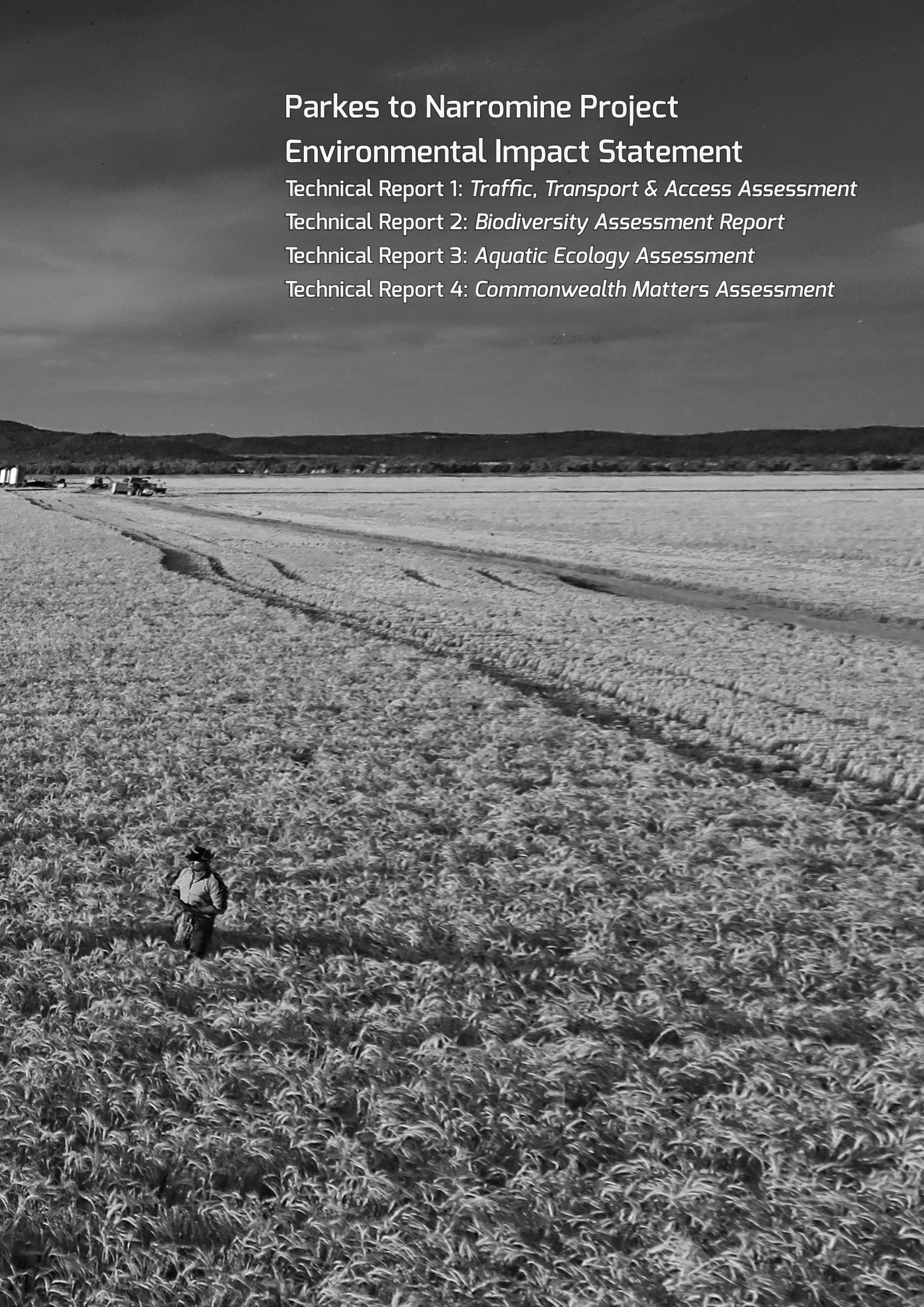
Parkes to Narromine Project
Environmental Impact Statement

Technical Report 1: *Traffic, Transport & Access Assessment*

Technical Report 2: *Biodiversity Assessment Report*

Technical Report 3: *Aquatic Ecology Assessment*

Technical Report 4: *Commonwealth Matters Assessment*



TECHNICAL REPORT 1:
Traffic, Transport & Access Assessment

Australian Rail Track Corporation

Inland Rail - Parkes to Narromine

Traffic, Transport and Access Assessment

June 2017

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Executive summary

This report details an assessment of the traffic, transport and access impacts of the Parkes to Narromine section of Inland Rail ('the proposal').

The proposal would involve upgrading the existing rail line between Parkes and Narromine, including new passing loops, some track realignment and replacement of culverts. The proposal also includes a new north to west connection between Inland Rail and the Broken Hill line (Parkes north west connection). Ancillary works will include upgrading, closing or consolidating level crossings, upgrading signalling and communications, establishing new fencing or upgrading existing fencing along the rail corridor, and relocating/protecting services and utilities.

There are 71 existing level crossings, which are crossed by the proposal, including 38 of which are on private roads. The preferred approach to level crossings consists of a mix of retaining, upgrading and investigating the potential consolidation of level crossings.

Construction

The proposal will be constructed in three stages, working from south to north.

For the majority of the construction period, the workforce would average about 150 people, who would be transported to the work site each day by bus or car. Delivery of materials would be made by truck. Total additional activity associated with construction is some 400 vehicles movements per day. A peak hourly volume of 100 vehicles (one-way) is expected. With this additional traffic, all roads used for construction access, including the Newell Highway and Henry Parkes Way, are expected to operate at Level of Service B or better. Localised traffic management would be put in place to manage traffic movement around any works that interact with the road network, including access to construction areas.

Operation

During operation of the proposal minimal traffic generation is expected. Where there is the potential for public roads to be closed, detours are available, and in most situations the number of road users who will be affected is low.

