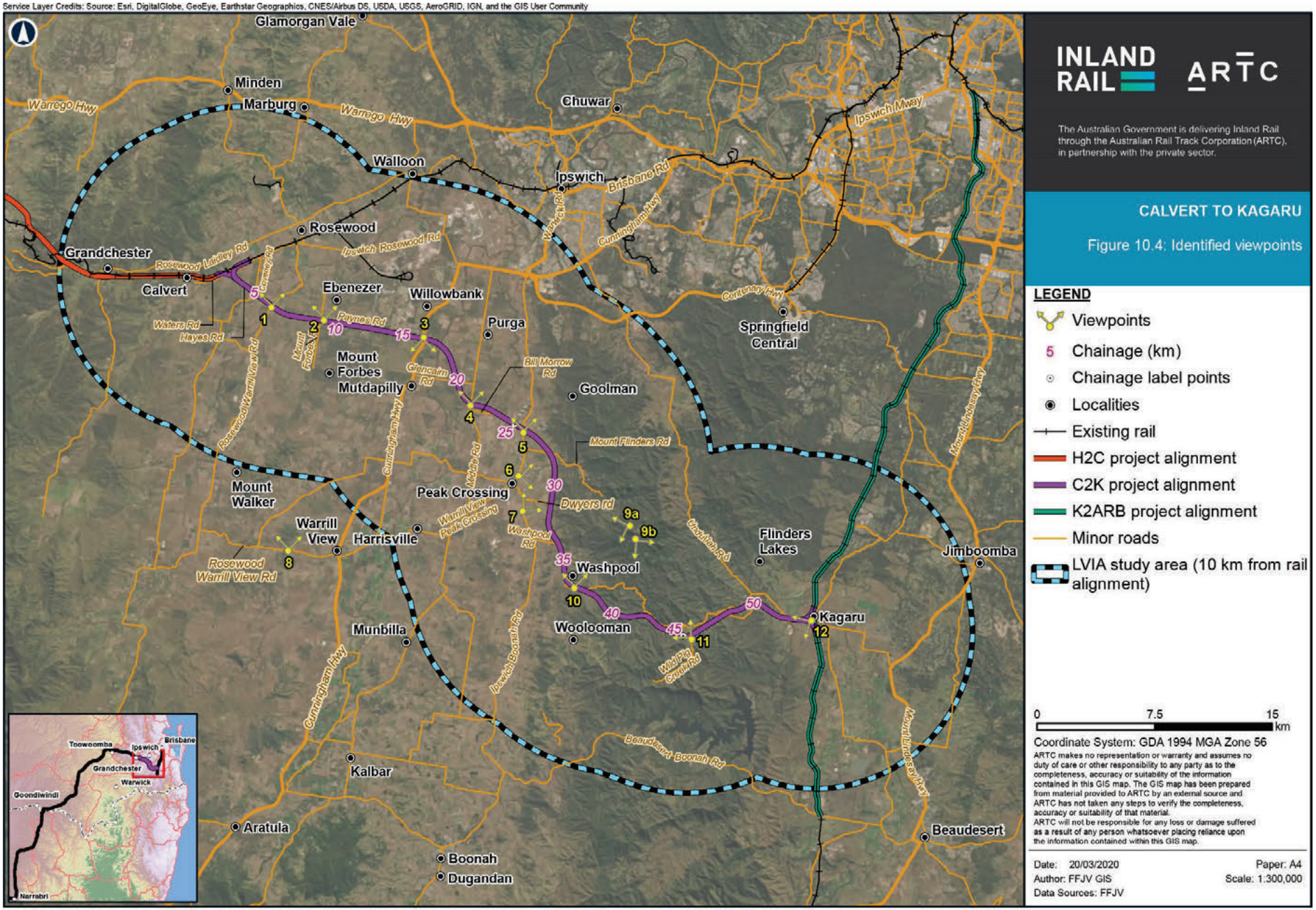
Date: 20/03/2020
Author: FFJV GIS
Data Sources: FFJV
Paper: A4
Scale: 1:300,000
SOMERSET
LOCKYER VALLEY
SCENIC RIM
IPSWICH
BRISBANE
LOGAN
Glamorgan Vale
Minden
Marburg
Chuwar
Walloon
Ipswich
Rosewood
Grandchester
Calvert
Ebenezer
Willowbank
Purga
Springfield Central
Mount Forbes
Mutdapilly
Goolman
Peak Crossing
Mount Walker
Harrisville
Warrill View
Flinders Lakes
Jimboomba
Kagaru
Munbilla
Woolooman
Kalbar
Aratula
Boonah
Dugandan
Beaudesert
Warrego Hwy
Brisbane Rd
Ipswich Mway
Little Liverpool Range
Cunningham Hwy
Centenary Hwy
Rosewood Laidley Rd
Ipswich Rosewood Rd
Paynes Rd
Glencairn Rd
Bill Morrow Rd
Mount Flinders Rd
Dwyers Rd
Washpool Rd
Warrill View Peak Crossing
Rosewood Warrill View Rd
Teviot Range
Bugandan Range
Mount Lindesay Hwy
Tea Trees Nature Refuge
Edward Corbould Reserve and Retreat No.4 Nature Refuge
Moggill Conservation Park
Hawkesbury Road Nature Refuge
Toohey Forest Conservation Park
Mount Crosby Weir Nature Refuge
Wacol Bushlands Nature Refuge
Ipswich Pteropus Conservation Park
Pooh Corner Nature Refuge
Blunder Creek Reserve Nature Refuge
Denmark Hill Conservation Park
White Rock Conservation Park
Woolshed Nature Refuge
Bowman Park Koala Nature Refuge
Tir Na Cram Nature Refuge
Gum Tips Nature Refuge
Purga Nature Reserve
Stewartdale Nature Refuge
Flinders-Goolman Conservation Estate
Mount Perry Conservation Park
Koolena Nature Refuge
Old Hiddenvale Nature Refuge
Danroben Nature Refuge
Sticky Gully Nature Refuge
Angel Place Nature Refuge
Van der Loos Nature Refuge
Henderson Reserve Nature Refuge
Flinders Peak Conservation Park
Moogerah Peaks National Park
Toowoomba
Ipswich
Brisbane
Grandchester
Warwick
Goondiwindi
Narrabri
Map by: DMcP/MF/MEF/GN Z:\GIS\GIS_General\Tasks\Environment\390-ELE-201808061159_LVIA\C2K\390-ELE-201808061159_ARTC_Fig10.3_RSA_v5.mxd Date: 22/03/2020 21:08



Map by: DMcP/MF/MEF/GN Z:\GIS\GIS_General\Tasks\Environment\390-ELE-201808061159_LVIA\C2K\390-ELE-201808061159_ARTC_Fig10.4_Viewpoints_C2K_v2.mxd Date: 22/03/2020 21:10

Viewpoint 1

TABLE 10.19: LIKELY VISUAL EFFECT OF THE PROJECT ON VIEWPOINT 1 (VP1)

Viewpoint 1: Rosewood–Warrill View Road looking north-east

Visual baseline assessment

Existing view from Viewpoint 1 (VP1)

Location and description	▸ GPS Location: 27°40'56.766" S 152°34'22.625" E ▸ Elevation: 48.0 m ▸ North-easterly view from Rosewood–Warrill View Road, looking in the direction of Rosewood. ▸ Presence of vegetation adjoining Bremer River to the west (left hand side) of the view. ▸ Proposed alignment is approximately 100 m to the north-east of this viewpoint. ▸ Represents typical and accessible views of rural residents and of visitors, workers and tourists travelling along Rosewood–Warrill View Road. ▸ North-easterly views from this viewpoint provide open views towards the proposed alignment including landscapes typical of LCT A: Vegetated Watercourses—Rivers (LCA A1 Bremer River) and LCT D: Dry Croplands and Pastures (LCA D6 Mount Forbes).
Key visual sensitivities	▸ Receptors, including few rural residents, workers and travellers experiencing transient views along Rosewood–Warrill View Road (Annual Average Daily Traffic (AADT) around 1,041 per day, of which up to 14.5 per cent are heavy vehicles. ▸ The presence of existing infrastructure (power poles and powerlines) 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 low number and interest of viewers (i.e. small numbers of nearby rural residents and travellers along Rosewood–Warrill View Road).

Visual evaluation

Photomontage view from Viewpoint 1 (VP1)

Viewpoint 1: Rosewood–Warrill View Road looking north-east

Construction	
Magnitude of change assessment	▸ The proposed alignment and associated earthworks will introduce considerable construction works into the view. This change will be exacerbated by the relatively open and flat nature of the landscape in this location. ▸ The proposed location of a laydown immediately west of this viewpoint would cause a reduction in visual amenity from this viewpoint; however, this impact would be temporary. ▸ The key impacts will relate to the presence of construction plant and disturbance due to the construction of the Bremer River Rail Bridge, Hallam Road Rail Bridge and associated embankments. ▸ Substantial vegetation clearing for the construction of the proposed alignment, bridge structures and laydown area will reduce the density of screening vegetation, increasing the visibility of the alignment from Rosewood–Warrill View Road and surrounding isolated rural properties. ▸ While construction works will be clearly evident from this viewpoint, the impact of these works is temporary, which represents a considerable change and **moderate** magnitude of change.
Significance of effect	▸ The effect of the Project on VP1 during construction is considered to be **low**.
Operation	
Magnitude of change assessment—permanent infrastructure	The nearest section of the alignment is approximately 100 m north-east of this viewpoint. The skyline is already affected by the presence of powerlines. The magnitude of change on this receptor is anticipated to be dominant, therefore high, due to the following factors: ▸ Widespread change in the view due to the introduction of new rail infrastructure into the rural landscape, including the Bremer River Rail Bridge (over road) and reconstruction of Rosewood–Warrill View Road, with embankments reaching heights up to around 9.5 m above the existing surface level of Rosewood–Warrill View Road. ▸ Vegetation clearing for the construction of the proposed alignment, service road and laydown area will reduce the density of screening vegetation and open views to the permanent 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 close distance, the proposed alignment will be highly 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 1,800 m long with a height of 6.5 m will highly evident to local rural residents due to the elevated design level of the railway track. Trains will be evident to travellers on Rosewood–Warrill View Road, but only experienced intermittently due to the moderate number and transient nature of travellers on this road. Therefore, the magnitude of impact is considered to be **moderate**.
Significance of effect	The effect of the Project on VP1 during operation is considered to be **moderate**.

