7. Proposal features and operation

This chapter provides a description of the proposal's features and operation for the purposes of the EIS. It includes a description of the approach to avoiding/minimising impacts during the design of the proposal, the infrastructure proposed, land acquisition likely to be required, and how the proposal would operate. The proposed approach to construction of the proposal is described in chapter 8.

7.1 Overview

7.1.1 The proposal

The key features of the proposal, which are shown in Figure 1.2, are as follows:

- upgrading the track, track formation, and culverts within the existing rail corridor for a distance of 106 kilometres between Parkes and Narromine
- realigning the track where required within the existing rail corridor to minimise tight curves
- providing three new crossing loops within the existing rail corridor, at Goonumbla, Peak Hill, and Timjelly
- providing a new 5.3 kilometre long rail connection to the Broken Hill line to the west of Parkes, ('the Parkes north west connection'), including a road bridge over the new section of rail at Brolgan Road ('the Brolgan Road overbridge').

The key features of the proposal are described in sections 7.2 and 7.3.

Ancillary work would include works to level crossings, signalling and communications, signage, fencing, and services and utilities. Ancillary works are described in section 7.4.

The Parkes to Narromine line is an existing operational rail line, which would continue to operate prior to, during, and following construction of the proposal. Accordingly, the existing operation of the Parkes to Narromine line, described in section 2.5, does not form part of the proposal. Any associated maintenance works and other minor works, undertaken by ARTC in accordance with existing ARTC procedures and processes and under relevant State legislative requirements on this existing line, does not form part of the proposal.

7.1.2 Approach to avoiding or minimising potential impacts during the design process

The approach to design development (shown in Figure 7.1) has included a focus on avoiding and/or minimising the potential for impacts during all key phases of the process.

As described in chapter 6, the multi-criteria assessments undertaken during the option selection and design process included consideration of environmental and social impacts. Various options assessments have been undertaken, and the preferred option chosen based on the outcome of the assessments. The options assessment process also included assessment of opportunities and risks.

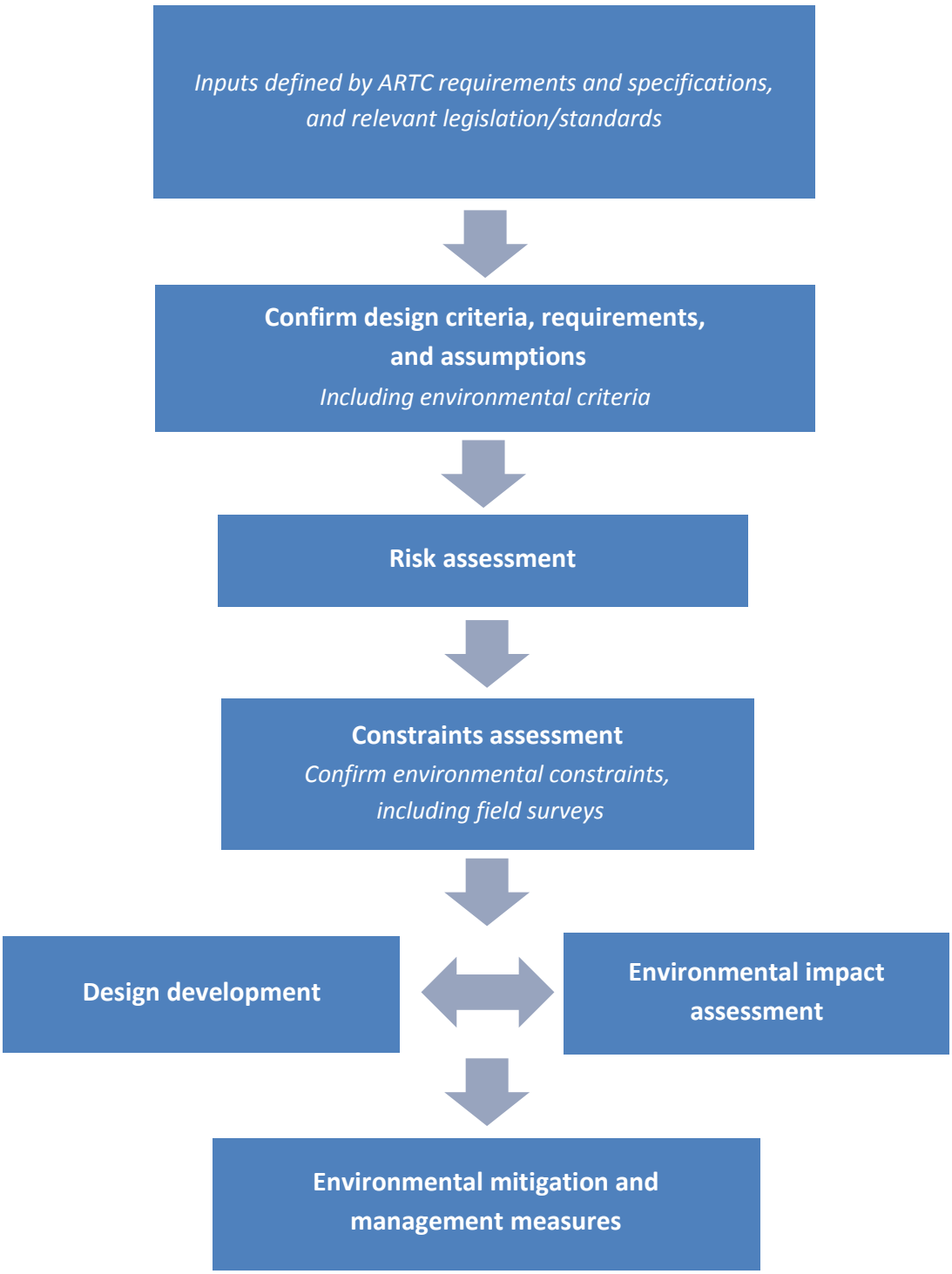

Figure 7.1 Approach to avoiding and minimising impacts during the design process

Reuse of material

Track upgrade works make up a large part of the overall proposal. A standard rail formation design involves removing all existing material and replacing it with 'structural' and 'capping' materials. These materials are specification controlled, and are therefore generally required to be imported onto a site from a quarry or other suitable location. Importing material and exporting spoil requires truck movements.