The key traffic impacts of the proposal relate to more frequent train activity at level crossings, although the proposal will allow faster train speeds which will slight reduce delays associated with individual trains. Traffic activity at most level crossings in the study area is low, and the volume of traffic likely to be delayed by train activity is not substantial. There is capacity at each level crossing for delayed traffic to queue clear of adjacent intersections.

Recommendations

It is recommended that the following measures be implemented to mitigate the potential traffic, transport and access impacts of the proposal:

- During construction
  - Preparation of a Construction Traffic Management Plan to guide the interaction of construction activities with the public road network. The Construction Traffic Management Plan should be developed in consultation with Parkes Shire Council, Narromine Shire Council and Roads and Maritime Services, and be subject to periodic review and update as agreed between the stakeholders.

- During operation
  - Provision of signage and other controls at level crossings in accordance with ARTC policy.
  - Regular review of traffic behaviour and infrastructure at level crossings to confirm that the provided level of protection continues to be appropriate.

1. Introduction

1.1 Overview

The Australian Government has committed to delivering a significant piece of national transport infrastructure by constructing a high performance and direct interstate freight rail corridor. The Inland Rail programme (Inland Rail) involves the design and construction of a new inland rail connection, about 1,700 kilometres long, between Melbourne and Brisbane, via central-west New South Wales (NSW) and Toowoomba in Queensland. Inland Rail would enhance Australia's existing national rail network and serve the interstate freight market.

Australian Rail Track Corporation Ltd (ARTC) has sought approval to construct and operate the proposal.

The proposal requires approval from the NSW Minister for Planning under Part 5.1 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

This report has been prepared by GHD Pty Ltd (GHD) as part of the environmental impact statement (EIS) for the proposal. The EIS has been prepared to accompany the application for approval of the proposal, and address the environmental assessment requirements of the Secretary of the Department of Planning and Environment (the SEARs), issued on 8 November 2016 and the terms of the assessment bilateral agreement between the Commonwealth and the State of New South Wales under the EPBC Act.

1.2 The proposal

1.2.1 Location

The proposal is generally located in the existing rail corridor between the towns of Parkes and Narromine, via Peak Hill. In addition, a new connection to the Broken Hill rail line ('the Parkes north west connection') is proposed outside the existing rail corridor at the southern end of the proposal site near Parkes. The location of the proposal is shown in Figure 1-1.

1.2.2 Key features

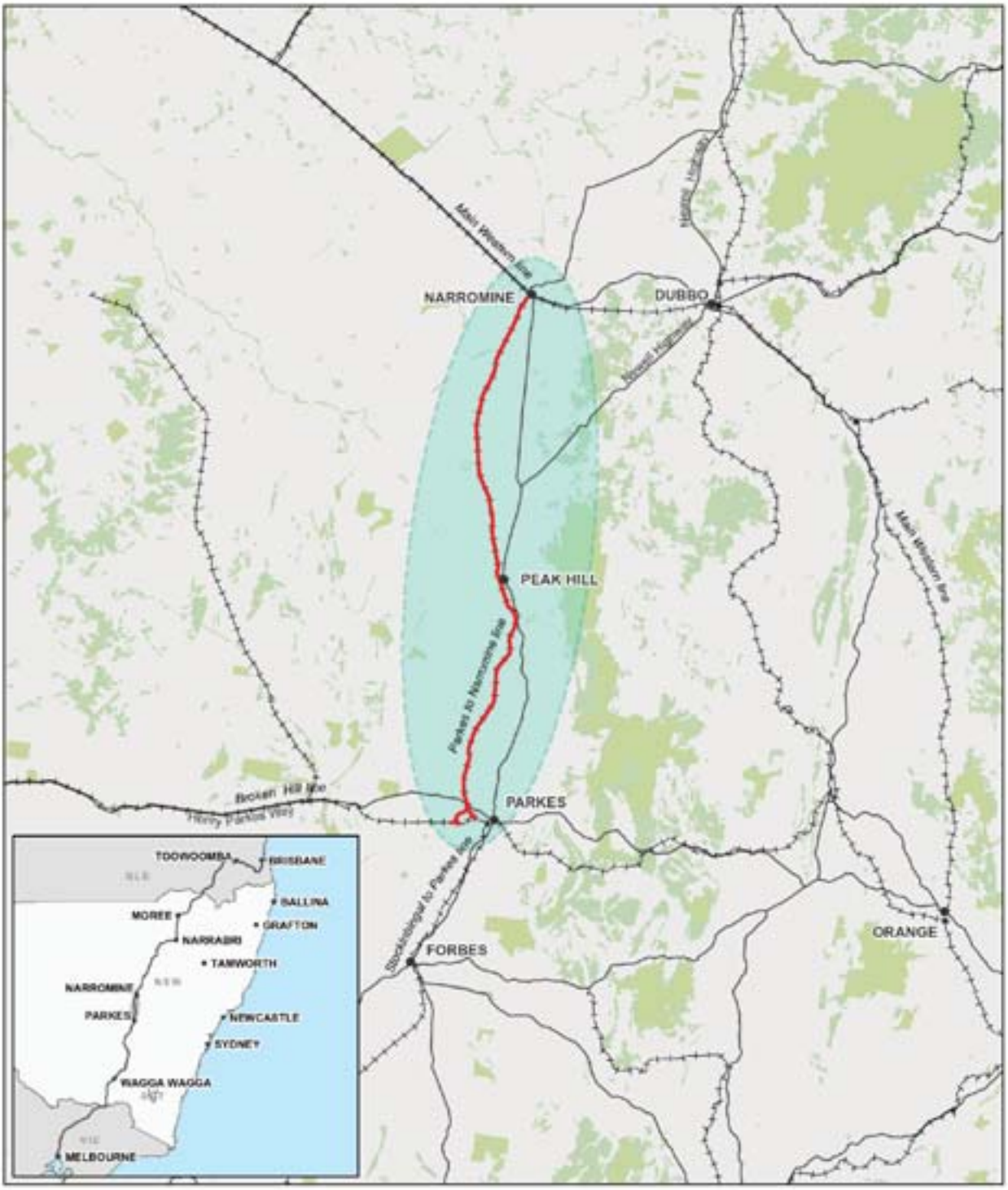
The key features of the proposal involve:

- Upgrading the track, track formation, and culverts within the existing rail corridor for a distance of 106 kilometres between Parkes and Narromine.
- Realigning the track where required within the existing rail corridor to minimise the radius of 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 existing rail corridor at Brolgan Road ('the Brolgan Road overbridge').