Viewpoint 2

TABLE 10.20: LIKELY VISUAL EFFECT OF THE PROJECT ON VIEWPOINT 2 (VP2)

Viewpoint 2: Paynes Road looking south

Visual baseline assessment	
 Existing view from Viewpoint 2 (VP2)	
Location and description	▸ GPS Location: 27°41'22.866" S 152°36'24.948" E ▸ Elevation: 80.0 m ▸ South-westerly view towards private rural property from Paynes Road near the junction with Mount Forbes Road. ▸ Proposed alignment is approximately 60 m to the south of this viewpoint. ▸ Represents typical accessible views of the residents living in rural properties accessed off Paynes Road and of any visitors or workers travelling along this quiet local road. ▸ South-westerly views from this viewpoint provide close views towards the proposed alignment that are somewhat screened by existing vegetation, including landscapes typical of LCT E: Vegetated Grazing (E5: Mount Forbes Vegetated Grazing). ▸ This characteristic continues along the length of Paynes Road with properties set back from the road behind fairly dense partially wooded edge of mature trees.
Key visual sensitivities	▸ Low sensitivity of receptors predominantly comprising a low density of rural residents as well as small numbers of workers and travellers driving along Paynes Road. ▸ The presence of existing infrastructure (power poles, powerlines and mobile phone tower) reduces the overall sensitivity of this view. ▸ This viewpoint it is considered to have a **low** sensitivity overall. ▸ This viewpoint lies close to LCA G4: Willowbank Transitional and the surrounding area is likely to be considerably developed as part of the Ebenezer Major Development Area in the near future.
Visual evaluation	
Note that no visualisation has been provided for this viewpoint. 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.	
Construction	
Magnitude of change assessment	▸ Substantial vegetation clearing for the construction of the proposed alignment, bridge structures and laydown area will reduce the density of screening vegetation, increasing the visibility of the alignment from Paynes Road and surrounding rural properties. ▸ The construction of the proposed alignment will require the resumption and demolition of the property shown in this viewpoint. ▸ Earthworks associated with the proposed alignment will require large volumes of material and vegetation to be removed. ▸ The construction of the Mount Forbes Road Bridge, cuts and embankments will also temporarily disturb the landscape character. ▸ Construction works will occur within and alongside the road reserve; therefore, the construction of the alignment would cause a considerable change in views from this viewpoint and other similar viewpoints along the road during construction. ▸ The proposed alignment and associated earthworks will introduce new rail infrastructure into and noticeably modify the existing landscape, representing a **moderate** magnitude of change.
Significance of effect	The effect of the Project on VP2 during construction is considered to be **low**.

Viewpoint 2: Paynes Road looking south

Operation	
Magnitude of change assessment—permanent infrastructure	The nearest section of the alignment is approximately 60 m to the south of this viewpoint. The skyline is already affected by the presence of powerlines, power poles and a mobile phone tower. The magnitude of change on this receptor is anticipated to be considerable, due to the following factors: ▸ Change due to the provision of new rail infrastructure, including the Mount Forbes Road Bridge (7.1 m minimum clearance over rail). ▸ Vegetation clearing for the construction of the proposed alignment, Mount Forbes Road Bridge and laydown area will reduce the density of screening vegetation and open views. ▸ However, views to the rail alignment from local rural properties (the key visual receptor audience in this location) will be limited, as the alignment is at a lower elevation than the remaining surrounding properties due to the cut (depths of up to 20 m). ▸ 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 alignment and new Mount Forbes Road Bridge will be visible and considerably change the visual character of the landscape, as it will be introducing new rail and road infrastructure into what is currently a relatively intact and vegetated 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 predominately screened due to the lower design level of the railway track. Trains will be evident to travellers passing over Mount Forbes Road Bridge, but only experienced occasionally due to the low number and transient nature of travellers on this road. Therefore, the magnitude of impact is considered to be **low**.
Significance of effect	The effect of the Project on VP2 during operation is considered to be **low**.

Viewpoint 3

TABLE 10.21: LIKELY VISUAL EFFECT OF THE PROJECT ON VIEWPOINT 3 (VP3)

Viewpoint 3: Cunningham Highway looking south-east to Flinders Peak

Visual baseline assessment

Existing view from Viewpoint 3 (VP3)

Location and description	▸ GPS Location: 27°41'59.387" S 152°40'17.412" E ▸ Elevation: 50.0 m ▸ South-easterly view towards Flinders Peak from Cunningham Highway. ▸ Proposed alignment is approximately 80 m to the south of this viewpoint. ▸ Represents views of people travelling south along the Cunningham Highway. It is also located relatively close to Willowbank Racecourse and a few rural properties. ▸ South-easterly views from this viewpoint provide open views towards the proposed alignment, and the Flinders–Goolman Conservation Estate on the horizon, including foreground landscapes typical of the LCD D: Dry Croplands and Pastures (D7: Willowbank) and midground elements of LCT B: Vegetated Watercourses—Creeks and Channels (Warrill Creek) with LCT H: Forested Uplands (H5: Teviot Range) beyond.
Key visual sensitivities	▸ A high number of receptors travel along Cunningham Highway (AADT around 5,675 per day, of which up to 25 per cent are heavy vehicles) and would experience changes to the view. However, these are passing at speed and would experience transient views. ▸ This part of the Cunningham Highway is not a formal tourist drive/scenic route. ▸ The presence of existing infrastructure (power poles, powerlines and transmission towers) 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.

Visual evaluation

Photomontage view from Viewpoint 3 (VP3)

Viewpoint 3: Cunningham Highway looking south-east to Flinders Peak	
Construction	
Magnitude of change assessment (construction)	▸ Construction will be a temporary impact. ▸ Substantial vegetation clearing for the construction of the proposed alignment, bridge structures and laydown area will reduce the density of screening vegetation, increasing the visibility of the alignment from the Cunningham Highway and surrounding rural properties. ▸ Earthworks associated with the proposed alignment will require the movement of large volumes of material. ▸ The presence of construction plant constructing the alignment, Cunningham Highway Bridge, Warrill Creek Rail Bridge, service road, cuts and embankments will temporarily change the character of the landscape, creating a considerable change in the landscape character of this viewpoint. ▸ This represents a **moderate** magnitude of change.
Significance of effect	The effect of the Project on VP3 during construction is considered to be **moderate.**
Operation	
Magnitude of change assessment—permanent infrastructure	The nearest section of the alignment is approximately 80 m to the south-east of this viewpoint. The skyline is already affected by the presence of powerlines, power poles and transmission towers. The magnitude of change on this receptor is anticipated to be dominant, therefore **high**, due to the following factors: ▸ Introduction of significant new rail infrastructure, including the Cunningham Highway Bridge (7.1 m clearance over rail) and Warrill Creek Rail Bridge which are new elements in the view. ▸ Provision of new road bridge will provide elevated views over the general landscape and alignment, increasing the visibility of the Project. ▸ Vegetation clearing for the construction of the proposed alignment, Cunningham Highway Bridge, Warrill Creek Rail Bridge, service road and laydown area will reduce the density of screening vegetation. ▸ 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 alignment and new Cunningham Highway Bridge will be highly evident and will have a dominant impact on the character of the landscape as it will be introducing new rail and road infrastructure into what is currently a relatively intact and vegetated rural setting as experienced from the highway. 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 will be partially screened due to the lower design level of the railway track. Elevated views to the alignment will be possible for travellers passing over the Cunningham Highway Bridge. While experienced by a large number of motorists, these views are of transient nature. Therefore, the magnitude of change is considered to be **moderate**.
Significance of effect	The effect of the Project on VP3 during operation is considered to be **high**.

Viewpoint 4

TABLE 10.22: LIKELY VISUAL EFFECT OF THE PROJECT ON VIEWPOINT 4 (VP4)

Viewpoint 4: Middle Road, looking north

Visual baseline assessment	
 Existing view from Viewpoint 4 (VP4)	
Location and description	▸ GPS Location: 27°44'20.658" S 152°42'5.633" E ▸ Elevation: 49.0 m ▸ North-easterly view towards Purga Nature Reserve from Middle Road near 871 Middle Road and north of junction with Bill Morrow Road. ▸ Proposed alignment is approximately 150 m to the north of this viewpoint. ▸ Represents typical and accessible views of a small number of rural residents and of residents and workers travelling north along Middle Road. ▸ North-easterly views from this viewpoint provide open views towards the proposed alignment and Purga Reserve within LCD D: Dry Croplands and Pastures (D10: Purga) and distant views to the wooded backdrop created by the Flinders–Goolman Conservation Estate, LCT H: Forested Uplands (H5: Teviot Range) beyond.
Key visual sensitivities	▸ Low sensitivity of receptors, including rural residents, workers, travellers driving along Middle Road and visitors to Purga Nature Reserve. ▸ The presence of existing infrastructure (power poles, powerlines and existing high voltage transmission towers) 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 relatively small number of receptors, most of whom would obtain only transient views from this location i.e. travellers on Middle Road and nearby rural residents).
Visual evaluation	
Note that no visualisation has been provided for this viewpoint. 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.	
Construction	
Magnitude of change assessment	▸ The proposed alignment and associated earthworks will modify the existing landscape during construction. ▸ Substantial vegetation clearing for the construction of the proposed alignment and laydown area will reduce the density of screening vegetation, increasing the visibility of the alignment from Middle Road and surrounding rural properties, exacerbated by the open and flat nature of the landscape. ▸ While, the change would be considerable, the change is only temporary, decreasing the magnitude of change. ▸ Overall, this is considered to represent a **moderate** magnitude of change.
Significance of effect	The effect of the Project on VP4 during construction is considered to be **low**.

Viewpoint 4: Middle Road, looking north

Operation	
Magnitude of change assessment—permanent infrastructure	The nearest section of the alignment is approximately 150 m to the north of this viewpoint. The proposed alignment will cross Middle Road. The skyline is already affected by the presence of powerlines, power poles and transmission towers. The magnitude of change on this receptor is anticipated to be considerable, due to the following factors: ▸ Introduction of rail infrastructure, including controlled level crossing on Middle Road and embankments associated with the Purga Creek Rail Bridge, which may restrict views to the distant ranges in places. ▸ Earthworks associated with the proposed alignment and resurfacing of Middle Road will require vegetation to be removed opening views to the alignment. ▸ 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 alignment will be highly evident and will change the visual character of the landscape, as it will be introducing new rail infrastructure into what is currently a relatively intact and vegetated rural setting. However, elements of the rural landscape including the existing dwelling and foreground trees will remain, helping to assimilate the rail infrastructure. 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 partially screened due to the lower design level of the railway track. Trains will be evident to travellers on Middle Road, but only experienced intermittently due to the moderate number and transient nature of travellers on this road. Therefore, the magnitude of impact is considered to be **moderate**.
Significance of effect	The effect of the Project on VP4 during operation is considered to be **low**.

