

CHAPTER

04

Site Description

INLAND
RAIL 

NORTH STAR TO NSW/QUEENSLAND BORDER ENVIRONMENTAL IMPACT STATEMENT

ARTC

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4. Site description

This chapter provides a concise description of the general biophysical and socio-economic environment likely to be impacted by the North Star to NSW/Queensland Border project (the proposal). The context for this chapter is established by the State Significant Infrastructure Standard Secretary's Environmental Assessment Requirements (SEARs) requirement 2.1. The Environmental Impact Statement (EIS) must include, but not necessarily be limited to: (h) a concise description of the general biophysical and socio-economic environment that is likely to be impacted by the proposal (including offsite impacts). Elements of the environment that are not likely to be affected by the proposal do not need to be described.

The existing environment is described in more detail in Chapters 11 to 25, as relevant to each key issue assessed by this EIS.

4.1 Regional setting

The regional setting for the proposal is shown in Figure 4.1.

The proposal is situated in the New England North West region of NSW, between North Star and the NSW/QLD border. The New England North West region consists of over 32,000 square kilometres (km²) of prime agricultural and grazing land.

The proposal is situated within two local government areas (LGAs): the southern section is within the Gwydir LGA, while the northern section is within the Moree Plains LGA. Both LGAs adjoin the NSW/QLD border.

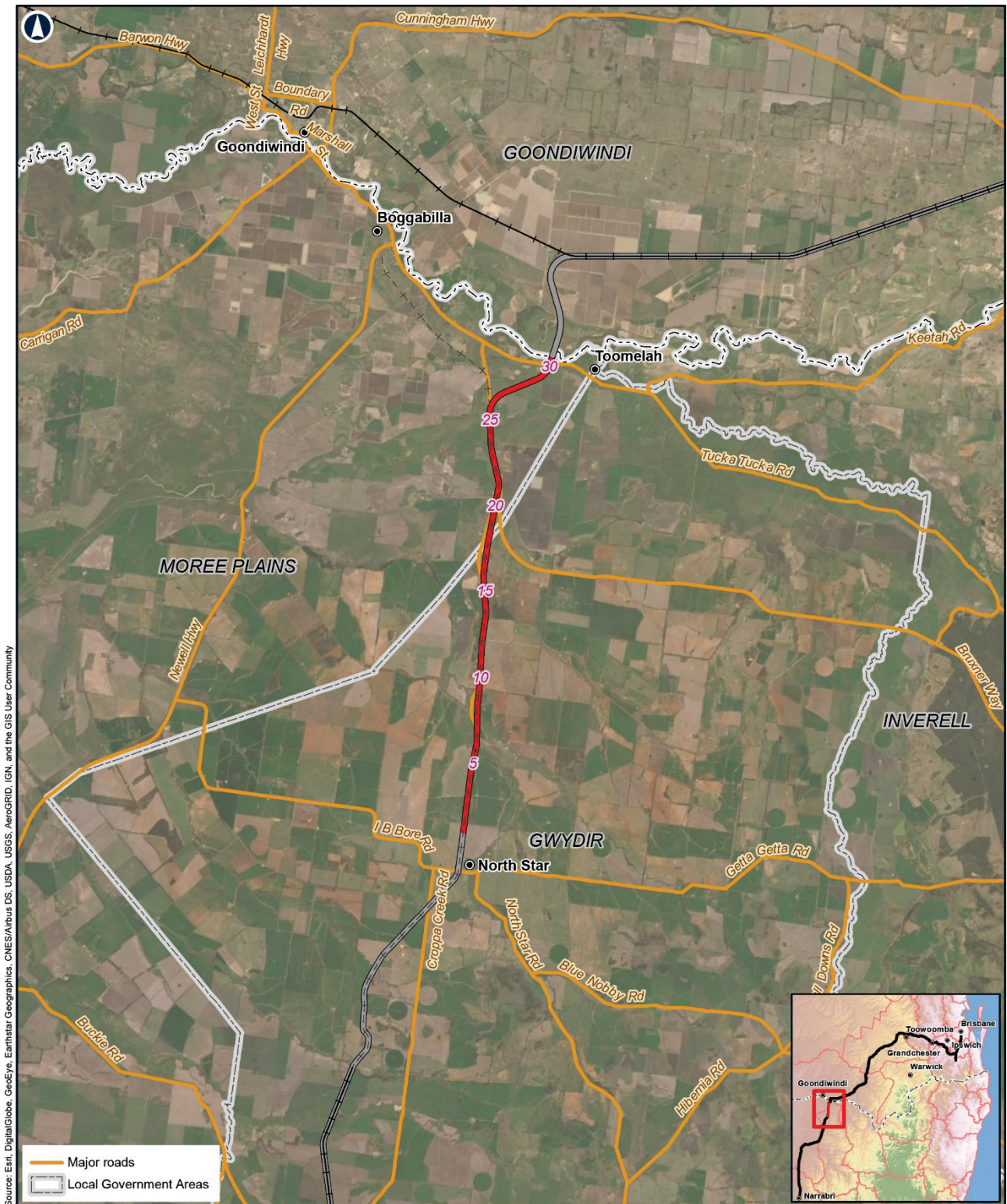
The southern end of the proposal is bounded by North Star, which had a population of 230 people at the 2016 census. The closest towns to the northern end of the proposal are Boggabilla and Goondiwindi, which had populations of 990 and 6,355 respectively, at the 2016 census.