For the proposal, the track works have been designed to reuse as much existing material as possible. Geotechnical investigations have been undertaken to identify what materials are contained within the proposal site. This has enabled the proposal to include reuse of as much existing material as possible via a site-specific formation design.

By undertaking this approach, import quantities have been reduced, and excess spoil quantities have been further reduced.

7.2 Description of key proposal features within the existing rail corridor

This section describes those features of the proposal that would be located within the existing rail corridor.

7.2.1 Track upgrading

The existing track would be upgraded within the existing rail corridor for a distance of 106 kilometres. All of the existing track would be upgraded in some way. As noted in section 6.3.1, this would involve a combination of:

- track reconstruction
- skim reconditioning
- skim plus reconditioning.

Track reconstruction would involve replacing the existing track and formation. An indicative design for this form of treatment is provided in Figure 7.2.

Skim reconditioning would involve using the existing track ballast and sub-ballast as structural capping on the existing consolidated subgrade. An indicative design for this form of treatment is shown in Figure 7.3.

Skim plus reconditioning would involve a combination of skim reconditioning and track reconstruction. This form of treatment seeks to reuse as much existing material as possible. An indicative design for this form of treatment is shown in Figure 7.4.

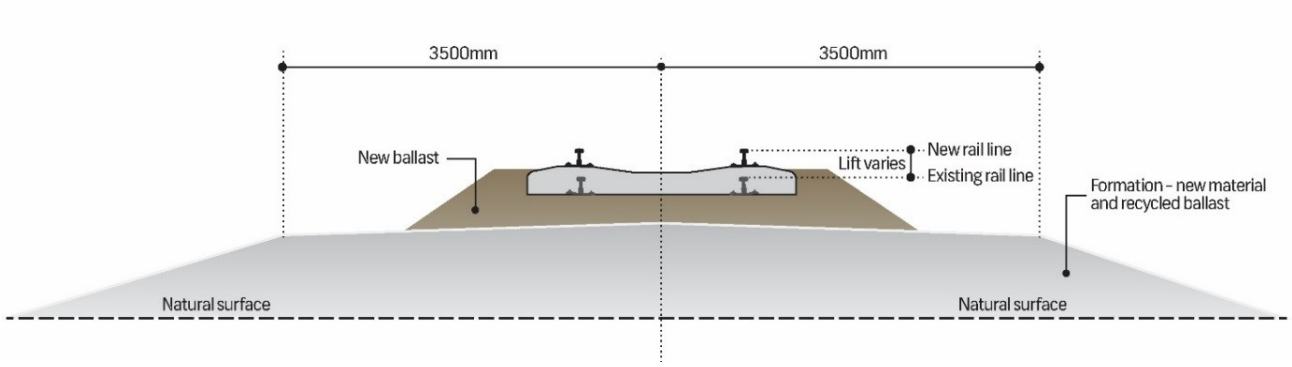

Figure 7.2 Track reconstruction

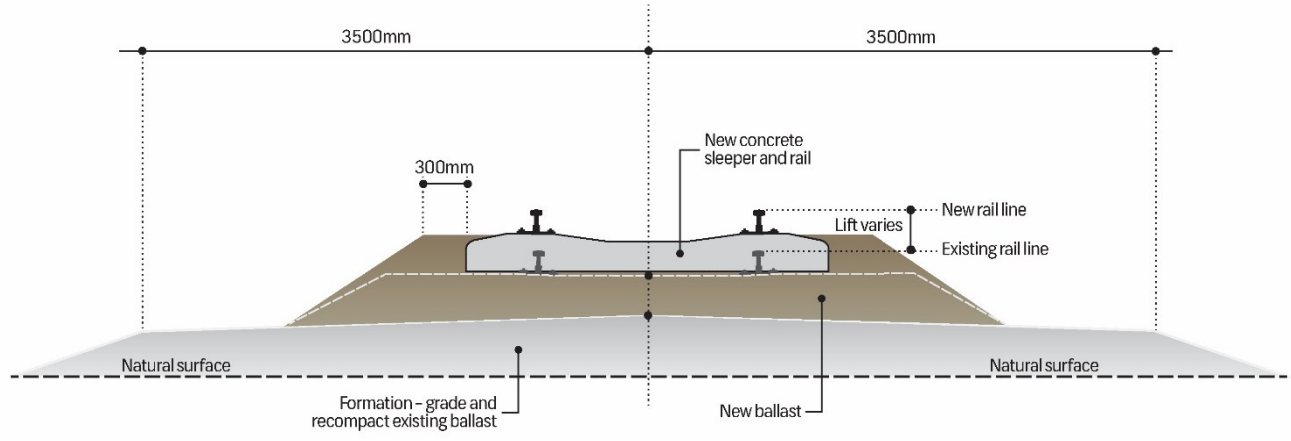

Figure 7.3 Skim reconditioning

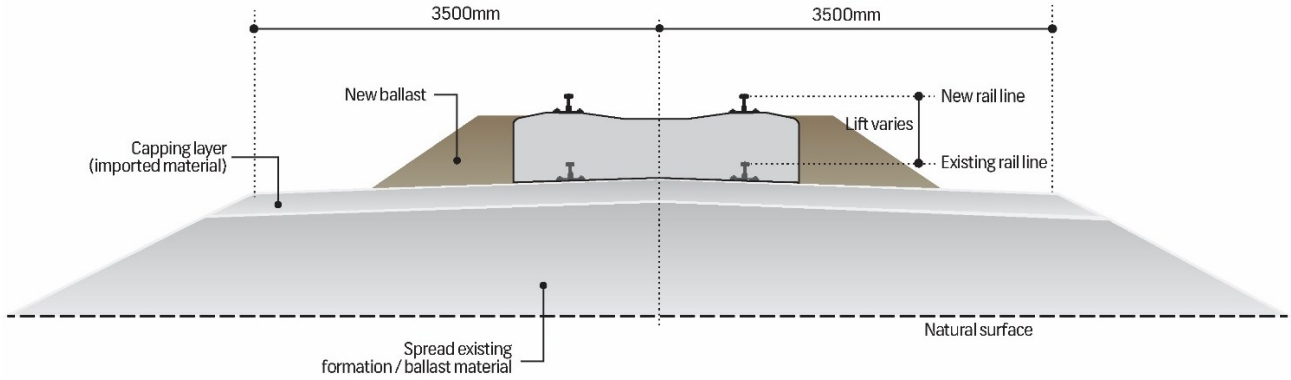

Figure 7.4 Skim plus reconditioning

7.2.2 Culvert upgrading

There are 165 culverts located along the proposal site. The majority of these need to be replaced as part of the proposal to meet Inland Rail operational requirements. The design of replacement culverts has been informed by a hydrologic and hydraulic assessment of the proposal site, and an assessment of existing structures. An assessment of flooding events has been undertaken for each culvert. The target design condition for the new culverts is the 100-year average recurrence interval (ARI) runoff event (one per cent annual exceedance probability (AEP) event), where reasonably practicable. Geotechnical investigations were also completed along the alignment to provide additional information for the culvert design.