The key features of the proposal are shown in Figure 1-2.

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

Further information on the proposal is provided in the EIS.



LEGEND

- Proposal site
- Proposal location
- Rail lines
- Main roads

Paper Size A4

0 5 10 20 30

Kilometers

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

N

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Australian Rail Track Corporation
Inland Rail Track Alignment

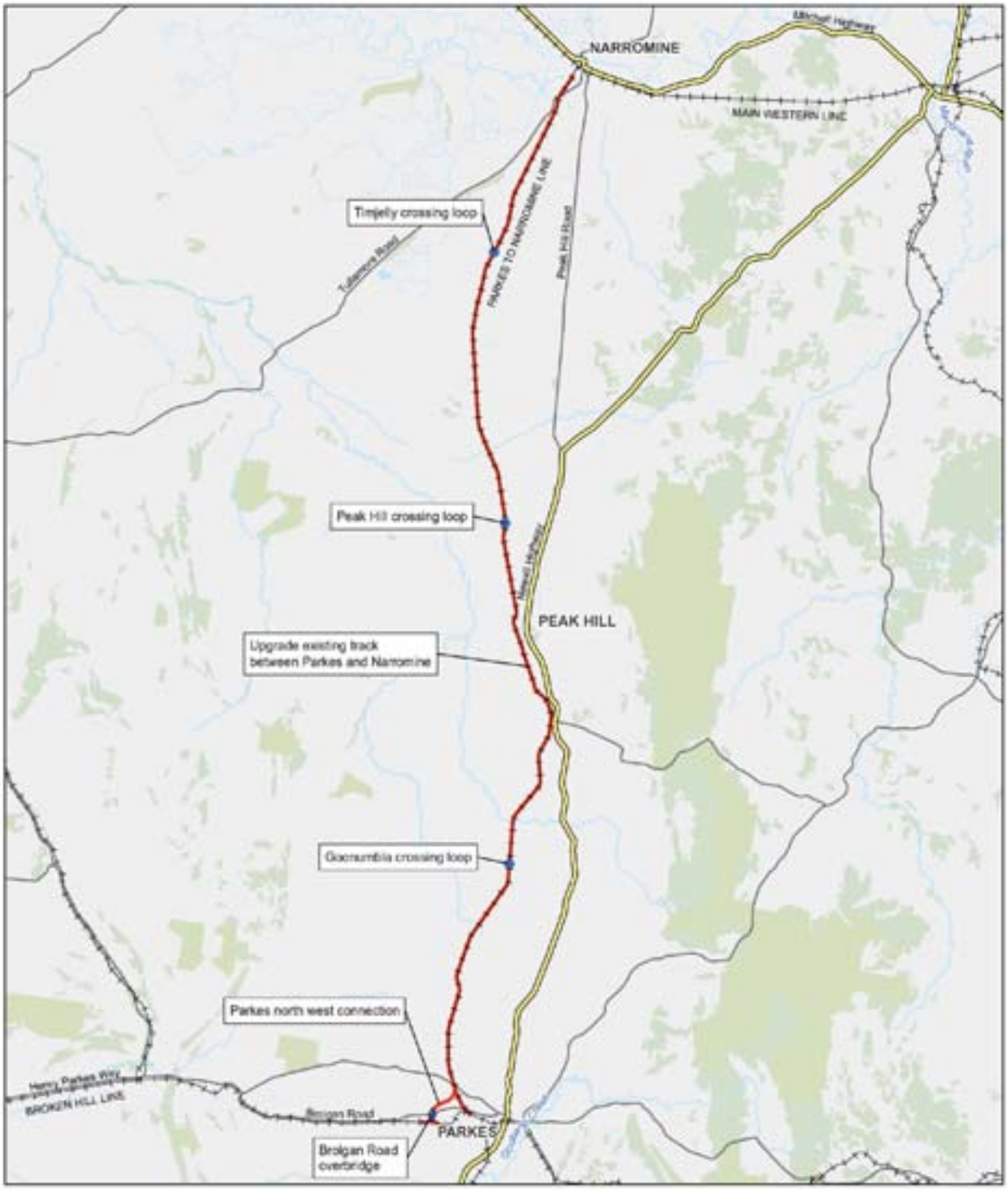
Job Number 2217516
Revision 0
Date 30 Nov 2016

Location of the proposal

Figure 1-1

180 Lonsdale Street Melbourne VIC 3000 Australia T 61 3 8687 8000 F 61 3 8687 8111 E melmail@ghd.com W www.ghd.com

Data source: Commonwealth of Australia (Geoscience Australia), 1996 1:1 megapixel Data Series 1, 2006



LEGEND

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

Paper Size A4

0 2.5 5 10 15

Kilometers

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

N

GHD

Australian Rail Track Corporation
Inland Rail Track Alignment

Job Number 2217516
Revision 0
Date 19 Jun 2017

Key features of the proposal

Figure 1-2

180 Lonsdale Street Melbourne VIC 3000 Australia T 61 3 8687 8000 F 61 3 8687 8111 E melmail@ghd.com W www.ghd.com

Data source: Commonwealth of Australia (Geoscience Australia), 1:250K Topographic Data Series 3, 2006

1.2.3 Timing

Subject to approval of the proposal, construction is planned to start in early to mid 2018, and is expected to take about 18 months. Existing train operations along the Parkes to Narromine line would continue prior to, during, and following construction. Inland Rail as a whole would be operational once all 13 sections are complete, which is estimated to be in 2025.