4.2 Description of the proposal site

4.2.1 Description

From a point approximately 900 m north of North Star, the proposal follows the existing non-operational Boggabilla rail corridor for approximately 25 km towards Whalan Creek. The proposal continues along a 5 km section of greenfield rail corridor towards the NSW/QLD border. The NSW/QLD border is defined by the median line of the Macintyre River.

For design purposes, the delivery model for the proposal includes a 7 km section of new track north of the NSW/QLD border that ties into the existing Queensland Rail South Western Line near Kurumbul, Queensland. For the purpose of obtaining the necessary environmental approvals, this 7 km section of new track will be assessed as part of the NSW/QLD Border to Gowrie Inland Rail project that is being assessed under a separate EIS as per the *State Development and Public Works Organisation Act 1971* (Qld) (SDPWO Act), which is currently being prepared.



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

- Major roads
- Local Government Areas

Figure 4.1: Regional setting

NORTH STAR TO NSW/QLD BORDER

9km

LEGEND

- Chainage (km)
- Existing rail (operational)
- Existing rail (non-operational)
- NSW/QLD border
- North Star to NSW/QLD border alignment
- Adjoining alignments

Coordinate System: GDA 1994 MGA Zone 56
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FIGURE 4.1 REGIONAL SETTING

4.2.2 Existing rail facilities

The existing rail network in the vicinity of the proposal is comprised of the Queensland Rail South Western System line, located north-east of the proposal in Queensland, and the non-operational Boggabilla line, located north-west of the proposal.

The Queensland Rail South Western System line operates between Warwick and Dirranbandi, through Karara, Inglewood, Kurumbul, Goondiwindi and Thallon. Passenger services no longer operate on the South Western line; however, it is still used for freight as far as Thallon. The line beyond Thallon was closed in 2010, having suffered extensive damage during the 2011 floods.

The Boggabilla line was opened in 1932. It was originally constructed to transport agricultural products south through NSW ports rather than north, across the border to Queensland, although it also operated passenger services. Passenger services came to a halt in August 1974 when services were cancelled due to a fuel crisis. Agriculture and freight services also diminished at this time, with services replaced by road trucks working out of Moree. In 1987, the line was truncated at North Star. The remainder of the line was closed to normal operations in 2013.