Replacement culverts have been designed with the intent to:

- take into account local constraints and flooding/hydrological conditions (described in chapter 15)
- permit an appropriate flow and minimise the potential for adverse flooding impacts, by:
  - locating culverts at low points along the proposal site to prevent upstream water ponding
  - ensuring that the inside base of the culverts match the bed of the watercourse
  - retaining (at a minimum) the existing flow
  - minimising the potential for increases in the area of flood inundation
  - ensuring that sizes and capacities are as close to the existing situation as practicable, to minimise impacts on adjacent land and infrastructure

- meet ARTC design standards
- ensure that the flooding situation is no worse than the existing situation.

The culverts would be constructed of concrete, and would consist of three types:

- low level culvert consisting of twin cells, with approximate dimensions for each cell of 300 millimetres high by 755 millimetres wide
- mid level culvert consisting of a single cell with approximate dimensions of 700 millimetres high by 2.6 metres wide
- high level culvert consisting of a single cell with approximate dimensions of 1.5 metres high by 2.5 metres wide.

7.2.3 Crossing loops

Three new crossing loops are proposed at Goonumbla, Peak Hill and Timjelly. The loops would be constructed as new sections of track roughly parallel to the existing track. They would each be 2.2 kilometres long, to fit the design length of the train (1.8 kilometres). The existing rail corridor is of sufficient width to accommodate the new crossing loops.

An indicative crossing loop design is shown in Figure 7.5. The loops are shown in Figure 7.6 to Figure 7.8.

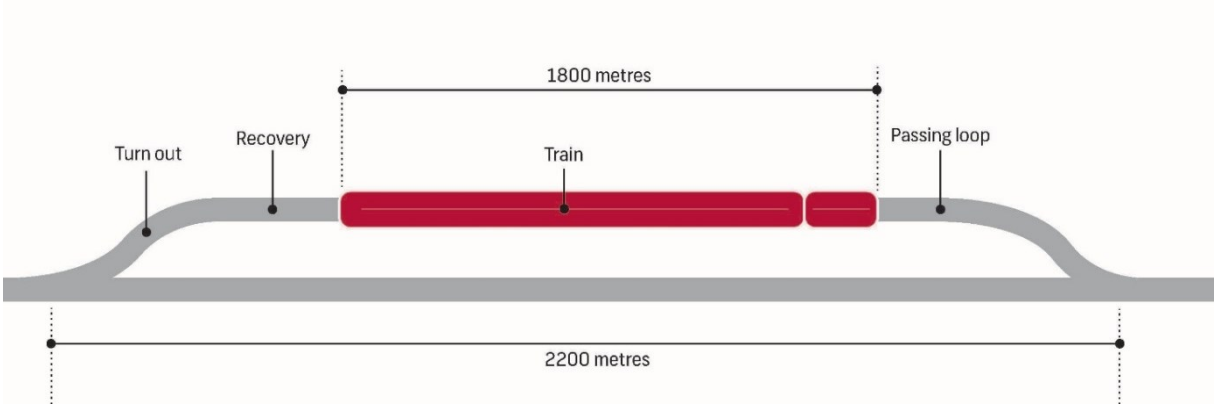

Figure 7.5 Indicative crossing loop

7.2.4 Turnouts

Turnouts enable trains to be guided from one track to another. The proposal involves replacing some existing turnouts, and providing new turnouts, as described below.

New turnouts

Turnouts would be constructed at the beginning and end of each of the crossing loops (six in total).

An additional three turnouts are proposed as part of the construction of the Parkes north west connection. Refer to section 7.3.1 for further information.