1.2.4 Operation

Prior to the opening of Inland Rail as a whole, the proposal would be used by existing rail traffic, which includes trains carrying grain and ore at an average rate of about four trains per day. It is estimated that the operation of Inland Rail would involve an annual average of about 8.5 trains per day in 2025, increasing to 15 trains per day in 2040. The trains would be a mix of grain, intermodal (freight), and other general transport trains.

1.3 Purpose and scope of this report

This report provides the results of the traffic and transport impact assessment of the proposal. It addresses the traffic and transport specific requirements of the SEARs, which are listed in Table 1-1. It also addresses the requirements of Roads and Maritime Services (Roads and Maritime), which are listed in Table 1-2. This report:

- Considers the impact of construction by determining the likely traffic generation, access and egress routes, and parking requirements, in the context of the surrounding road network.
- Determines the existing and future delays (total closure time) at level crossings based on train lengths, travel speeds, and pre and post-train closure times.
- Assesses impacts on travel time due to the proposal.
- Assesses impacts on the wider transport network, including impacts to access, cyclists, pedestrians, and public transport.
- Recommends measures to mitigate the impacts identified.

Table 1-1 Relevant SEARs

Requirements	Where addressed in this report
Traffic and Transport (item 17)	
1. The Proponent must assess construction transport and traffic (vehicle, pedestrian, bus services, train operation and cyclists) impacts, including, but not necessarily limited to:	
a. A considered approach to route identification and scheduling of transport movements.	Section 5.3.2
b. The number, frequency and size of construction related vehicles (passenger, commercial and heavy vehicles, including spoil management movements and track machines).	Section 5.3.1
c. Construction worker parking.	Section 5.3.6
d. The nature of existing traffic (types and number of movements) on construction access routes (including consideration of peak traffic times and sensitive road users and parking arrangements) and assessment of traffic impacts on these routes including identifying traffic management measures to mitigate any issues.	Section 3.3 Section 5.3.1 Section 6.2

Requirements	Where addressed in this report
e. Provisions proposed to ensure safe access and egress to/from the classified road network.	Section 5.3.4
f. The nature of any train paths (types and number of movements) and potential impact to these train paths due to additional track possession requirements.	Section 5.3.5
g. The need to close, divert or otherwise reconfigure elements of the road and cycle network associated with construction of the project.	Section 5.3.7
2. The Proponent must assess (and model) the operational transport impacts of the project for both road and rail, including:	
a. Existing and forecast travel demand and traffic volumes for the project (road and rail).	Section 5.4.1
b. Travel time analysis (road and rail).	Section 5.4.1
c. Performance of key interchanges and intersections by undertaking a level of service analysis at key locations.	Section 5.4.2 Section 5.4.3
d. Assessment of impacts on the operation of bus services and public transport infrastructure.	Section 5.4.9
e. Wider transport interactions (local and regional roads, cycling, public and freight transport and the broader NSW rail network).	Section 5.4.7
f. Identification of traffic and transport measures to mitigate any impacts.	Section 6.2
3. The proponent must assess the feasibility of level crossings (existing and planned) and take into account:	
a. Safety assessments.	Section 3.5
b. Consistency with any Interface Agreements and related Safety Management Plans, including draft Interface Agreements and draft Safety Management Plans.	Section 4.1
c. Operation of level crossings with regard to road and rail travel speeds, vehicle types, train lengths, train numbers, road and rail traffic volumes and sight distance.	Section 5.4.3
Health and Safety (item 9)	
1. The Proponent must assess the likely risks of the project to public safety, paying particular attention to pedestrian safety, subsidence risks, bushfire risks and the handling and use of dangerous goods.	Section 5.3.8 Section 5.4.3 Section 5.4.8 Non traffic and transport risks assessed in other reports.

Table 1-2 Roads and Maritime requirements

Requirements	Where addressed in this report
A traffic impact study prepared in accordance with the methodology set out in Section 2 of the RTA's Guide to Traffic Generating Developments 2002 and including:	
• Hours and days of construction.	Section 5.3.1
• Schedule for phasing/staging of the project.	Section 5.3.1
• Road and rail traffic volumes including: – Existing background traffic. – Project-related for each stage including construction and operation. – Projected future traffic volumes, including background and project related.	Section 3.3 Section 5.3.2 Section 5.4.2
• Traffic volumes are to also include a description of: – Ratio of light vehicles to heavy vehicles. – Peak times for existing road and rail traffic. – Peak times for project-related road and rail traffic.	Section 3.3 Section 5.3.1 Section 5.4.1
• The origin, destination and routes for construction traffic including: – Employee and contractor light traffic – Heavy traffic – Oversize and over mass traffic.	Section 5.3.2
Details of intermodal hubs required to service the project, their locations, uses and projected traffic impacts on the public road network generated by such development.	Section 5.4.1
Details of access requirements and an analysis of affected intersections are to be provided to determine their suitability. In particular, access requirements and locations to/from the classified road network, that is the Newell Highway (HW17), Henry Parkes Way (MR61), McGrane Way (MR354) and Mitchell Highway (HW7), are to be identified and provisions proposed to ensure safe access and egress.	Section 5.3.4
A description of all oversize and over mass vehicles and the materials to be transported. The shortest and least trafficked route is to be given priority for the movement of materials and machinery to minimise the risk and impact to other motorists, so far as is reasonably practicable.	Section 5.3.1
The impact of generated traffic and measures employed to ensure efficiency and safety on the public road network during construction and operation of the project.	Section 5.3.2 Section 5.4.2 Section 6.2
The level crossing feasibility study is to include a safety assessment for each level crossing. The safety assessment should be consistent with any Interface Agreements and related Safety Management Plans, including draft Interface Agreements and draft Safety Management Plans.	Section 3.5 Section 4.1 Section 5.4.3
Consideration should also be given to the operation of level crossings with regard to road and rail travel speeds, vehicle types, train lengths, road and rail traffic volumes and sight distance.	Section 5.4.3