The condition of existing track and infrastructure on the Boggabilla line requires significant upgrades to support the types and speeds of freight trains that would use Inland Rail. Therefore, as part of the proposal, all existing track and infrastructure will be removed and replaced.

4.3 General biophysical environment

This section summarises the general biophysical environment that is likely to be impacted by the proposal.

4.3.1 Biodiversity

4.3.1.1 Flora and fauna

Native vegetation within the study area has been extensively modified as a result of agricultural and pastoral land use activities, with the overwhelming majority cleared for grazing and/or cropping. Existing vegetation predominantly consists of exotic grassland with scattered paddock trees.

Despite being extensively modified, the study area provides suitable habitat for several Threatened Ecological Communities (TECs) and conservation significant species listed under the provisions of the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) and *Biodiversity Conservation Act 2016* (NSW). The subject land contains a suite of other terrestrial ecological values, including habitat connectivity, wetlands and waterways.

For the purposes of the flora and fauna assessment, 136 ecological receptors were identified within the subject land. These receptors varied from broad-scale receptors, such as landscape features, down to finer species-scale receptors, including TECs (6 TECs listed under *Biodiversity Conservation Act 2016* and/or EPBC Act), and habitat for conservation significant species (16 flora species and 74 fauna species) and migratory species (10 migratory fauna species). These receptors range between high-, moderate- and low-sensitivity categories based on factors, including conservation status, exposure to threatening processes, resilience and representation in the broader landscape.

The complete list of TECs and conservation significant species assessed during development of the EIS is in Chapter 11: Biodiversity.

4.3.1.2 Groundwater dependent ecosystems

Several groundwater dependent ecosystems (GDEs), dependent on either the surface or subsurface expression of groundwater, are considered to occur within the study area. For instance, the riparian vegetation associated with the Macintyre River and Mobbindry Creek depends on the surface expression of groundwater, while vegetation such as *Eucalyptus populnea*, depends on the subsurface expression of groundwater.

More information of GDEs is in Chapter 14: Groundwater.

4.3.1.3 Habitat connectivity

Riparian corridors within the study area, particularly those associated with the Macintyre River, Mobbindry Creek and Back Creek, provide east–west movement opportunities for fauna. For instance, riparian vegetation along the Macintyre River connects northern portions of the study area with Dhinna Dhinawan National Park, located east of the study area.

Vegetation corridors along North Star Road and Bruxner Way provide north–south movement opportunities for fauna within the study area. Barriers to fauna movement along North Star Road and Bruxner Way include adjacent cropping land, existing roads, the existing non-operational Boggabilla rail corridor and vegetation breaks.

Further information on habitat connectivity is provided in Chapter 11: Biodiversity.

4.3.2 Land resources

4.3.2.1 Topography

The study area is characterised by gently undulating topography. Low ridges and hilltops are interspersed with numerous drainage lines ranging from first-order ephemeral waterways to major rivers with extensive flood plains.

The proposed alignment declines in elevation from south to north. The elevation at North Star is approximately 260 metres (m) above Australian Height Datum (mAHD), while the elevation at the Macintyre River is approximately 220 mAHD.

4.3.2.2 Geology and groundwater

The underlying geology of the study area primarily consists of Quaternary sand and alluvium deposits. Quaternary sand deposits primarily consist of sand, red sandy soil, silt, and some gravel floodout and sheet sand. Quaternary alluvium deposits, on the other hand, primarily consist of clay, silt, sand and a gravel layer. Alluvium is typically deposited by water flowing over floodplains or in riverbeds.

The northern section of the study area passes through the Jurassic age Kumbarilla Beds, which form the underlying bedrock geology of the proposal site. The Kumbarilla Beds are composed of sandstone, siltstone, mudstone and conglomerate. They are overlain by the Quaternary age deposits.