Viewpoint 5

TABLE 10.23: LIKELY VISUAL EFFECT OF THE PROJECT ON VIEWPOINT 5 (VP5)

Viewpoint 5: Ipswich–Boonah Road looking north-east, near properties 276 and 288

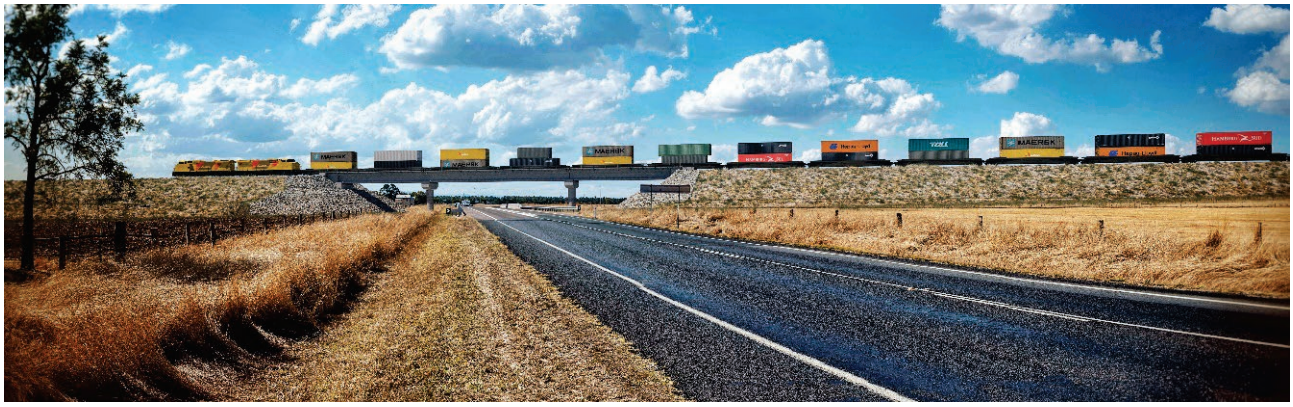
Visual baseline assessment

Existing view from Viewpoint 5 (VP5)

Location and description	▸ GPS Location: 27°45'17.321" S 152°44'9.33" E ▸ Elevation: 51.0 m ▸ North-easterly view towards Boral Quarries Peak Crossing (Purga) and Flinders Peak from Ipswich–Boonah Road. ▸ Proposed alignment is approximately 170 m to the north-east of this viewpoint. ▸ Represents typical views of residents and of visitors, workers and tourists travelling Ipswich–Boonah Road as well as representative publicly accessible a small cluster of rural dwellings located near this location. ▸ North-easterly views from this viewpoint provide open views towards the proposed alignment across LCT D: Dry Croplands and Pastures (D12: Goolman) and LCT G: Transitional Landscapes (G3: Purga Quarry) and more distant views towards LCT H: Forested Uplands (H5: Teviot Range).
Key visual sensitivities	▸ **Moderate** sensitivity of receptors, including rural residents, workers and travellers along Ipswich–Boonah Road (AADT around 6,449 per day, of which up to 11 per cent are heavy vehicles). ▸ The presence of existing infrastructure (power poles, powerlines, transmission towers and the quarry) reduce the overall sensitivity of this view. ▸ This viewpoint it is considered to have a **moderate** sensitivity overall due to the relatively large numbers of travellers on Ipswich–Boonah Road and presence of nearby rural residents.

Visual evaluation

Photomontage



Photomontage view from Viewpoint 5 (VP5)

Viewpoint 5: Ipswich–Boonah Road looking north-east, near properties 276 and 288

Construction	
Magnitude of change assessment	▸ Vegetation clearing will have minimal impact due to how sparse vegetation is in this location. ▸ Considerable construction areas are proposed that would be visible from this viewpoint, including a major construction laydown area, fuel storage, and satellite offices. ▸ Construction of proposed embankments, cuts, installation of rail bridge infrastructure and the resurfacing of the Ipswich–Boonah Road will cause temporary disturbance within the landscape. ▸ The construction of the proposed alignment will require the resumption and demolition of the property located on Castle Hill Lane shown to the west of this viewpoint (right-hand side of view). ▸ At this distance, construction works and laydown areas will be highly evident and change the visual character of the landscape, albeit temporarily. This is considered to be a **moderate** magnitude of change.
Significance of effect	The effect of the Project on VP5 during construction is considered to be **moderate.**
Operation	
Magnitude of change assessment—permanent infrastructure	The nearest section of the alignment is approximately 170 m to the north-east of this viewpoint. The skyline is already affected by the presence of powerlines, power poles, transmission towers and the Boral Purga quarry. The magnitude of change on this receptor is anticipated to be dominant, therefore high, due to the following factors: ▸ Dominant change due to proposed earthworks and the provision of significant new rail infrastructure, including the Ipswich–Boonah Road Rail Bridge (rail over road) and Mount Flinders Road Rail Bridge and resurfacing of Ipswich–Boonah Road. ▸ Height of proposed embankments varies, with the maximum proposed height being approximately 12 m above natural ground, and the deepest cut being approximately 7.8 m below existing surveyed level due to the sparse nature of existing vegetation, vegetation will provide minimal screening of the alignment. ▸ 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 alignment and associated infrastructure will be clearly evident, and represent a dominant change the visual character of the landscape introducing new, dominant visual elements into the landscape, considered to be up to **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 will be partially screened due to proposed embankments; however, they will still be experienced at close distance will have a considerable impact on travellers on Ipswich–Boonah Road. Therefore, the magnitude of impact is considered to be **moderate**.
Significance of effect	The effect of the Project on VP5 during operation is considered to be **high**.

Viewpoint 6

TABLE 10.24: LIKELY VISUAL EFFECT OF THE PROJECT ON VIEWPOINT 6 (VP6)

Viewpoint 6: Peak Mountain View Park, near Peak Crossing State School and Peak Crossing township

Visual baseline assessment	
 Existing view from Viewpoint 6 (VP6)	
Location and description	▸ GPS Location: 27°46'46.8" S 152°43'57.912" E ▸ Elevation: 51.0 m ▸ Easterly views from Peak Mountain View Park towards Purga Creek. ▸ Proposed alignment is approximately 2.25 km to the east of this viewpoint. ▸ Represents accessible and representative views of Peak Crossing State School patrons and of visitors, workers and tourists travelling Ipswich–Boonah Road and using the facilities (playground, amenities and barbeque/picnic facilities) at Peak Mountain View Park. Also representative of worst-case views of residents of Peak Crossing. ▸ The viewpoint falls on the edge of LCT F: Rural Settlement (LCT F5: Peak Downs). ▸ Easterly views towards the proposed alignment are screened by vegetation along associated with LCT B: Vegetated Watercourses Creeks and Channels (B4: Purga Creek) while there are distant views to the Flinders–Goolman Conservation Estate within LCT H: Forested Uplands (H5: Teviot Range).
Key visual sensitivities	▸ Receptors include residents of Peak Crossing, people visiting/parking in Peak Mountain View Park (including people waiting to pick up school children) and travellers passing through Peak Crossing along Ipswich–Boonah Road. ▸ The presence of existing infrastructure (power poles and powerlines) reduces the overall sensitivity of this view. ▸ This viewpoint it is considered to have a **high** sensitivity overall to the change proposed, due to the number and types of viewers who are anticipated to spend some time at the viewpoint (e.g. travellers on Ipswich–Boonah Road and visitors to Peak Mountain View Park).
Visual evaluation	
Note that no visualisation has been provided for this viewpoint. 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.	
Construction	
Magnitude of change assessment	▸ Due to the distance of this viewpoint from the proposed alignment, and screening foreground vegetation along Purga Creek it is anticipated that there will be, at most, only marginal views of construction activities through gaps in vegetation. ▸ This will have negligible impact, creating a barely perceptible change in the visual amenity of this viewpoint. ▸ This represents a **negligible** magnitude of change.
Significance of effect	The effect of the Project on VP6 during construction is considered to be **low.**
Operation	
Magnitude of change assessment—permanent infrastructure	The nearest section of the alignment is approximately 2.25 km to the east of this viewpoint. The skyline is already affected by the presence of powerlines and power poles. The magnitude of change on this receptor is anticipated to be barely perceptible due to the following factors: ▸ Distance from the alignment, and obstruction of views to the alignment by screening vegetation along Purga Creek and Dwyers Road. ▸ At this distance, the alignment will be barely perceptible and will not change the fundamental visual character of the landscape, as it will become just another element in the rural landscape. ▸ This represents a **negligible** magnitude of change.

Viewpoint 6: Peak Mountain View Park, near Peak Crossing State School and Peak Crossing township

Magnitude of change assessment—train	Movement of double-stacked freight trains up to 1,800 m long with a height of 6.5 m experienced at long distances may be noticeable where there are breaks in screening vegetation (to the north-east of this viewpoint) and will have a noticeable impact on residents of Peak Crossing and those visiting Peak Mountain View Park. Therefore, the magnitude of impact is considered to be **low**.
Significance of effect	The effect of the Project on VP6 during operation is considered to be up to **moderate**.