Requirements	Where addressed in this report
The distance between rail lines and road intersections is to be measured to identify storage capacity and any short stacking risks for road traffic giving way to rail traffic. Improvements to the road network, including upgrades to rail crossings, road widening and intersection treatments, to cater for and to mitigate the impact of project-related traffic are to be identified and provided in the study.	Section 5.4.3
Vibration assessments and studies are to include the impact of construction and rail traffic on nearby road infrastructure including roads, bridges, culverts and road side furnishings.	Refer separate assessment
Proposed road facilities, access and intersection treatments, including road-rail interfaces are to be identified and be in accordance with Austroads Guide to Road Design and Roads and Maritime supplements.	Section 6.2.1
Local climate conditions that may affect road safety for vehicles used during construction and operation of the project (e.g. fog, wet weather, etc).	Section 6.2.1
A Traffic Management Plan is to be developed in consultation with Parkes Shire Council, Narromine Shire Council and Roads and Maritime prior the commencement of haulage and/or construction operations.	Section 6.2.1
Details of existing or required rail encroachments into adjoining road reserves.	Section 5.3.4

1.4 Structure of this report

The report is structured as follows.

- Section 1 – provides an introduction to the report and assessment
- Section 2 – describes the methodology for the assessment
- Section 3 – describes the existing conditions on the road and rail network
- Section 4 – outlines relevant details of the proposal
- Section 5 – outlines the impacts of construction and operation of the proposal
- Section 6 – provides mitigation measures for the impacts identified
- Section 7 – conclusion

2. Assessment approach and methodology

2.1 Methodology

The methodology for undertaking this traffic and transport impact assessment was as follows:

- Review concept design for the proposal.
- Determine the likely traffic generation of the construction activities associated with the proposal.
- Make an assessment of the traffic impacts of construction, including pedestrians, cyclists and public transport.
- Obtain traffic volume data for the road network surrounding the site and key level crossings.
- Determine the existing and future delays (total closure time) at level crossings based on train lengths, travel speeds and pre- and post-train closure times:
  - It was assumed that at active crossings the boom gates close 45 seconds prior to a train arriving and open five seconds after the end of train has passed. Actual times vary on a site by site basis, with the assumed values representing a worst-case scenario.
- Assess impacts on travel time of road users.
- Assess impacts on wider transport network, including impacts to cyclists, pedestrians and public transport.
- Determine mitigation measures for any impacts identified in the assessment.

2.2 Legislative and policy context

The following documents are referenced in SEARs for this proposal:

- Guide to Traffic Management – Part 3 Traffic Studies and Analysis (Austroads, 2007)
- Guide to Traffic Generating Developments Version 2.2 (RTA, 2002)
- Cycling Aspects of Austroads Guides (Austroads, 2014)
- NSW Bicycle Guidelines v 1.2 (RTA, 2005)
- Planning Guidelines for Walking and Cycling (DIPNR, 2004)
- NSW Sustainable Design Guidelines Version 3.0 (TfNSW, 2013)
- Central West Regional Transport Plan (TfNSW 2013)
- Western Regional Transport Plan (TfNSW 2013)
- Construction of New Level Crossing Policy (TfNSW)
- NSW Freight and Port Strategy (TfNSW 2013)
- ONRSR Railway Crossing Policy (2016)

2.3 Outcomes sought in relation to traffic and transport

The proposal will provide for more efficient and productive rail operations, while minimising impacts on the operation of the road network around the proposal. This includes managing any short-term impacts during construction, and ongoing issues once the proposal is complete and is operational.

3. Existing environment

3.1 Key roads in the study area

The road network within the study area consists mainly of local roads and private rural roads. The major roads within the study area include the Newell Highway, part of the National Highway, and Henry Parkes Way, a State Road under the management of Roads and Maritime Services.

3.1.1 Newell Highway

The Newell Highway runs generally north-south, and connects between the Goulburn Valley Highway near the Victoria/New South Wales border, and Leichardt Highway near the Queensland/New South Wales border. Within the study area, the Newell Highway runs to the east of the rail line between Parkes and Tomingley, passing through Peak Hill.

Outside of built-up areas the Newell Highway has a posted speed limit of 110 kilometres per hour, and generally comprises a single lane of travel in each direction on a single carriageway, with sealed shoulders. Overtaking lanes are provided in some locations.

3.1.2 Henry Parkes Way

Henry Parkes Way (part of Main Road 61) is an arterial road connecting Parkes and Condobolin. It is a state owned road. The proposal site crosses Henry Parkes Way about six kilometres north west of Parkes. At this location, Henry Parkes Way comprises a single lane of travel in each direction on a single carriageway, with a posted speed limit of 100 kilometres per hour.

3.1.3 Other roads

The proposal crosses a number of local roads, which are listed in Table 3-1. Local roads are managed by the relevant local government. State roads and the National Highway are managed by Roads and Maritime Services. Regional roads are managed jointly by Roads and Maritime and local government.