The groundwater regime in the proposal area is comprised of two main aquifer systems:

- ▶ Cenozoic alluvium deposits associated with the Border Rivers Alluvium and other drainage systems that the proposal intersects (e.g. Macintyre River, Whalan Creek and Mobbindry Creek)
- ▶ Jurassic to Cretaceous sedimentary rocks of the Surat Basin, which form part of the Great Artesian Basin.

Site-specific groundwater level data from proposed monitoring wells for the period late July to early October 2018 showed variations in groundwater levels ranging from 0.17 m (BH2213) to 1.60 m (BH2212).

A summary of groundwater use based on registered bores demonstrated that, based on the location, depth and lithology of the registered bores, the following can be deduced on water usage:

- ▶ In the northern portion of the alignment (Chainage (Ch) 20 km to Ch 30 km) bores are constructed predominantly within the Cenozoic alluvial aquifer with the type of bore/groundwater use ranging widely. Bores located near the Macintyre River are predominantly used for water supply and domestic purposes (i.e. Toomelah township 2 km east of the alignment). Three bores within the alluvium to the east of Ch 25 km are reported to be irrigation bores (GW027891, GW027892 and GW027893)
- ▶ Bore use in the southern portion of the alignment (i.e. Ch 0 km to Ch 20 km) is dominated by extraction from the Kumbarilla Beds and the Walloon Coal Measures for stock and, to a lesser extent, irrigation and domestic purposes. This description reflects the limited extent of alluvium in the southern portion and the generally higher salinity associated with the deeper hydrostratigraphic units.

Further information on geology and groundwater is provided in Chapter 14: Groundwater and Chapter 15: Land Resources and Contamination.

4.3.2.3 Soil

Vertosols, chromosols and dermosols are the dominant soil types within the study area. Key characteristics of these soil types are in Table 4.1.

TABLE 4.1 CHARACTERISTICS OF SOIL TYPES WITHIN THE STUDY AREA

Soil type	Key characteristics
Vertosols	<ul style="list-style-type: none"> ▶ Clay-rich soils that exhibit strong cracking when dry ▶ Exhibit chemical fertility and water holding capacity, therefore have agricultural potential
Chromosols	<ul style="list-style-type: none"> ▶ Moderate chemical fertility and water-holding capacity ▶ Susceptible to soil acidification and soil structure decline
Dermosols	<ul style="list-style-type: none"> ▶ Moderate to high chemical fertility and water-holding capacity ▶ Have good agricultural potential

The proposal is not located on land affected by acid sulfate soils; however, high erosion hazard areas have been identified north and north-east of North Star. Erosion and sediment control measures will be implemented during construction and operation to mitigate erosion hazards.

Further information on soils is provided in Chapter 15: Land Resources and Contamination.

4.3.2.4 Contamination

During development of the EIS, searches of the NSW Environment Protection Authority (EPA) Contaminated Site Register, ARTC Contaminated Land Register, and the Department of Planning, Industry and Environment (DPIE) cattle dip site locator were completed. No contaminated sites were identified within the study area. Similarly, no sites within the study area are currently under investigation for contamination.

The study area has been assessed as having a 'Low' contamination risk; however, contaminants such as hydrocarbons, arsenic, asbestos and lead paint are often found near existing rail sites, such as the existing, non-operational Boggabilla rail corridor between North Star and Whalan Creek. Potential sources of contamination include:

- ▶ Agricultural activities: hydrocarbons (fuel and oil storage and use), pesticides and herbicides, asbestos and lead paint, arsenic (livestock dips or spray races) and landfilling
- ▶ Housing/sheds: hydrocarbons (fuel and oil storage and use), pesticides and herbicides, lead paint and asbestos
- ▶ Landfilling, waste disposal: hazardous materials, hydrocarbons, metals/metalloids, phenols, polychlorinated biphenyls, phthalates, volatiles, pesticides and herbicides
- ▶ Existing non-operational Boggabilla rail corridor: metals, asbestos, hydrocarbons, pesticides and herbicides
- ▶ Roads: metals and hydrocarbons
- ▶ Unknown fill material in the rail corridor: asbestos, metals/metalloids and hydrocarbons.