Replacement turnouts

Six turnouts would be replaced at existing sidings. All siding turnouts are maintained by ARTC under agreement with the siding owner.

Figure 7.6
Goonumbla crossing loop

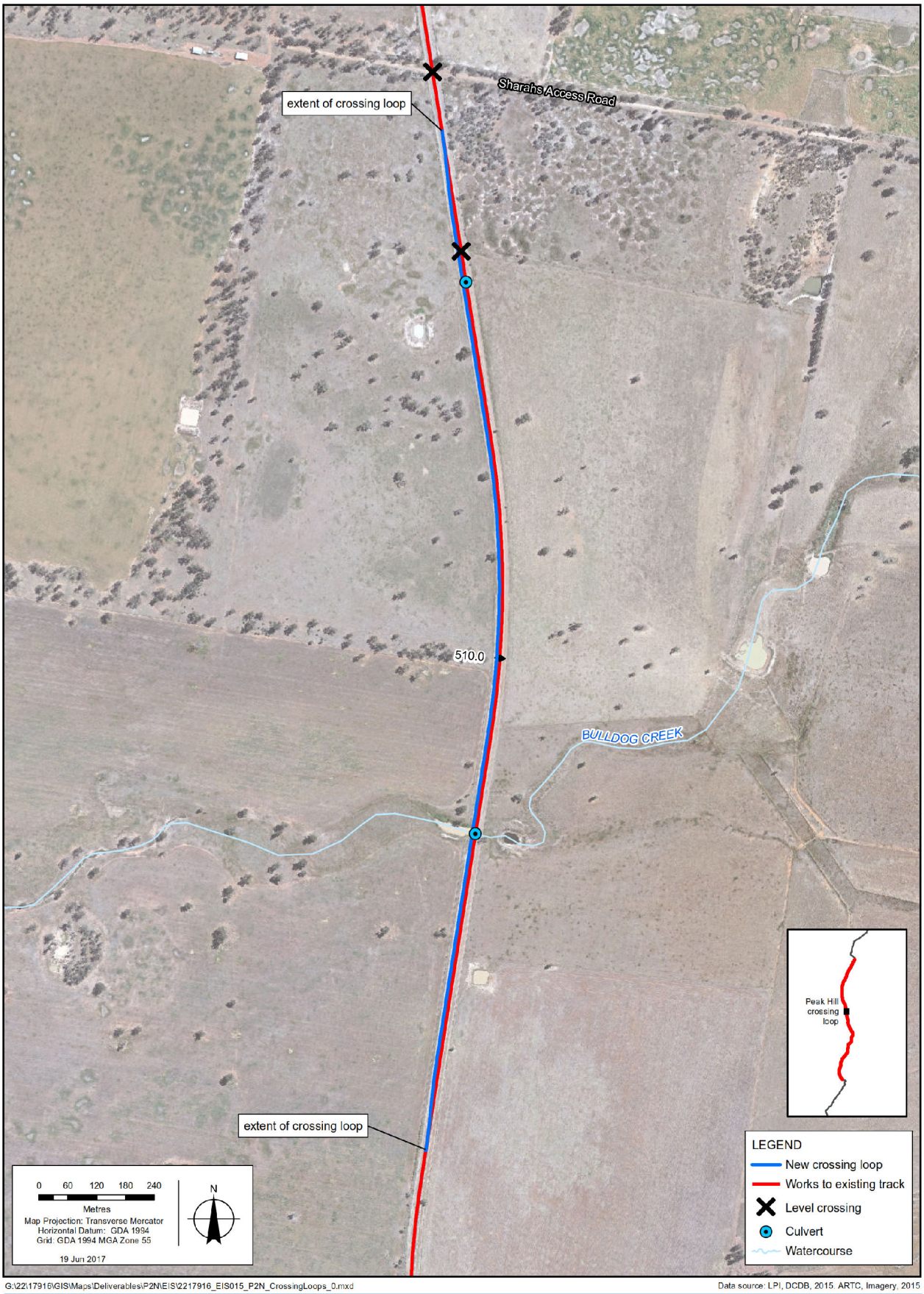

Figure 7.7
Peak Hill crossing loop

Figure 7.8
Timjelly crossing loop

7.3 Description of key proposal features outside the existing rail corridor

This section describes those features of the proposal that would be located outside the existing rail corridor.

7.3.1 Parkes north west connection

The Parkes north west connection (shown in Figure 7.9) would involve:

- 5.3 kilometres of new track and formation, including three turnouts and four culverts
- an access track within the new rail corridor next to the track
- a road overbridge at Brolgan Road
- crossing of Millers Lookout Road and Coopers Road.

Further information on the features of the Parkes north west connection is provided below.

New track

As described in section 2.2, the proposal site for the new section of track would cross rural land between the existing Broken Hill line and the Parkes to Narromine line, travelling to the north of the Parkes Hub. The proposal site traverses flat to undulating terrain resulting in a variety of embankment types, including a cutting of six metres to the north of Brolgan Road.

The features of the new section of track would be similar to the upgraded track (described in section 7.2) and would include:

- track formation
- ballast, sleepers, and rails
- culverts
- turnouts
- drainage
- signalling and communications.

Typical sections are shown in Figure 7.10 and Figure 7.11.

Three turnouts are proposed to provide connections to the Parkes to Narromine line (one connection – the northern turnout) and the Broken Hill line (two connections – the eastern and western turnouts). Four culverts are required to cross ephemeral watercourses located across the proposal site.