Table 3-1 Roads crossed by the proposal[1]

Road name	Road management	Surface type	Shoulders	Linemarking
Dandaloo Road	Local - Narromine	Sealed	No	Yes
Old Backwater Road	Local - Narromine	Sealed	No	No
Wingfield Road	Local - Narromine	Unsealed	No	No
McGrane Road (Tullamore to Narromine Road)	Regional	Sealed	No	Yes
Craigie Lea Lane	Local - Narromine	Unsealed	No	No
Narwonah Road	Local - Narromine	Sealed	No	No
Haberworth Lane	Local - Narromine	Unsealed	No	No

[1] Excluding private roads and some unnamed local roads

Road name	Road management	Surface type	Shoulders	Linemarking
Fairview Road	Local - Narromine	Unsealed	No	No
Wyanga Road	Local - Narromine	Unsealed	No	No
Tinks Lane	Local - Narromine	Unsealed	No	No
Tomingley West Road	Local - Narromine	Sealed	No	No
Kitto's Bridge Road	Local - Narromine	Unsealed	No	No
Bulgandramine Road	Local – Narromine / Parkes	Sealed	No	No
Tullamore Road (Ingalba Street)	Regional	Sealed	No	Yes
Mingelo Street	Local - Parkes	Sealed	No	No
Whitton Park Road (Attwells Lane)	Local - Parkes	Sealed	No	No
Trewilga Road	Local - Parkes	Unsealed	No	No
Mickibri Road	Local - Parkes	Unsealed	No	No
Barber Lane	Local - Parkes	Unsealed	No	No
Alectown West Road	Local - Parkes	Unsealed	No	No
Bogan Road	Local - Parkes	Sealed	No	Yes
Wyatts Lane	Local - Parkes	Unsealed	No	No
Nanardine Lane	Local - Parkes	Unsealed	No	No
Back Trundle Road	Local - Parkes	Sealed	No	Yes
Henry Parkes Way	State	Sealed	Yes	Yes
Millers Lookout Road	Local - Parkes	Unsealed	No	No
Brolgan Road	Local - Parkes	Sealed	Yes	Yes
Coopers Road	Local - Parkes	Unsealed	No	No

Also relevant to the assessment are a number of roads which run parallel to the proposal, and may be used for construction access. These are listed in Table 3-2.

Table 3-2 Roads parallel to the proposal

Road name	Road management	Surface type	Shoulders	Linemarking
Peak Hill Railway Road	Local - Narromine	Sealed	No	No
McGrane Road	Regional	Sealed	No	Yes
Tomingley Road	Regional	Sealed	Yes	Yes
Bulgandramine Road	Local – Narromine / Parkes	Sealed	No	No
Newell Highway	National Highway	Sealed	Yes	Yes
Railway Parade	Local - Parkes	Unsealed	No	No
Mickibri Road	Local - Parkes	Unsealed	No	No
Plowman Lane	Local - Parkes	Unsealed	No	No

3.2 Existing rail movements

The Parkes to Narromine line forms a cross-country link between the Main Western and the Broken Hill lines. Parkes is located on the Broken Hill line and Narromine located on the Main Western line.

3.2.1 Passenger services

The Parkes to Narromine line was closed to passenger services in the early 1970s.

The Indian Pacific, which travels between Sydney and Perth on the Main Western Line, stops at Parkes twice a week. The Broken Hill Outback Xplorer service, run by NSW TrainLink, travels to Broken Hill on Mondays and Sydney on Tuesdays.

3.2.2 Freight services

The Parkes to Narromine line is used by grain and general freight trains at an average rate of 3.8 trains per day (two way) with up to 10 trains on a peak day.

Trains using the line have a maximum length of 1,800 metres. Train speeds are limited to a maximum of 90 to 100 kilometres per hour, with local speed restrictions due to limitations associated with the existing track.

3.3 Existing traffic volumes around the proposal site and on construction access routes

Given the length of the proposal site, the access routes will vary depending on the origin of construction vehicles and the particular location of the work site. Limited traffic volume data is available for most roads in and around the study area, although based on road function, location and surrounding land use volumes are expected to range between 50 vehicles per day for lower order roads, up to 2,000 vehicles per day on some of the more significant roads connecting to Parkes. The busiest road to be affected is the Newell Highway, which is discussed below.

3.3.1 Newell Highway

Traffic volumes along the Newell Highway vary within the study area. Traffic counts (sourced from the Roads and Maritime Services Traffic Volume Viewer, www.rms.nsw.gov.au) indicate Annual Average Daily Traffic (AADT) volumes as shown in Figure 3-1, Figure 3-2 and Figure 3-3.

Tomingley

- 2,800 vehicles per day in 2015
  - 33 percent heavy vehicles
  - Peak volumes of around 220 vehicles per hour (two-way), with traffic volumes relatively consistent between 9:00 am and 5:00 pm