Further information on contamination is provided in Chapter 15: Land Resources and Contamination.

4.3.3 Hydrology, flooding and water quality

The proposal is located within the Border Rivers catchment, which is part of the Murray–Darling Basin. Key waterways within the study area include:

- ▶ Macintyre River
- ▶ Mobbindry Creek
- ▶ Forest Creek
- ▶ Back Creek
- ▶ Whalan Creek.

The proposed alignment also crosses numerous small ephemeral creeks that experience water flows during high rainfall events.

The northern portion of the proposal's alignment traverses the Macintyre River floodplain and associated tributaries and has a range of key geomorphological features. The banks of the river are 50 m to 100 m wide and have a substantial cover of weedy species. Aside from strands of vegetation along the riparian zone of the Macintyre River, the floodplain has been cleared for agricultural purposes. Some landowners have built contour banks and dams to capture water as it flows across the floodplain. There are also several irrigation channels within the study area that convey pumped irrigation water from the Macintyre River to properties on the southern floodplain.

There is a strong presence of alluvium deposits associated with sediments deposited through the transportation of channelled stream water. The main form of alluvium deposit in the Moree Plains and Gwydir region is likely to consist of prairie soils, black earths and grey clays that have developed on finer-grained sediment. Alluvium deposits in the region will potentially result in deposits of sand, silt or silty clay on low ridges along floodplains.

Ephemeral creeks within the proposal area sit predominantly within broad floodplains and are often impacted by rural land use activities such as clearing. In-stream habitats are commonly runs and pools are expected to be present after rain. Watercourses within the proposal area typically consist of gravel and/or sandy bed composite, and silt at some sites, and are not expected to be resistant to scour if exposed to high-velocity waters.

The local area has a long history of flooding. Significant flood events occurred in 1996 and 1976. During the 1976 flood event, the water level peaked at approximately 221 mAHD, while during the 1996 flood event, the water level peaked at approximately 220 mAHD.

Compared to the floods of 1976 and 1996, the floods of 2011 and 2012 were not as severe across the southern floodplain; however, the floods of 2011 and 2012 resulted in severe flooding of the Macintyre River at Boggabilla and other downstream localities.

Overall, within the study area, there is a high degree of connectivity between surface water features, such as rivers and creeks, and underlying groundwater systems. Several GDEs, dependent on either the surface or subsurface expression of groundwater, have been identified within the study area.

Further information on hydrology, flooding and water quality is provided in Chapter 13: Surface Water and Hydrology. GDEs are discussed in more detail in Chapter 14: Groundwater.

4.4 General socio-economic environment

A summary of the general socio-economic environment likely to be impacted by the proposal is provided below.

4.4.1 Heritage

4.4.1.1 Aboriginal heritage

The proposal is located within the New England North West region of the NSW Local Aboriginal Land Council. The Toomelah Local Aboriginal Land Council is the respective Land Council for the proposal site. The proposal is also located within the Gomeroi People's Native Title Claim, which was accepted by the Australian Government in 2011. A determination on the Native Title Claim has not been made.

Much of the proposal occurs within the existing non-operational Boggabilla rail corridor that has been heavily disturbed. However, the new section of rail corridor between Whalan Creek and the NSW/QLD border has not been previously disturbed by transport infrastructure but has been disturbed by other land use activities, including grazing land, grazing-modified pastures and cropping land. Further information is provided in Chapter 22: Land Use and Property.

During development of the EIS, 54 Aboriginal archaeological heritage sites in proximity to the proposed alignment were identified, including three previously registered sites in the Aboriginal Heritage Information Management System (AHIMS). The sites consisted of carved and scarred trees, artefact scatters and isolated artefacts. During field surveys of the study area, a range of bush foods and bush medicines were also identified.