Viewpoint 7

TABLE 10.25: LIKELY VISUAL EFFECT OF THE PROJECT ON VIEWPOINT 7 (VP7)

Viewpoint 7: Ipswich–Boonah Road near Flinders Peak Winery

Visual baseline assessment

Existing view from Viewpoint 7 (VP7)

Location and description	▸ GPS Location: 27°48'0.701" S 152°44'6.839" E ▸ Elevation: 77.0 m ▸ North-easterly view towards Flinders Peak Winery and Flinders–Goolman Conservation Estate, including Flinders Peak from Ipswich–Boonah Road. ▸ Proposed alignment is approximately 1.72 km to the east of this viewpoint. ▸ Represents accessible transient views of residents, workers and tourists travelling along the Ipswich–Boonah Road. Also represents longer-term views obtained by a relatively small number of residents, visitors and guests of Flinders Peak Winery. ▸ North-easterly views from this viewpoint provide generally open views towards the proposed alignment across LCT D: Dry Croplands and Pastures (D11: Limestone Ridges) towards LCT B: Vegetated Watercourses—Creeks and Channels (B4: Purga Creek) while there are distant views to the distinctive landform of LCT H: Forested Uplands (H5: Teviot Range).
Key visual sensitivities	▸ Receptors include visitors to Flinders Peak Winery who are tourists and therefore anticipated to be interested in the view, which contributes to the ambience of the winery. Receptors also include travellers driving along Ipswich–Boonah Road who would be less concerned about the view from this particular location. ▸ The presence of existing infrastructure (power poles and powerlines) reduce the overall sensitivity of this view. ▸ This viewpoint is considered to have a **moderate** sensitivity overall to the change proposed, due to the combination of number and type of viewers (e.g. travellers on Ipswich–Boonah Road and tourists/visitors to Flinders Peak Winery).

Visual evaluation

Note that no visualisation has been provided for this viewpoint. 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.

Construction

Magnitude of change assessment	▸ Vegetation clearing, excavation and bulk earthworks will have a localised impact and reduce the density of screening vegetation, including the formation of a construction access road within the existing road easement (Flinders–Dolomite Road) to the south of the Flinders Peak Winery. ▸ At this distance, views towards construction works from Ipswich–Boonah Road and Flinders Peak Winery will be distant and create a noticeable change in the visual character of the landscape. ▸ This represents a **low** magnitude of change.
Significance of effect	The effect of the Project on VP7 during construction is considered to be **low**.

Viewpoint 7: Ipswich–Boonah Road near Flinders Peak Winery	
Operation	
Magnitude of change assessment—permanent infrastructure	The nearest section of the alignment is approximately 1.72 km to the east of this viewpoint. The skyline is already affected by the presence of powerlines and power poles. The magnitude of change on this viewpoint is anticipated to be noticeable due to the following factors: ▸ Proposed earthworks and the introduction of new rail infrastructure, including an uncontrolled level crossing. ▸ Vegetation clearing for the construction of the proposed alignment, and realignment of Dwyers Road will reduce the density of screening vegetation. ▸ Depth of proposed cuts varies, with the maximum proposed depth being approximately 18.25 m below natural ground—it is likely that views to the rail alignment from Ipswich–Boonah Road and Flinders Peak Winery will be partially screened due to the rail line being at a lower elevation than the foreground landscape i.e. infrastructure in cut would not be visible from this viewpoint. ▸ 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 alignment will be noticeable; however, it will not change the fundamental visual character or amenity of the landscape. ▸ Due to the speed at which people are driving along Ipswich–Boonah Road the change would have a noticeable impact on views representing a **low** magnitude of change. ▸ The alignment will 'blend' into the existing view to a considerable extent.
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 partially screened due to the lower design level of the railway track. Distant views to the alignment will be possible for travellers on Ipswich–Boonah Road, and while experienced by a large number of motorists, these views are of transient nature. Views from Flinders Peak Winery to the alignment would be relatively unobstructed, albeit distant and, as described, partially screened by the landscape. Therefore, the magnitude of impact is considered to be **low**.
Significance of effect	The effect of the Project on VP7 during operation is considered to be **low**.

Viewpoint 8

TABLE 10.26: LIKELY VISUAL EFFECT OF THE PROJECT ON VIEWPOINT 8 (VP8)

Viewpoint 8: Cunningham Lookout off Rosewood–Warrill View Road east looking towards Flinders Peak

Visual baseline assessment	
 Existing view from Viewpoint 8 (VP8)	
Location and description	▸ GPS Location: 27°49'20.586" S 152°34'59.891" E ▸ Elevation: 161 m ▸ Easterly view towards the rural settlement of Warrill View and elevated peaks associated with Flinders–Goolman Conservation Estate, including Flinders Peak from Cunningham Lookout, off Rosewood–Warrill View Road. ▸ Viewpoint located beyond LVIA study area—proposed alignment is approximately 17 km to the east of this viewpoint. However, this viewpoint has been included due to its potential significance. ▸ Represents typical and accessible views of workers, residents, and tourists travelling along Rosewood–Warrill View Road as well as visitors of Cunningham Lookout. ▸ North-easterly views from this viewpoint provide very distant views towards the proposed alignment across a range of Landscape Types to the LCT H: Forested Uplands (H5: Teviot Range).
Key visual sensitivities	▸ Regional lookout with tourist signposting and facilities. ▸ However, relatively low number of visitors anticipated to be stopping at Cunningham Lookout, on the basis of the relatively low numbers of people travelling along Rosewood–Warrill View Road (AADT around 271 per day, of which up to 19 per cent are heavy vehicles). However, these visitors have a high level of interest in this environment and, particularly, the views they obtain from the lookout. ▸ Overall, therefore, this viewpoint is considered to have a **moderate** sensitivity.
Visual evaluation	
Note that no visualisation has been provided for this viewpoint. 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.	
Construction	
Magnitude of change assessment	Due to the distance of this viewpoint from the proposed alignment (17 km), it is anticipated construction works will not be evident and will have **no impact**.
Significance of effect	The effect of the Project on VP8 during construction is considered to have **no impact**.
Operation	
Magnitude of change assessment—permanent infrastructure	Due to the distance of this viewpoint from the proposed alignment (17 km), it is anticipated that permanent infrastructure will not be discernible, and the Project will have **no impact**.
Magnitude of change assessment—train	Due to the distance of this viewpoint from the proposed alignment (17 km), it is anticipated the moving train will not be evident and will have **no impact**.
Significance of effect	The effect of the Project on VP8 during operation is considered to have **no impact**.

Viewpoint 9

TABLE 10.27: LIKELY VISUAL EFFECT OF THE PROJECT ON VIEWPOINT 9 (VP9)

Viewpoint 9: Flinders Peak

Visual baseline assessment

Existing view from Viewpoint 9A (VP9A)

Existing view from Viewpoint 9B (VP9B)

Location and description (Viewpoint 9A)	▸ GPS Location: 27°48'30.774" S 152°48'17.135" E ▸ Elevation: 543.0 m ▸ Westerly view towards Peak Crossing ▸ Proposed alignment is approximately 4.7 km to the southwest. ▸ Represents typical views of those doing the Flinders Peak trail in Flinders–Goolman Conservation Estate. ▸ Westerly views from this elevated viewpoint provide panoramic views towards the proposed alignment across a variety of landscapes including LCT H: Forested Uplands (H5: Teviot Range), LCT E: Vegetated Grazing, LCT A: Vegetated Watercourses—Creeks and Channels and LCT G: Transitional Landscapes (G4: Limestone Hills). ▸ Boral Quarries Peak Crossing (Purga), Flinders Peak Winery and Ivory's Rock Convention and Events Centre can be seen in the foreground. ▸ Distant views to Mount Walker and Main Range National Park. ▸ This viewpoint is selected to represent a multitude of views obtained while on the trail and from the summit. Viewpoint 9B (also included and considered to have similar sensitivities and effects) provides an alternative perspective for reference purposes.
Key visual sensitivities	▸ Low number of visitors undertaking the Flinders Peak hiking track, due to its classification as a Class 5—difficult trail. However, these visitors have a very high level of interest in this environment and views obtained from the summit and trail. ▸ Although this view comprises a strong forested and rural character, the presence of the existing rural infrastructure, and views of extractive industries (e.g. Boral Quarry) detract from the rural and natural qualities and sense of remoteness. ▸ This viewpoint it is considered to have a **high** sensitivity overall to the change proposed, due to the low number, but very high sensitivity of viewers (e.g. hikers) who are walking specifically to obtain the view in this regionally significant landscape (within Flinders Goolman Conservation Estate, Flinders to Karawatha Regional Corridor, and the *ShapingSEQ* Regional Scenic Amenity Overlay Area).

Viewpoint 9: Flinders Peak

Visual evaluation

Photomontage view from Viewpoint 9A

Construction	
Magnitude of change assessment	▸ The proposed alignment and associated earthworks will introduce new rail infrastructure into and the existing rural landscape, creating a noticeable change in the landscape character of this viewpoint. ▸ Due to the distance from the alignment, the most evident construction impact will be the clearance of vegetation for the construction of the proposed alignment, which will reduce the density of screening vegetation and increase the visibility of the alignment from Flinders Peak. ▸ This represents a **low** magnitude of change.
Significance of effect	The effect of the Project on VP9 during construction is considered to have **moderate** impact.
Operation	
Magnitude of change assessment—permanent infrastructure	The nearest section of the alignment is approximately 4.7 km to the south-west of this viewpoint. The skyline is already affected by the presence of powerlines, power poles, transmission towers and the Boral quarry. The magnitude of change on this receptor is anticipated to be noticeable, therefore **low**, due to the following factors: ▸ Noticeable change due to the provision of new rail infrastructure, which will at this distance become another element in the rural landscape. ▸ Vegetation clearing during bulk earthworks and for the construction of the proposed alignment, will have limited impact due to how dense vegetation is at this location. ▸ At this distance, the alignment will be noticeable and will not change the fundamental visual character of the landscape, as it will 'blend' into the existing rural landscape to a considerable extent. ▸ This represents a **low** 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 only be experienced occasionally due to the low number of people undertaking the Flinders Peak hiking track. Therefore, the magnitude of impact is considered to be **low**.
Significance of effect	The effect of the Project on VP9 during operation is considered to be **moderate**.