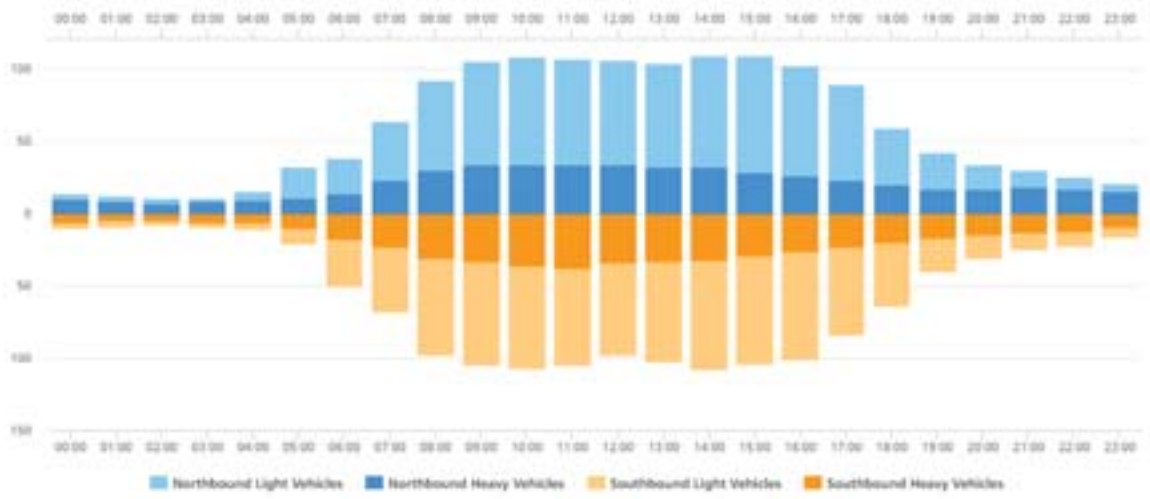


Figure 3-1 Newell Highway daily traffic profile at Tomingley 2015

Peak Hill (Caswell Street)

- 6,100 vehicles per day in 2009
  - Peak volumes of 240 vehicles per hour, in the peak direction, highest in the mid-morning

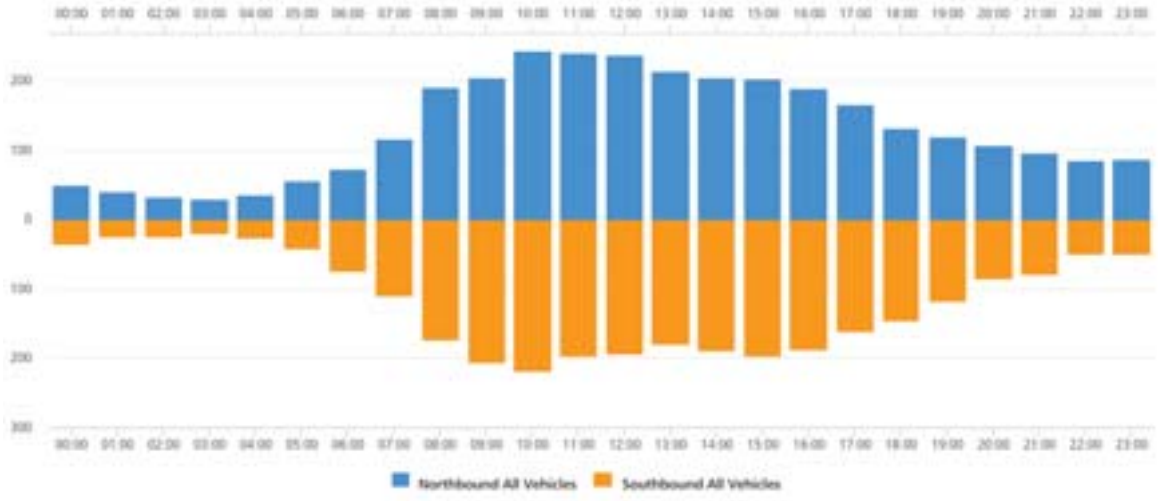


Figure 3-2 Newell Highway daily traffic profile at Peak Hill 2009

Parkes (South of Bogan Road)

- 2,800 vehicles per day in 2009
  - 31 percent heavy vehicles
  - Peak volumes of around 220 vehicles per hour (two-way), relatively consistent across the middle of the day

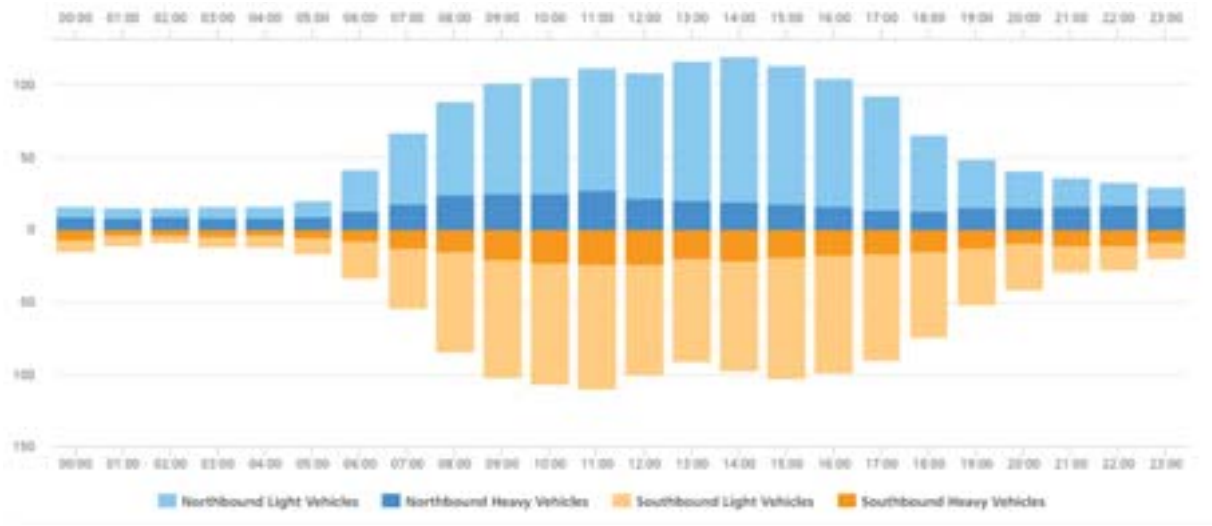


Figure 3-3 Newell Highway daily traffic profile at Parkes 2009

Level of Service

A Level of Service assessment was undertaken for the Newell Highway, using the methodology outlined in the Austroads Guide to Traffic Management for two-lane, two-way roads. For the busiest of the above segments, at Peak Hill with a peak direction volume of 260 vehicles per hour (allowing for 1.2 percent per annum growth in the peak hour volume since the 2009 count), the Newell Highway currently operates at Level of Service B.