Further information on Aboriginal heritage is provided in Chapter 12: Heritage.

4.4.1.2 Historical heritage

During development of the EIS, 17 historical heritage sites in proximity of the proposed alignment were identified. Sites are located within the proposed rail corridor (historic rail sidings, bridges and fettlers (construction) camps). Given the regional setting of the proposal, the potential for additional historical heritage sites to be encountered during construction or operation of the proposal is considered low.

Further information on historical heritage is provided in Chapter 12: Heritage.

4.4.2 Land use and ownership

Other than the existing non-operational Boggabilla rail corridor, existing land uses within the study area include grazing land, grazing modified pastures and cropping land. This is consistent with the fact that agricultural production is the cornerstone of the region's economy and is the primary industry of employment across the proposal site. Some land within the study area is used for transport and communication, particularly where the proposal intersects existing roads and utilities.

The existing non-operational Boggabilla rail corridor is owned by the NSW Government. Properties outside the Boggabilla rail corridor that intersect the study area include freehold land, one parcel of land with NSW Government tenure, one parcel of land with unknown tenure, and four parcels of Crown land used as Travelling Stock Reserves (TSRs).

Land acquisitions may be needed to ensure that all infrastructure associated with the proposal is within the ultimate Inland Rail corridor. Where appropriate, land acquisitions will be carried out in accordance with the *Land Acquisition (Just Terms) Compensation Act 1991* (NSW). The extent of property acquisitions will be confirmed during the detailed design phase, in consultation with the affected landowners.

Further information is provided in Chapter 22: Land Use and Property.

4.4.3 Socio-economic

4.4.3.1 Population centres

The proposal is within two LGAs: the southern section of the proposal is within the Gwydir LGA and the northern section is within the Moree Plains LGA. Both LGAs adjoin the NSW/QLD border. The closest population centres are:

- ▶ North Star
- ▶ Boggabilla
- ▶ Toomelah
- ▶ Goondiwindi.

North Star is located approximately 900 m south of the proposed alignment. It had a population of 230 people at the 2016 Census.

Boggabilla, with a strong rural history, is located approximately 8.5 km west of the proposed alignment. It had a population of 990 people at the 2016 Census, with 56 per cent of the population identifying as Aboriginal.

Toomelah is an Aboriginal community located approximately 2.5 km east of the proposed alignment, adjacent to the Macintyre River. At the 2016 Census, more than 98 per cent of Toomelah residents identified as Aboriginal, and more than 50 per cent of the population was aged 24 years or younger. The lack of community-based employment and intergenerational welfare dependency mean that socio-economic conditions in Toomelah are very poor.

North Star, Boggabilla and Toomelah are all predominantly comprised of low-density urban forms, open spaces, and farming and grazing activities.

4.4.3.2 Industry and employment

Agriculture, forestry and fishing is the primary industry of employment across the study area, accounting for more than 45 per cent of Gwydir LGA's workforce and 25 per cent of Moree Plains' workforce.

The unemployment rate in Gwydir LGA has remained slightly above the NSW average over the past five years; however, unemployment has been consistently higher in the Moree Plains LGA.

4.4.3.3 Landscape character and amenity

The visual character of the study area is predominantly rural, with agricultural activities dominating the landscape. Other dominant features of the landscape include the existing non-operational Boggabilla rail line, Bruxner Way and Tucka Tucka Road.

Given the rural nature of the study area, ambient noise levels are relatively low. Current noise-generating activities include agricultural activities, road traffic, and rail operations south of North Star. Similarly, existing concentrations of airborne particulate matter and pollutants are relatively low. The main activities affecting air quality within the proposal site include road traffic, agricultural activities and the prevailing meteorological conditions.

Further information is in Chapter 16: Noise and Vibration, Chapter 17: Air Quality and Chapter 23: Socio-economic Impact Assessment.