Viewpoint 10

TABLE 10.28: LIKELY VISUAL EFFECT OF THE PROJECT ON VIEWPOINT 10 (VP10)

Viewpoint 10: Washpool Road near rural properties 456–463

Visual baseline assessment	
 Existing view from Viewpoint 10 (VP10)	
Location and description	▸ GPS Location: 27°50'39.96" S 152°46'6.353" E ▸ Elevation: 82.0 m ▸ Northerly views towards private rural properties and distant views to Flinders Peak from Washpool Road. ▸ Proposed alignment is approximately 300 m to the north of this viewpoint. ▸ Represents typical and accessible views of residents, visitors, and workers travelling Washpool Road. ▸ Northerly views from this viewpoint provide open views towards the proposed alignment, as well as including landscapes typical of the LCT B: Vegetated Watercourses—Creeks and Channels (B4: Purga Creek), LCT D: Dry Croplands and Pastures (D13: Wyaralong) and LCT H: Forested Uplands (H5: Teviot Range) landscape types.
Key visual sensitivities	▸ Small number of receptors, including residents of the few rural properties located in this area, workers and visitors driving along Washpool Road. ▸ The lack of existing infrastructure increases 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 of viewers.
Visual evaluation	
Note that no visualisation has been provided for this viewpoint. 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.	
Construction	
Magnitude of change assessment	▸ The construction of the alignment, rail bridges, service road, cuts and embankments will introduce new rail infrastructure into and result in changes to the existing landscape that will be a dominant change in the landscape character of this viewpoint. ▸ Substantial vegetation clearing for the construction of the proposed alignment, bridge structures, laydown area, realignment of Washpool Road and service roads will reduce the density of screening vegetation, increasing the visibility of the alignment from Washpool and surrounding rural properties. ▸ This represents a **high** magnitude of change.
Significance of effect	The effect of the Project on VP10 during construction is considered to have **moderate** impact.
Operation	
Magnitude of change assessment—permanent infrastructure	The nearest section of the alignment is approximately 300 m to the north of this viewpoint. This is anticipated to have a dominant change on the viewpoint due to the following factors: ▸ Introduction of new rail infrastructure within what is currently a relatively intact rural setting, including introduction of the Purga Creek rail bridges, realignment of Washpool Road and associated major earthworks. ▸ Vegetation clearing for the construction of the proposed alignment, Purga Creek rail bridges, service road and laydown area will reduce the density of screening vegetation. ▸ 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.

Viewpoint 10: Washpool Road near rural properties 456–463

Magnitude of change assessment—permanent infrastructure (continued)	At this distance, the alignment and new Purga Creek rail bridges 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 and vegetated 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 will be experienced by a small number of rural residents and by those travelling on Washpool Road. Therefore, the magnitude of impact is considered to be **moderate**.
Significance of effect	The effect of the Project on VP10 during operation is considered to be up to **moderate**.

Viewpoint 11

TABLE 10.29: LIKELY VISUAL EFFECT OF THE PROJECT ON VIEWPOINT 11 (VP11)

Viewpoint 11: Wild Pig Creek Road near rural properties 717–722

Visual baseline assessment

Existing view from Viewpoint 11 (VP11)

Location and description	▸ GPS Location: 27°52'26.717" S 152°50'40.56" E ▸ Elevation: 70.0 m ▸ North-easterly view towards Boral Quarries Peak Crossing (Purga) and Flinders Peak from Ipswich–Boonah Road. ▸ Proposed alignment is approximately 280 m to the north-east of this viewpoint. ▸ Represents typical and accessible views of residents, visitors, and workers travelling along Wild Pig Creek Road. ▸ North-easterly views from this viewpoint provide open views towards the proposed alignment at the transition of LCT D: Dry Croplands and Pastures (D16: Undullah Road) and LCT H: Forested Uplands (H5: Teviot Range).
Key visual sensitivities	▸ Very small number of receptors in this location, including rural residents, workers and few travellers driving along Wild Pig Creek Road. ▸ This viewpoint it is considered to have a **low** sensitivity overall to the change proposed, due to the low sensitivity of viewers (e.g. very small numbers of viewers including rural residential properties).

Visual evaluation

Photomontage view from Viewpoint 11 (VP11)

Viewpoint 11: Wild Pig Creek Road near rural properties 717–722

Construction	
Magnitude of change assessment	▸ The construction of the alignment, level crossing, service road, cuts and embankments will introduce new rail infrastructure into and significantly modify the existing landscape, creating a dominant change in the landscape character of this viewpoint. ▸ Substantial vegetation clearing for the construction of the proposed alignment, bridge structures, laydown area, realignment of Washpool Road and service roads will reduce the density of screening vegetation, increasing the visibility of the alignment from Wild Pig Creek Road and surrounding rural properties. ▸ This represents a **high** magnitude of change.
Significance of effect (construction)	The effect of the Project on VP11 during construction is considered to have **moderate** impact.
Operation	
Magnitude of change assessment—permanent infrastructure	The nearest section of the alignment is approximately 280 m to the north-east of this viewpoint. The magnitude of change on this receptor is anticipated to be dominant, therefore high, due to the following factors: ▸ Dominant change due to the provision of new rail infrastructure within what is currently a relatively intact rural setting, including a level crossing and major earthworks. ▸ Vegetation clearing for the construction of the proposed alignment, service road and laydown area will reduce the density of screening vegetation. ▸ 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 alignment 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 and vegetated 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 will be experienced by a small number of rural residents and by those travelling on Wild Pig Creek Road. Therefore, the magnitude of impact is considered to be **moderate**.
Significance of effect	▸ The effect of the Project on VP11 during operation is considered to be **moderate**.

Viewpoint 12

TABLE 10.30: LIKELY VISUAL EFFECT OF THE PROJECT ON VIEWPOINT 12 (VP12)

Viewpoint 12: Undullah Road near 'Brooklands' rural property

Visual baseline assessment	
 Existing view from Viewpoint 12 (VP12)	
Location and description	▸ GPS Location: 27°51'47.658" S 152°55'20.345" E ▸ Elevation: 50.0 m ▸ North-easterly view towards Flagstone from Undullah Road. ▸ Proposed alignment is approximately 270 m to the north-east of this viewpoint. ▸ Represents typical and accessible views of residents, visitors, and workers travelling Undullah Road. ▸ North-easterly views from this viewpoint provide open views towards the proposed alignment across and distant views to the Flagstone residential growth area across LCT D: Dry Croplands and Pastures (D17: Allenview) towards LCT H: Forested Uplands (H5: Teviot Range).
Key visual sensitivities	▸ Low sensitivity of receptors, including rural residents, workers and travellers driving along Undullah Road. ▸ The presence of existing infrastructure (power poles, powerlines, and the existing Beaudesert Railway Line (decommissioned) 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. travellers on Undullah Road and small numbers of nearby rural residents).
Visual evaluation	
Note that no visualisation has been provided for this viewpoint. 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.	
Construction	
Magnitude of change assessment	▸ The construction of the alignment, Undullah Road Bridge, realignment of Undullah Road, laydown areas, cuts and embankments will introduce new rail infrastructure into the landscape, creating a dominant change in the landscape character of this viewpoint. ▸ The construction of the proposed alignment may require the resumption and demolition of the property shown in this viewpoint. ▸ The new alignment ties into the existing (decommissioned) rail line. ▸ Vegetation clearing will have minimal impact due to how sparse vegetation is in this location. ▸ This represents a **high** magnitude of change.
Significance of effect	▸ The effect of the Project on VP12 during construction is considered to be **moderate**.
Operation	
Magnitude of change assessment—permanent infrastructure	The nearest section of the alignment visible within this viewpoint is approximately 270 m to the north, while additional rail infrastructure is proposed 140 m to the southwest of this viewpoint (not visible within the view). The skyline is already affected by the presence of powerlines, power poles and there is existing rail infrastructure. The magnitude of change on this receptor is anticipated to be dominant, therefore **high**, due to the following factors: ▸ Dominant change due to the provision of new rail infrastructure, including the realignment of Undullah Road and the new Undullah Road Bridge (7.1m clearance over rail) ▸ Provision of new road bridge will provide elevated views over the general landscape and alignment, increasing the visibility of the Project

Viewpoint 12: Undullah Road near 'Brooklands' rural property	
Magnitude of change assessment—permanent infrastructure (continued)	▸ Due to the sparse nature of existing vegetation, vegetation clearance will have minimal impact on the screening of the alignment ▸ 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, while the alignment, realignment of Undullah Road and new Undullah Road Bridge will be more evident than the existing rail line, it will not change the fundamental visual character of the landscape. ▸ 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 will be evident; however, they will only be experienced at close distance by a small number of people travelling along Undullah Road and isolated rural residences. Therefore, the magnitude of impact is considered to be **moderate**.
Significance of effect	The effect of the Project on VP12 during operation is considered to be up to **moderate**.

10.6.2.3 Lighting

This section considers the impact of Project lighting.

As described in Section 10.6, construction lighting will only be associated with site offices and fuel storage areas. It may also be used at bridge laydown areas and if provided, with proposed flash butt welding facilities. In terms of operational lighting, proposed permanent lighting for the Project is associated with safety lighting at proposed level crossings (including on Middle Road), and minimal internal lighting within the tunnel, with only low-level and emergency lighting expected. There would also be transient lighting associated with train headlights. On this basis, most of the assessed viewpoints would not receive any lighting impacts. Therefore, only the following viewpoints have been assessed, which are reported in Table 10.31 to Table 10.34:

- Viewpoint 4
- Viewpoint 5
- Viewpoint 7
- Viewpoint 11.

Viewpoint 4

TABLE 10.31: LIKELY VISUAL EFFECT OF THE PROJECT LIGHTING ON VIEWPOINT 4

Viewpoint 4: Middle Road, looking north	
Lighting assessment	
Visual evaluation	
Sensitivity assessment	**Low** as described for daytime assessment. There will be few receptors in this location at night—the residents of 871 Middle Road would be the key night-time viewers.
Construction	
Magnitude of change assessment	▸ During construction, it is anticipated that minimal works will be undertaken at night. However, the laydown area proposed within this view would be lit. ▸ The current light levels are assumed to be 'intrinsically dark' and it is assumed that, with careful planning, the levels would be 'predominantly dark' representing a noticeable **low** magnitude of change.
Significance of effect	**Negligible**
Operation	
Magnitude of change assessment—permanent infrastructure	▸ The active level crossing proposed would be controlled by automatic warning systems including flashing lights and would be visible from the rural property at 871 Middle Road, as well as nearby rural properties on Middle Road and Bill Morrow Road. ▸ This would, at worst, change a 'intrinsically dark' landscape into a 'predominantly dark' landscape representing a noticeable change considered to have a **low** magnitude of change.
Significance of effect	**Negligible**