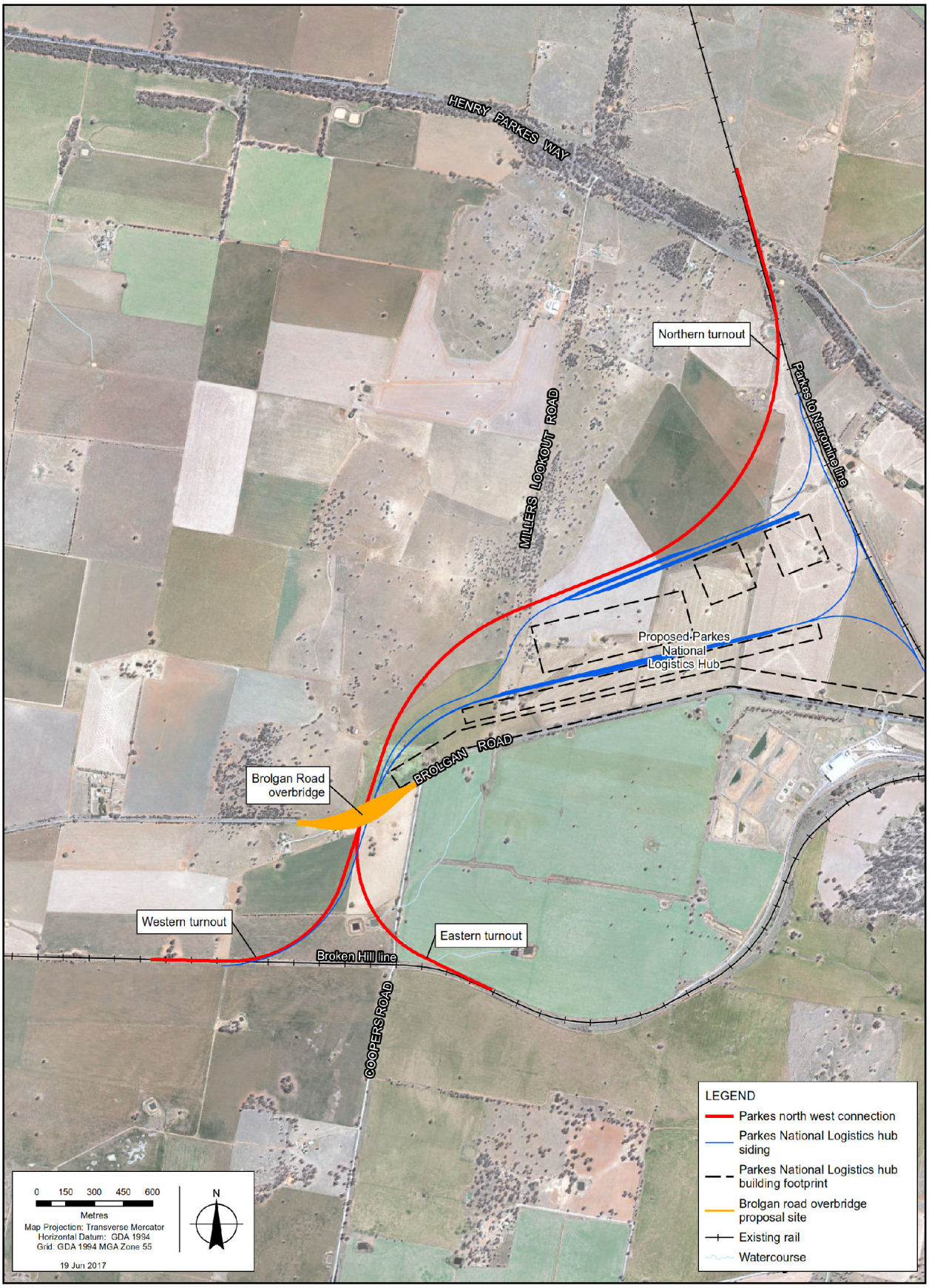

Figure 7.9
Parkes north west connection

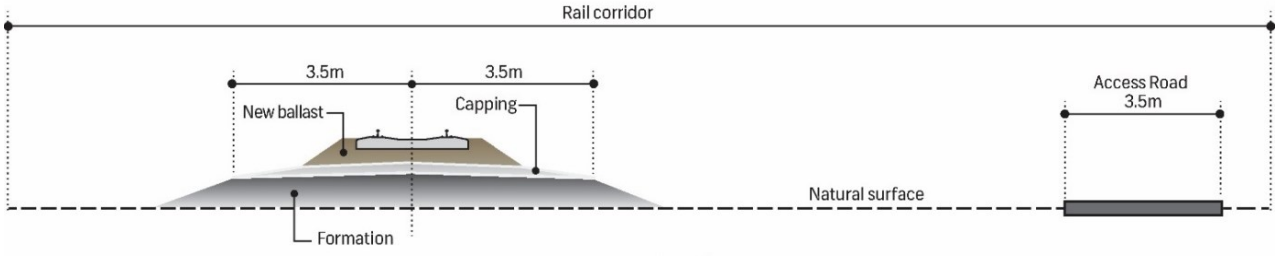

Figure 7.10 Parkes north west connection – typical section

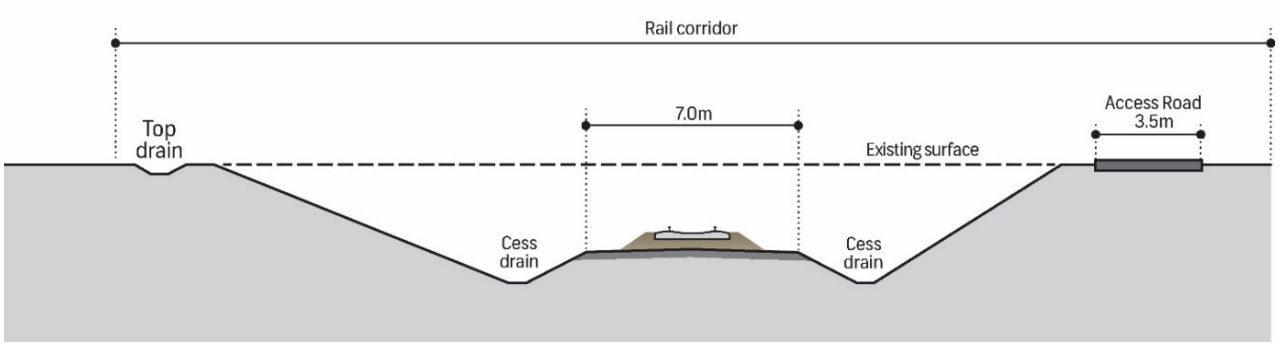

Figure 7.11 Parkes north west connection – section in cut

Road crossings

The Parkes north west connection would cross Millers Lookout Road about 675 metres to the north of Brolgan Road, and 2.3 kilometres to the south of its intersection with Henry Parkes Way. The eastern turnout of the Parkes north west connection would cross Coopers Road about 110 metres to the north of the existing level crossing on the Broken Hill line, 845 metres to the south of the intersection of Coopers Road and Brolgan Road, and 2.8 kilometres to the north of the intersection of Coopers Road and London Road.

The need for any road changes would be determined during the detailed design phase following further investigations and consultation with relevant stakeholders (including Parkes Shire Council).

7.3.2 Brolgan Road overbridge

An overbridge is proposed to enable Brolgan Road to cross the Parkes north west connection with sufficient clearance for double stacked Inland Rail trains to pass beneath. To enable access along Brolgan Road to be maintained during construction, the overbridge would be constructed 'offline' and to the north of Brolgan Road. The overbridge would consist of 1,040 metres of new two-lane road with a design speed of 80 kilometres per hour, and would include a bridge structure and two tie-ins.

Key features of the overbridge are described on the following page and are shown in Figure 7.12.

Bridge structure

The bridge structure would consist of:

- single 22 metre long span super T girders, supported on cast insitu reinforced concrete piers/abutments, and founded using reinforced concrete bored piles
- road pavement 23 metres long and 11 metres wide, consisting of two lanes with a width of 3.5 metres each, and two shoulders with a width of two metres each
- the maximum bridge height would be nine metres, which would provide a minimum clearance above Inland Rail trains of 6.5 metres

- reinforced soil wall abutments with a maximum height of 10 metres
- maximum grade of four percent over 110 metres
- throw screens on both sides of the bridge.

Tie-ins

New sections of road (known as 'tie-ins') would be constructed at the eastern and western ends of the overbridge to connect the bridge to the existing section of Brolgan Road. The tie-ins would be about 500 metres long (each) and 11 metres wide, and would consist of two lanes with a width of 3.5 metres each, and two shoulders with a width of two metres each.