Viewpoint 5

TABLE 10.32: LIKELY VISUAL EFFECT OF THE PROJECT LIGHTING ON VIEWPOINT 5

Viewpoint 5: Ipswich–Boonah Road looking north-east, near properties 276 and 288

Lighting assessment	
Visual evaluation	
Sensitivity assessment	**Moderate** as described for daytime assessment. There will be few receptors in this location at night—the residents of 276 and 288 Ipswich–Boonah Road would be the key night-time viewers.
Construction	
Magnitude of change assessment	▸ During construction it is anticipated that minimal works will be undertaken at night. However, the laydown area proposed within this view would be lit. ▸ The current light levels are assumed to be 'intrinsically dark' and it is assumed that, with careful planning, the levels would be 'predominantly dark' representing a noticeable **low** magnitude of change.
Significance of effect	**Low**
Operation	
Magnitude of change assessment—permanent infrastructure	There would be no lighting associated with the new Ipswich–Boonah Road Rail Bridge and Mount Flinders Road Rail Bridge (over road). Therefore, there would be **no impact** at night.
Significance of effect	**No impact**

Viewpoint 7

TABLE 10.33: LIKELY VISUAL EFFECT OF THE PROJECT LIGHTING ON VIEWPOINT 7

Viewpoint 7: Ipswich–Boonah Road near Flinders Peak Winery

Lighting assessment	
Visual evaluation	
Sensitivity assessment	**Moderate** as described for daytime assessment. Visitors staying at the Flinders Peak Winery and nearby residents of isolated rural properties would be the key night-time viewers.
Construction	
Magnitude of change assessment	During construction it is anticipated that minimal works will be undertaken at night. It is assumed that the laydown area this view would not be lit. It is also assumed that construction traffic would not travel along Flinders–Dolomite Road after approved working hours. Therefore, there would be **no impact** at night.
Significance of effect	**No impact**
Operation	
Magnitude of change assessment—permanent infrastructure	▸ The active crossing proposed on Dwyers Road would be controlled by automatic warning systems including flashing lights and would be visible to people travelling along Dwyers Road and nearby residential properties. ▸ The current light levels are assumed to be 'intrinsically dark' and it is assumed that, with careful planning, the levels would remain 'intrinsically dark' representing a **negligible** magnitude of change due to the distance of this viewpoint and the Flinders Peak Winery from the active level crossing.
Significance of effect	**Low**

Viewpoint 11

TABLE 10.34: LIKELY VISUAL EFFECT OF THE PROJECT LIGHTING ON VIEWPOINT 11

Viewpoint 11: Wild Pig Creek Road near rural properties 717–722	
Lighting assessment	
Visual evaluation	
Sensitivity assessment	**Negligible**, largely as for daytime assessment but noting that even fewer people would be likely to be in this location at night. There will be very few receptors in this location at night—the residents of rural properties 717–722 Wild Pig Creek Road are the key night-time viewers, with the closest lying 390 m from the laydown area and 500 m from the proposed level crossing.
Construction	
Magnitude of change assessment	▸ During construction it is anticipated that minimal works will be undertaken at night. However, the laydown area proposed within this view would be lit. ▸ The current light levels are assumed to be 'intrinsically dark' and it is assumed that, with careful planning, the levels would be 'predominantly dark' representing a noticeable **low** magnitude of change.
Significance of effect	**Negligible**
Operation	
Magnitude of change assessment—permanent infrastructure	▸ The active level crossing proposed would be controlled by automatic warning systems including flashing lights and would be visible to people travelling along Wild Pig Creek Road. ▸ This would, at worst, change a 'intrinsically dark' landscape into a 'predominantly dark' landscape representing a noticeable change considered to have a **low** magnitude of change.
Significance of effect	**Negligible**

10.7 Mitigation measures

10.7.1 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 pre-construction, construction and operational phases of the Project.

10.7.2 Design considerations

The mitigation measures presented in Table 10.35 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 construction and operational phases of the Project.

TABLE 10.35: INITIAL MITIGATION MEASURES THROUGH DESIGN RESPONSES

Aspect	Initial design 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 Flinders–Goolman Conservation Estate and Purga Nature Reserve. ▸ The Project is generally located within the existing SFRC, which was gazetted as a future rail corridor in 2010. The design has been developed to use the existing rail corridor protection and minimise land severance and impacts to natural and rural landscapes to the greatest extent possible. ▸ 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 Project has minimised direct impacts on areas noted as being of regional landscape significance defined using the regional scenic amenity methodology (*ShapingSEQ*). ▸ Alignment 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 alignment has been kept away from settlements to the greatest extent possible.

10.7.3 Proposed mitigation measures

In order to manage and mitigate impacts, a number of mitigation measures and design objectives are proposed for implementation in future stages of design and delivery to achieve a further reduction in significance from the initial significance rating. These proposed mitigation measures respond to Project-specific issues and opportunities, address legislative requirements, accepted government plans, policy and practice.

Table 10.36 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 10.36: PROPOSED MITIGATION MEASURES

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: ▸ Between Mt Forbes Road and the Cunningham Highway (approximately Ch 9.7 km to Ch 16.5 km) ▸ Areas adjacent to and within the Teviot Range and the Flinders–Goolman Conservation Estate, particularly around Dwyers Road near the Flinders Peak Winery and near the proposed Teviot Range tunnel between Ch 39.0 km and Ch 45.5 km. 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 biodiversity, vegetation establishment and erosion and sediment control outcomes to be achieved) ▸ Where appropriate, the plan describes 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 objectives ▸ Native flora species endemic to the Scenic Rim and Ipswich regions or other suitable species appropriate to the landscape context and nursery/seed stock sources ▸ 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. A Landscape and Rehabilitation Management Plan must be developed to define post construction maintenance requirements, monitoring requirements and completion criteria for areas defined in the landscape design and/or identified in the Reinstatement and Rehabilitation Plan.
	Landscape and visual impacts on watercourses	Develop the detailed design to minimise impacts to waterways, riparian vegetation and in-stream flora and habitats (particular locations include Western Creek, Bremer River, Warrill Creek, Purga Creek, Sandy Creek, Dugandan Creek, Wild Pig Creek, Woollaman Creek and Teviot Brook and their tributaries). Aim to avoid, then minimise, the extent of temporary or permanent waterway diversions.
	Visual impact of rail infrastructure	Infrastructure (such as structures, embankments/cuttings, tunnel portals, tunnel control centre 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 Project alignment to enhance the overall recognition and legacy of the Project ▸ *Bridges*: Bridge design considers appropriate design principles at key viewpoints, including the Cunningham Highway, Ipswich–Boonah Road, Undullah Road and the Bremer River near Rosewood–Warrill View Road ▸ *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, via sensitive stabilisation, revegetation or, where appropriate, screen planting. These locations may include Rosewood–Warrill View Road (VP1), Ipswich–Boonah Road (VP5) and Mt Flinders Road, and in locations close to the future Greater Flagstone PDA, between Ch 49.3 km and 54.5 km. ▸ *Tunnel approaches and 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 Teviot Range tunnel portal, cuts around Paynes Road, the Cunningham Highway and Undullah Road.

Delivery phase	Aspect	Proposed mitigation measures
Detailed design (continued)	Landscape design treatments	Develop a Project landscape design with landscaping treatments determined by 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 *Engineering (Track & Civil) Code of Practice Section 17 Right of Way Requirements*: ▸ *Rural and natural landscapes:* The landscape design shall 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/shelterbelts adjacent to major earthworks within the rail corridor to the extent consistent with safety. For example, planting strips could 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 incudes similar shelterbelts beside roads and riparian vegetation along watercourses), as described above, and in the following locations: – Adjacent to Dwyers Road, between Ch 31.2 km to Ch 32.4 km to screen views from Flinders Peak Winery and buffer adjacent properties to the west of Dwyers Road – Selective planting adjacent to the Cunningham Highway Bridge to screen the alignment and bridge abutments while maintaining distant views to Flinders Peak and the Teviot Range ▸ The landscape design shall 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 ▸ Where appropriate consult with local stakeholders and landholders 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 and seed mixes to maximise and connect habitat types for ecological gain ▸ Enhancement of landscape corridors and ecological links across the landscape by, where possible, joining or re-joining fragmented areas of habitat ▸ Landscape design and planting to incorporate ecological requirements to benefit the characteristic and visual amenity of local landscapes including revegetation with locally indigenous species.
	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.
Pre-construction	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*.

Delivery phase	Aspect	Proposed mitigation measures
Construction and commissioning	Landscape and visual values	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.
	Visual impacts of construction activities	▸ Avoid or minimise locating construction compounds within close proximity to sensitive receptors to provide as much separation as possible. ▸ Minimise 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 must be considered to assist in reducing visual impacts of temporary infrastructure and sun glare within close proximity of sensitive receptors (such as Peak Crossing township and road networks).
	Lighting impacts of construction activities	Implement attenuation measures in discussion with potentially affected landholders.
	Reinstatement/ rehabilitation	Implement the landscape design, the Reinstatement and Rehabilitation Plan and the relevant requirements of the Landscape and Rehabilitation Management Plan, until performance criteria are satisfactorily achieved.
Operation	Visual impact of disturbed areas	As required, implement the relevant requirements of the Landscape and Rehabilitation Management Plan, until performance criteria are satisfactorily achieved and incorporate any specific ongoing management requirements into the Inland Rail Operation and Maintenance Management Plan.

10.8 Impact assessment

10.8.1 Summary of landscape impacts

Ten LCTs with associated character areas were identified through the landscape assessment process. A summary of the overall likely landscape impact anticipated during both the construction and operation of the Project for each LCT is presented in Table 10.37.

TABLE 10.37: SUMMARY LANDSCAPE ASSESSMENT (CONSTRUCTION AND OPERATION)

		Initial mitigation		With additional mitigation	
Landscape character type	Landscape sensitivity	Magnitude of change	Potential landscape effect	Magnitude of change	Potential landscape effect
LCT A: Vegetated Watercourses—Rivers	Low	Moderate	Low	Low	Negligible
LCT B: Vegetated Watercourses—Creeks and Channels	Low	Moderate	Low	Low	Negligible
LCT C: Irrigated Croplands	Low	High	Moderate	High	Moderate
LCT D: Dry Croplands and Pastures	Low	High	Moderate	High	Moderate
LCT E: Vegetated Grazing	Low	High	Moderate	High	Moderate
LCT F: Rural Settlement	Moderate	Negligible	Low	Negligible	Low
LCT G: Transitional Landscapes	Negligible	Moderate	Low	Moderate	Low
LCT H: Forested Uplands	High	Moderate	High	Moderate	High
LCT I: Rural Living	No impact	No impact	No impact	No impact	No impact
LCT J: Suburban Living	No impact	No impact	No impact	No impact	No impact

Table 10.37 shows that the landscapes within the LVIA study area were assessed to be of 'negligible' to 'high' sensitivity, and that impacts of a negligible to high magnitude of change are anticipated. The most significant impact identified was a high impact on LCT H: Forested Uplands (H5: Teviot Range). This relates to the introduction of extensive cut and fill and tunnelling and vegetation clearance within the forested landscapes of the Teviot Range south of Flinders Peak. Other impacts of up to Moderate significance are anticipated. Measures to manage these impacts are described in Section 10.7.

10.8.2 Summary of visual impacts

Based on visibility analysis mapping and the field survey, 12 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 is summarised for each viewpoint in Table 10.38.

TABLE 10.38: SUMMARY PRELIMINARY VISUAL ASSESSMENT (CONSTRUCTION)

		Initial mitigation		With additional mitigation	
Viewpoint name	Viewpoint sensitivity	Magnitude of change	Potential visual effect	Magnitude of change	Potential visual effect
Viewpoint 1: Rosewood–Warrill View Road Looking north-east	Moderate	Moderate	Moderate	Moderate	Moderate
Viewpoint 2: Paynes Road looking south	Low	Moderate	Low	Moderate	Low
Viewpoint 3: Cunningham Highway looking south-east to Flinders Peak	Moderate	Moderate	Moderate	Moderate	Moderate
Viewpoint 4: Middle Road, looking north	Low	Moderate	Low	Moderate	Low
Viewpoint 5: Ipswich–Boonah Road looking north-east, near properties 276 and 288	Moderate	Moderate	Moderate	Moderate	Moderate

Viewpoint name	Viewpoint sensitivity	Initial mitigation		With additional mitigation	
		Magnitude of change	Potential visual effect	Magnitude of change	Potential visual effect
Viewpoint 6: Peak Mountain View Park, near Peak Crossing State School and Peak Crossing township	High	Negligible	Low	Negligible	Low
Viewpoint 7: Ipswich–Boonah Road near Flinders Peak Winery	Moderate	Low	Low	Negligible	Low
Viewpoint 8: Cunningham Lookout off Rosewood–Warrill View Road east looking towards Flinders Peak	Moderate	No impact	No impact	No impact	No impact
Viewpoint 9: Flinders Peak	High	Low	Moderate	No impact	No impact
Viewpoint 10: Washpool Road near rural properties 456–463	Low	High	Moderate	High	Moderate
Viewpoint 11: Wild Pig Creek Road near rural properties 717–722	Low	High	Moderate	High	Moderate
Viewpoint 12: Undullah Road near 'Brooklands' rural property	Low	High	Moderate	High	Moderate

This shows that the Project is considered likely to result in visual impacts during construction of up to moderate significance. Measures to manage these impacts are described in Section 10.7.

A summary of the overall likely visual impact on the same representative viewpoints during the operation of the Project is summarised in Table 10.39.

TABLE 10.39: SUMMARY PRELIMINARY VISUAL ASSESSMENT (OPERATION)

Viewpoint name	Viewpoint sensitivity	Initial mitigation		With additional mitigation	
		Magnitude of change	Potential visual effect	Magnitude of change	Potential visual effect
Viewpoint 1: Rosewood–Warrill View Road Looking north-east	Moderate	High	High	Moderate	Moderate
Viewpoint 2: Paynes Road looking south	Low	Moderate	Low	Moderate	Low
Viewpoint 3: Cunningham Highway looking south-east to Flinders Peak	Moderate	High	High	Moderate	Moderate
Viewpoint 4: Middle Road, looking north	Low	Moderate	Low	Moderate	Low
Viewpoint 5: Ipswich–Boonah Road looking north-east, near properties 276 and 288	Moderate	High	High	High	High
Viewpoint 6: Peak Mountain View Park, near Peak Crossing State School and Peak Crossing township	High	Low	Moderate	Low	Moderate
Viewpoint 7: Ipswich–Boonah Road near Flinders Peak Winery	Moderate	Low	Low	Negligible	Low
Viewpoint 8: Cunningham Lookout off Rosewood–Warrill View Road east looking towards Flinders Peak	Moderate	No impact	No impact	No impact	No impact
Viewpoint 9: Flinders Peak	High	Low	Moderate	Low	Moderate
Viewpoint 10: Washpool Road near rural properties 456–463	Low	High	Moderate	High	Moderate
Viewpoint 11: Wild Pig Creek Road near rural properties 717–722	Low	High	Moderate	High	Moderate
Viewpoint 12: Undullah Road near 'Brooklands' rural property	Low	High	Moderate	High	Moderate

This shows that the Project is considered likely to result in high initial impacts on three representative views: Viewpoint 1: Rosewood–Warrill View Road Looking north-east; Viewpoint 3: Cunningham Highway looking south-east to Flinders Peak and Viewpoint 5: Ipswich–Boonah Road looking north-east, near properties 276 and 288. Measures to manage these impacts are described in Section 10.7, and have potential to reduce the significance of two of these impacts to moderate.

10.8.3 Summary of lighting impacts

As there is limited Project lighting proposed, most of the viewpoints are not anticipated to be affected by night lighting. A summary of the baseline analysis and overall likely visual impact anticipated during the operation of the Project is provided for each viewpoint (as described above) is presented in Table 10.40.

TABLE 10.40: SUMMARY LIGHTING ASSESSMENT (CONSTRUCTION AND OPERATION)

		Initial mitigation		With additional mitigation	
Viewpoint name	**Viewpoint sensitivity**	**Magnitude of change**	**Potential visual effect**	**Magnitude of change**	**Potential visual effect**
Viewpoint 1: Rosewood–Warrill View Road Looking north-east	Low	No impact	No impact	No impact	No impact
Viewpoint 2: Paynes Road looking south	Low	No impact	No impact	No impact	No impact
Viewpoint 3: Cunningham Highway looking south-east to Flinders Peak	Low	No impact	No impact	No impact	No impact
Viewpoint 4: Middle Road, looking north	Low	Low	Negligible (construction and operation)	Low	Negligible (construction and operation)
Viewpoint 5: Ipswich–Boonah Road looking north-east, near properties 276 and 288	Moderate	Low	Low (construction and operation)	Low	Low (construction and operation)
Viewpoint 6: Peak Mountain View Park, near Peak Crossing State School and Peak Crossing township	High	No impact	No impact	No impact	No impact
Viewpoint 7: Ipswich–Boonah Road near Flinders Peak Winery	Moderate	Negligible	Low (construction and operation)	Negligible	Low (construction and operation)
Viewpoint 8: Cunningham Lookout off Rosewood–Warrill View Road—east looking towards Flinders Peak	Moderate	No impact	No impact	No impact	No impact
Viewpoint 9: Flinders Peak	High	No impact	No impact	No impact	No impact
Viewpoint 10: Washpool Road near rural properties 456–463	Low	No impact	No impact	No impact	No impact
Viewpoint 11: Wild Pig Creek Road near rural properties 717–722	Negligible	Low	Negligible (construction and operation)	Low	Negligible (construction and operation)
Viewpoint 12: Undullah Road near 'Brooklands' rural property	Low	No impact	No impact	No impact	No impact

In summary, the qualitative desktop lighting assessment concludes that the proposed alignment and associated infrastructure is unlikely to create any obtrusive lighting impacts of greater than low significance on the external environment during typical night-time scenarios. Measures to manage these impacts are described in Section 10.7.

10.8.4 Impact assessment summary

In conclusion, the Project is assessed to have the following impacts on landscape and visual values summarised in Table 10.41.

TABLE 10.41: IMPACT ASSESSMENT SUMMARY

Impact	Significance
Landscape impacts during construction and operation	Impacts of up to **high** significance on LCT H: Forested Uplands (H5: Teviot Range). Impacts of up to **moderate** significance on three LCTs (LCT C: Irrigated Croplands; LCT D: Dry Croplands and Pastures and LCT E: Vegetated Grazing).
Visual impacts during construction	Up to **moderate** significance for six representative viewpoints (Viewpoint 1: Rosewood–Warrill View Road Looking north-east; Viewpoint 3: Cunningham Highway; Viewpoint 5: Ipswich–Boonah Road looking north-east, near properties 276 and 288; Viewpoint 10: Washpool Road near rural properties 456–463; Viewpoint 11: Wild Pig Creek Road near rural properties 717–722; and Viewpoint 12: Undullah Road near 'Brooklands' rural property).
Visual impacts during operation	Up to **high** significance for three representative viewpoints (Viewpoint 1: Rosewood–Warrill View Road Looking north-east; Viewpoint 3: Cunningham Highway and Viewpoint 5: Ipswich–Boonah Road looking north-east, near properties 276 and 288). Other impacts of up to **moderate** significance on five representative viewpoints (Viewpoint 6: Peak Mountain View Park, near Peak Crossing State School and Peak Crossing township; Viewpoint 9: Flinders Peak; Viewpoint 10: Washpool Road near rural properties 456–463; Viewpoint 11: Wild Pig Creek Road near rural properties 717–722; and Viewpoint 12: Undullah Road near 'Brooklands' rural property).
Lighting impacts	Up to **low** significance for one viewpoint during construction (Viewpoint 5: Ipswich–Boonah Road, looking north-east) and one viewpoint during operation (Viewpoint 7: Ipswich–Boonah Road near Flinders Peak Winery).
Cumulative impacts during construction	**Low consequence**
Cumulative impacts during operation	**Moderate consequence** primarily in the east of the LVIA study area around Kagaru.
Cumulative impacts of night lighting	**Nil**

Table notes:
Impact significance in the summary table above is given for the most significant impact identified for each attribute prior to any mitigation.

In conclusion, the most significant impacts are landscape impacts on LCT H: Forested Uplands and visual impacts during operation on two representative viewpoints—Viewpoint 3: Cunningham Highway and Viewpoint 5: Ipswich–Boonah Road looking north-east, near properties 276 and 288.

10.8.5 Residual impact assessment

Potential impacts to landscape and visual amenity associated with the Project in the construction and operation phases are outlined in Table 10.9 and Table 10.10. These impacts have been subjected to a significance assessment as per the methodology detailed in Chapter 4: Assessment Methodology and as described further in Section 10.4.

The initial impact assessment is undertaken on the basis that the design measures (or initial mitigation measures) detailed in Table 10.35 have been incorporated into the Project design.