The western tie-in would commence about 730 metres west of the existing intersection between Brolgan Road and Coopers Road. The eastern tie-in would commence about 335 metres east of this intersection.

Retain existing section of Brolgan Road

Construction of the overbridge would leave a short section of Brolgan Road about 1.1 kilometres long to the south of the overbridge. This section of road would be retained for local access purposes (to be confirmed in consultation with Parkes Shire Council).

7.4 Ancillary works and infrastructure

7.4.1 Track drainage

Drainage in the form of a cess drain would be installed within the rail corridor adjacent to the track. Cess drains are surface drains located to the side of the tracks, used to remove water that percolates through the ballast and flows along the capping layer towards the outside of the track formation. Cess drains are used to protect the track formation by keeping it dry.

As the proposal site is relatively flat, cess drains are proposed where the upstream catchment has an area of 5,000 square metres or greater, and is within 25 metres of the rail line.

The cess drains would be positioned towards the outer limit of the rail corridor, with the surrounding earthworks shaped to shed water towards its location.

7.4.2 Spoil mounds

Excess material resulting mainly from the excavation of track formation and cess drains would be stockpiled along the rail corridor. The stockpiles would be located as close as possible to the source of the excavated material and would be formed into permanent spoil mounds, spread out to minimise height. Spoil mounds would be designed to have a maximum height of two metres (about one metre above the height of the rails), and in some cases, may need to be located on both sides of the rail track. The mounds would be stabilised as required.

Gaps in the spoil mounds would be provided to allow water to drain away from the formation. The location, sizing and design of the mounds would be determined during the detailed design phase, with consideration given to the results of hydraulic modelling and sight distances. Mounds would not be located in areas where they would impact on flooding or drainage.

An indicative cross section of the proposal with spoil mounds on both sides of the corridor is shown in Figure 7.13.