Proposed mitigation measures, described in Table 10.36, were then applied as appropriate to the phase of the project to reduce the level of potential impact.

The residual significance 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 following impacts on landscape and visual values shown in Table 10.42.

TABLE 10.42: RESIDUAL IMPACT ASSESSMENT SUMMARY

			Initial significance[1]			Residual significance[2]	
Aspect	**Phase**	**Landscape character type/viewpoint**	**Sensitivity**	**Magnitude**	**Significance**	**Magnitude**	**Significance**
Landscape impacts	Construction/ operation	LCT A: Vegetated Watercourses—Rivers	Low	Moderate	Low	Low	Negligible
		LCT B: Vegetated Watercourses—Creeks and Channels	Low	Moderate	Low	Low	Negligible
		LCT C: Irrigated Croplands	Low	High	Moderate	High	Moderate
		LCT D: Dry Croplands and Pastures	Low	High	Moderate	High	Moderate
		LCT E: Vegetated Grazing	Low	High	Moderate	High	Moderate
		LCT F: Rural Settlement	Moderate	Negligible	Low	Negligible	Low
		LCT G: Transitional Landscapes	Negligible	Moderate	Low	Moderate	Low
		LCT H: Forested Uplands	High	Moderate	High	Moderate	High
		LCT I: Rural Living	No impact	No impact	No impact	No impact	No impact
		LCT J: Suburban Living	No impact	No impact	No impact	No impact	No impact
Visual impacts	Construction	Viewpoint 1: Rosewood–Warrill View Road Looking north-east	Moderate	Moderate	Moderate	Moderate	Moderate
		Viewpoint 2: Paynes Road looking south	Low	Moderate	Low	Moderate	Low
		Viewpoint 3: Cunningham Highway looking south-east to Flinders Peak	Moderate	Moderate	Moderate	Moderate	Moderate
		Viewpoint 4: Middle Road, looking north	Low	Moderate	Low	Moderate	Low
		Viewpoint 5: Ipswich–Boonah Road looking north-east, near properties 276 and 288	Moderate	Moderate	Moderate	Moderate	Moderate
		Viewpoint 6: Peak Mountain View Park, near Peak Crossing State School and Peak Crossing township	High	Negligible	Low	Moderate	Low
		Viewpoint 7: Ipswich–Boonah Road near Flinders Peak Winery	Moderate	Low	Low	Negligible	Low
		Viewpoint 8: Cunningham Lookout off Rosewood–Warrill View Road east looking towards Flinders Peak	Moderate	No impact	No impact	Low	No impact
		Viewpoint 9: Flinders Peak	High	Low	Moderate	No impact	No impact
		Viewpoint 10: Washpool Road near rural properties 456–463	Low	High	Moderate	Low	Moderate
		Viewpoint 11: Wild Pig Creek Road near rural properties 717–722	Low	High	Moderate	High	Moderate
		Viewpoint 12: Undullah Road near 'Brooklands' rural property	Low	High	Moderate	High	Moderate

			Initial significance[1]			Residual significance[2]	
Aspect	**Phase**	**Landscape character type/viewpoint**	**Sensitivity**	**Magnitude**	**Significance**	**Magnitude**	**Significance**
Visual impacts	Operation	Viewpoint 1: Rosewood–Warrill View Road Looking north-east	Moderate	High	High	Moderate	Moderate
		Viewpoint 2: Paynes Road looking south	Low	Moderate	Low	Moderate	Low
		Viewpoint 3: Cunningham Highway looking south-east to Flinders Peak	Moderate	High	High	Moderate	Moderate
		Viewpoint 4: Middle Road, looking north	Low	Moderate	Low	Moderate	Low
		Viewpoint 5: Ipswich–Boonah Road looking north-east, near properties 276 and 288	Moderate	High	High	High	High
		Viewpoint 6: Peak Mountain View Park, near Peak Crossing State School and Peak Crossing township	High	Low	Moderate	Low	Moderate
		Viewpoint 7: Ipswich–Boonah Road near Flinders Peak Winery	Moderate	Low	Low	Negligible	Low
		Viewpoint 8: Cunningham Lookout off Rosewood–Warrill View Road east looking towards Flinders Peak	Moderate	No impact	No impact	No impact	No impact
		Viewpoint 9: Flinders Peak	High	Low	Moderate	Low	Moderate
		Viewpoint 10: Washpool Road near rural properties 456–463	Low	High	Moderate	High	Moderate
		Viewpoint 11: Wild Pig Creek Road near rural properties 717–722	Low	High	Moderate	High	Moderate
		Viewpoint 12: Undullah Road near 'Brooklands' rural property	Low	High	Moderate	High	Moderate
Lighting impacts	Construction/ Operation	Viewpoint 1: Rosewood–Warrill View Road Looking north-east	Low	No impact	No impact	No impact	No impact
		Viewpoint 2: Paynes Road looking south	Low	No impact	No impact	No impact	No impact
		Viewpoint 3: Cunningham Highway looking south-east to Flinders Peak	Low	No impact	No impact	No impact	No impact
		Viewpoint 4: Middle Road, looking north	Low	Low	Negligible	Low	Negligible
		Viewpoint 5: Ipswich–Boonah Road looking north-east, near properties 276 and 288	Moderate	Low	Low	Low	Low
		Viewpoint 6: Peak Mountain View Park, near Peak Crossing State School and Peak Crossing township	High	No impact	No impact	No impact	No impact
		Viewpoint 7: Ipswich–Boonah Road near Flinders Peak Winery	Moderate	Negligible	Low	Negligible	Low
		Viewpoint 8: Cunningham Lookout off Rosewood–Warrill View Road east looking towards Flinders Peak	Moderate	No impact	No impact	No impact	No impact

			Initial significance[1]			Residual significance[2]	
Aspect	**Phase**	**Landscape character type/viewpoint**	**Sensitivity**	**Magnitude**	**Significance**	**Magnitude**	**Significance**
Lighting impacts (continued)	Construction/ Operation (continued)	Viewpoint 9: Flinders Peak	High	No impact	No impact	No impact	No impact
		Viewpoint 10: Washpool Road near rural properties 456–463	Low	No impact	No impact	No impact	No impact
		Viewpoint 11: Wild Pig Creek Road near rural properties 717–722	Negligible	Low	Negligible	Low	Negligible
		Viewpoint 12: Undullah Road near 'Brooklands' rural property	Low	No impact	No impact	No impact	No impact

Table notes:
1 Includes implementation of initial mitigation measures specified in Table 10.35.
2 Includes implementation of additional mitigation measures and controls as identified in Table 10.36.

10.9 Cumulative impacts

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, 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 impact, it is considered likely that the following projects may all have some overlap in construction periods:

- K2ARB
- H2C
- Greater Flagstone PDA
- Bromelton SDA
- Ripley Valley PDA
- RAAF Base Amberley future works
- Remondis Waste to Energy Facility
- South West Pipeline Bulk Water Connection to Beaudesert.

Other projects identified and assessed in the cumulative impact assessment in Chapter 22: Cumulative Impacts have not been considered for landscape and visual amenity due to their distances from the Project. It is therefore unlikely that these projects will materially contribute to the landscape and visual environment such that impacts are greater than those predicted in Section 10.8.

The area likely to be most affected by cumulative impacts is around Kagaru. This area will potentially be (depending on specific project phasing) affected simultaneously by Flagstone PDA, Bromelton SDA, and K2ARB activities. As there are relatively few existing visual receptors in this area and the construction impacts are temporary, the consequence of cumulative impacts during construction in this area is considered to be of **low significance**. The operations impacts associated with combined, successive and sequential views of adjoining projects is considered to be of **medium significance**. Further information on the potential cumulative impact of the Project relating to landscape and visual aspects is presented in Chapter 22: Cumulative Impacts.

10.10 Conclusions

The landscape between Calvert and Kagaru is highly varied, comprising intensive irrigated agriculture, dry croplands and pastures interspersed with a network of rivers and creeks, and set against the distinctive backdrop of forested hills created by the Teviot and Little Liverpool Ranges. An existing operational rail line is present in parts of the LVIA study area and, historically, a passenger rail also extended through parts of the landscape.

The Project would introduce 53 km of new single-track dual-gauge railway into the landscape occupying the low-lying area east of Calvert and skirting the Teviot Range to the east. Views across the rural landscape from the network of local roads and highways, including the Cunningham Highway, Rosewood–Laidley Road and Ipswich-Boonah Road.

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.

Ten LCTs have been identified within the LVIA study area, of which eight are potentially affected by the Project. One impact of high significance was identified on LCT H: Forested Uplands (H5: Teviot Range Forested Uplands) relating to the introduction of extensive cut and fill and tunnelling within the forested landscapes of the Teviot Range south of Flinders Peak.

For much of the area, there are relatively few visual receptors with the landscape comprising isolated farmsteads set on large private farms. However, there are some settlements within the potential viewshed of the Project including Calvert, Peak Crossing and Harrisville. Visual impacts are typically contained by the presence of vegetation, including along creek lines, and localised undulations in landform. Elevated and panoramic views over the alignment are also available from the Forested Uplands, particularly from walking trails around Flinders Peak. Elsewhere, there are fairly open views across the rural landscape from the network of local roads and highways, including the Cunningham Highway, Rosewood–Laidley Road and Ipswich–Boonah Road.

Twelve representative viewpoints have been assessed. The key visual impacts of the Project of high significance identified relates to the presence of railway infrastructure (bridges) as viewed from Viewpoint 1: Rosewood–Warrill View Road Looking north-east; Viewpoint 3: Cunningham Highway looking south-east to Flinders Peak and from Viewpoint 5: Ipswich–Boonah Road looking north-east. 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 lower modification to visual amenity.

Although tourists have been identified as a visual receptor within this chapter, discussion on the impacts to tourism business and tourist travel has been discussed in Chapter 16: Social including proposed mitigation measures to reduce impacts.

No significant lighting impacts were identified for either construction or operation phases of greater than low significance.

Cumulative impacts, particularly the effects in combination with the adjoining K2ARB and H2C ARTC alignments have been considered as well as projects including the Ripley Valley PDA, Greater Flagstone PDA, Ebenezer Regional Industrial Area and Bromelton SDA. It is concluded that the cumulative impact is up to medium consequence level.

ARTC will develop a Rehabilitation and Reinstatement Plan, which 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 additional mitigation measures described in Table 10.36 that will reduce the residual impact for some of the identified effects on landscape and visual values.