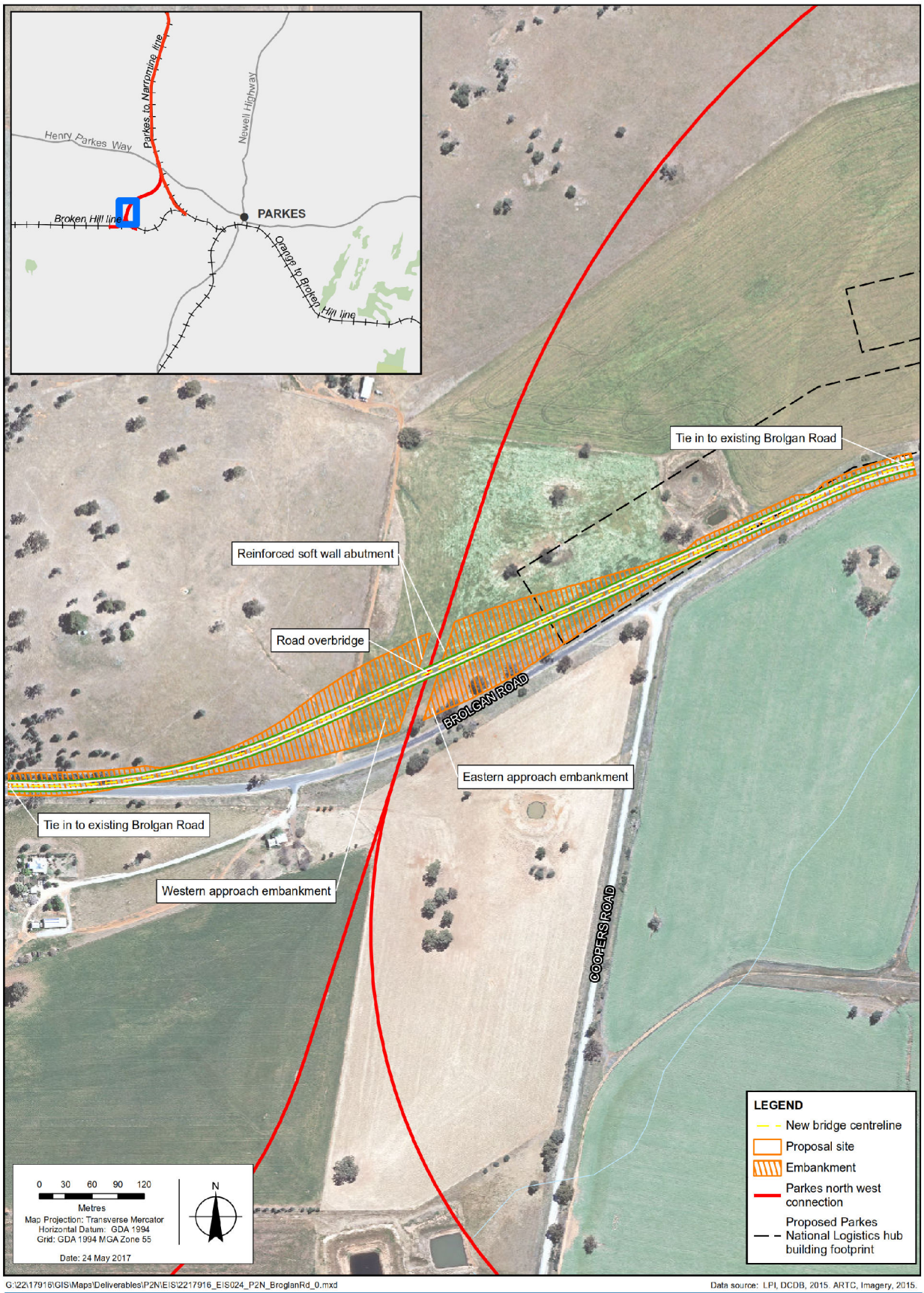

Figure 7.12
Brolgan Road overbridge

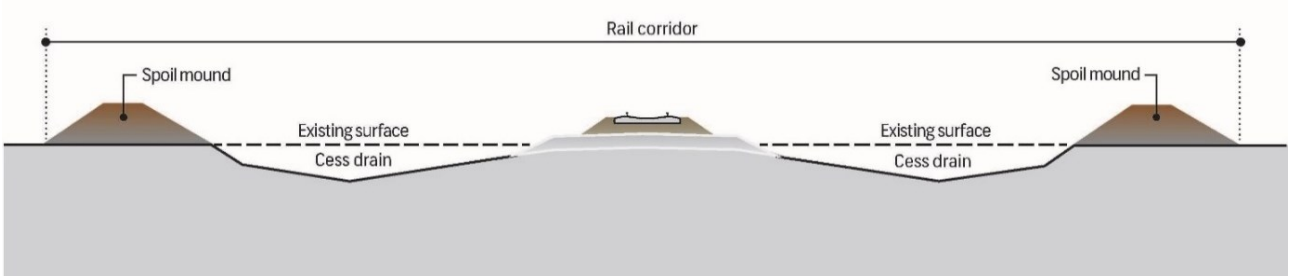

Figure 7.13 Indicative spoil mound cross-section

7.4.3 Level crossings

Works at the majority of the 71 level crossings along the proposal site are required to ensure crossings meet relevant Australian and ARTC level crossing design standards. The preferred option for level crossings, developed as an outcome of stage 1 of the level crossing strategy, involves a mix of retaining/refurbishing existing crossings, considering the consolidation of some crossings, upgrading the level of control, or installing a gated crossing.

ARTC is currently undertaking stage 2 of the level crossing strategy, which involves consulting with relevant stakeholders (including landowners and road owners) to confirm the preferred approach, and finalising the designs for the works at each crossing.

Where an existing access to or within a property is proposed to be removed, altered, or severed, additional works to reinstate access to the property would be undertaken. This may require works outside the rail corridor.

Further information on the level crossing strategy is provided in section 6.3.3.

Upgrading signalling and communications

Signalling and communications would be upgraded as part of the level crossing works, to enable any level crossings with active controls to tie into the rail network.

ARTC's Advanced Train Management System (ATMS) would be implemented to manage signalling and communications for the wider rail network. ATMS is a communication based train management system, which communicates via both voice and data between Network Control Centres and locomotives operating on ARTC's rail network.

New fencing

Existing fencing along the rail corridor would be replaced as required. Where the corridor abuts a public road, fencing would be installed on the track side only. The fencing would consist of a standard stock fence (1.2 metres high).

Signage

Signage would be provided/replaced where required.

7.5 Land acquisition

The existing rail corridor is owned by the NSW Government (Transport for NSW) and leased by ARTC. The majority of the proposal would be undertaken within the existing rail corridor or on land for which ARTC has existing access agreements.

A limited amount of property acquisition would be required, as summarised in Appendix G. The extent of property impacts would be refined and confirmed during detailed design in consultation with property owners. For partial acquisitions, property adjustment plans would be developed in consultation with the property owner.

Leasing requirements are unknown at this stage. Consultation regarding agreements would be undertaken with landowners prior to works commencing.

All acquisitions would be undertaken in accordance with the requirements of the *Land Acquisition (Just Terms) Compensation Act 1991*.

7.6 Operation of the proposal

7.6.1 Train operations

The proposal would form part of the rail network managed and maintained by ARTC. Train services would be provided by a variety of operators. The existing operation of the Parkes to Narromine line (described in section 2.5.2) will continue prior to, during, and following construction of the proposal. Inland Rail as a whole would be operational once all 13 sections are complete, which is estimated to be in 2025.

Inland Rail would involve operation of a single rail track with crossing loops, to accommodate double stacked freight trains up to 1.8 kilometres long and 6.5 metres high. Train speeds would vary according to axle loads, and range from 80 to 115 kilometres per hour.

It is estimated that Inland Rail would be trafficked by an average of 8.5 trains per day in 2025, increasing to the estimated maximum of 15 trains per day in 2040. This rail traffic would be in addition to the existing rail traffic using the Parkes to Narromine line. If business and market demands require increased capacity, consultation with relevant agencies would be undertaken, and approvals sought as required.

Figure 7.14 shows the projected growth in the number of Inland Rail trains that would travel between Melbourne and Brisbane between the commencement of operation of Inland Rail (2025) and 2040. These numbers do not include existing train volumes.

The trains would be a mix of grain, bulk freight, and other general transport trains. Total annual freight tonnages would be about 11.8 million tonnes in 2025, increasing to about 19 million tonnes in 2040 (from the existing two million tonnes of grain per year). Train stop locations would be confirmed during detailed design.

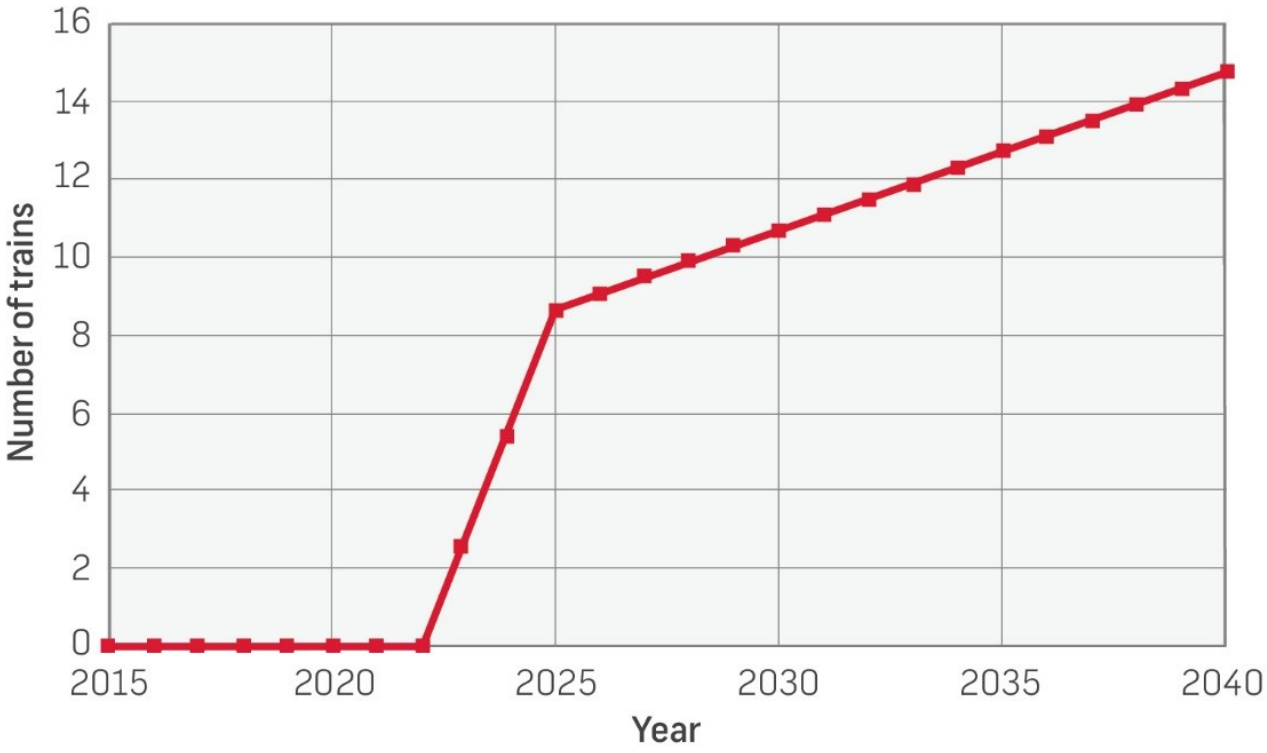

Figure 7.14 Projected growth in train numbers for Inland Rail

7.6.2 Maintenance activities

Standard ARTC maintenance activities would be undertaken during operations. Typically, these activities include minor maintenance works, such as bridge and culvert inspections, rail grinding and track tamping, through to major maintenance, such as reconditioning of track and topping up of ballast as required.