Approximate volume thresholds have been identified for each Level of Service band, for key road types in the study area, as an indication of the volume of traffic each road type is able to accommodate. These are shown in Table 3-3.

Table 3-3 Indicative maximum one-way volumes for Level of Service bands (vehicles/hour)

Level of Service band	Newell Highway	Henry Parkes Way	Local roads
Road Description	2-lane, wide sealed shoulders	2-lane, narrow sealed shoulders	No centre line, no shoulders
A	250	150	150
B	500	500	900
C	900	900	1450
D	1500	1500	2000

Note that the method of calculating Level of Service is different for local roads than for the other road types. For highway-type roads, Level of Service is determined by a combination of average speed and percent time spent following (unable to overtake). For local roads, the average speed relative to the free flow speed is the determinant of Level of Service.

Seasonal variation

Based on the dominant rural/agricultural land uses of the study area, traffic volumes on the road network are likely to increase during harvesting season. Harvest of winter crops in the study area can begin in late October and continue through until January in higher rainfall areas (Australian Grain Magazine, July 2016). Key winter crops in the study area include wheat, barley, oats and cereal rye. During this season, heavy vehicle usage on local and main roads in the study area increases as trucks transport grain and tractors and harvesters move between properties. Farming machinery is generally much larger and slower than other vehicles using the roads, and may result in localised delays.

A sensitivity assessment for seasonal variation in potential traffic impacts has been undertaken, detailed in Section 5.3.2.

3.4 Key intersection performance

A number of intersections are located on local roads near the proposal site. These are all priority controlled intersections (with give-way or stop signs), with very low traffic volumes on the side roads, and relatively low volumes on through movements. Intersections near the proposal site within the main towns and villages are listed in Table 3-4. The performance of these intersections was not quantified as part of the assessment. However, as a result of the low traffic volumes, it is expected that there would be little to no delay.

Table 3-4 Key intersections located near the proposal site

Locality	Intersecting road	Intersecting road
Narromine	Peak Hill Railway Road	The McGrane Way
Narromine	Wingfield Road	The McGrane Way
Narromine	Wilsons Lane	The McGrane Way
Narromine	Dandalloo Road	Dandaloo Street
Tomingley	Tomingley West Road	Peak Hill Railway Road
Peak Hill	Tullamore Road	Bulgandramine Road
Peak Hill	Whitton Park Road	Railway Parade
Peak Hill	Whitton Park Road	Newell Highway
Peak Hill	Newell Highway	Trewilga Road
Peak Hill	Trewilga Road	Mickbiri Road
Alectown	Alectown west Road	Plowman Lane
Alectown	Alectown west Road	Mickbiri Road
Parkes	Henry Parkes Way	Brolgan Road
Parkes	Henry Parkes Way	Millers Lookout Road
Parkes	Brolgan Road	Harigan Avene/Westlime Road
Parkes	Brolgan Road	Coopers Road

3.5 Level crossings

There are 71 level crossings (33 public and 38 private) along the proposal. A number of the crossings categorised as public roads are crown roads which provide access to single landholdings. Five of the crossings are controlled by active warning systems (warnings by flashing lights, sounds and/or barriers) and the remaining 66 crossings are controlled by passive systems (warnings provided through signs and line markings). The active crossings are located at:

- Brolgan Road
- Henry Parkes Way
- Bogan Road
- Ingalba Street
- Tullamore-Narromine Road

A summary of existing level crossing protection types between Parkes and Narromine is provided in Table 3-5.

Table 3-5 Existing level crossing protection

Level crossing protection type	Number
No protection	0
Passive: Give way signage ('RX-1')	0
Passive: Stop signage ('RX-2')	66
Active: Lights and bells ('RX-5')	5
Active: Lights, bells and booms ('RX-5 + booms')	0
Active: Lights, bells and advanced warning ('RX-11')	0
Total	**71**

The duration of any delay at a level crossing is related to factors including the train length (up to the 1800 metre maximum length currently allowed on the line) and the train speed. At active crossings, ARTC Engineering (Signalling) Standard ESD-03-01 requires a minimum pre-train warning time of 30 seconds, and a minimum 3 seconds once the train has passed. However in some locations the pre-warning time is 45 seconds, with 5 seconds once the train has passed, and this conservative assumption has been applied to the assessment of all level crossings in the study area.

Further detail on the level crossing strategy is located in Chapters 5 & 6 of the Environmental Impact Statement.

3.6 Parking

There is no formal on-street or off-street parking provided along or near the proposal site.

Rest areas are provided along the Newell Highway. Between Parkes and Tomingley, there are four rest areas designated for heavy and light vehicle access, and a further five suitable for light vehicles only.

3.7 Public transport

In addition to the passenger trains servicing Parkes as outlined in Section 3.2.1, there are a number of coach services providing links to and within the study area. Parkes is serviced four to five times per day by a coach network including services to Dubbo and Orange. Narromine is serviced by a coach between Dubbo and Bourke or Broken Hill with four services most days. These regional services operate on the Newell Highway.

There are also local buses including school services around Parkes, Peak Hill and Narromine. School buses cross the study area on various routes both before and after school including:

- Dandaloo Road
- Kitto's Bridge Road
- Tullamore Road
- Trewilga Road
- Bogan Road
- Henry Parkes Way

3.8 Pedestrians and cyclists

There are no pedestrian or cyclist paths which cross the proposal site. Given the remote nature of the proposal site, there is very low pedestrian and cyclist activity. Cycling is catered for on road shoulders, where provided.

3.9 Road safety

The five-year crash history (2009-2013) for the various roads in the study area was obtained from the Transport for NSW Centre for Road Safety. This is summarised in Table 3-6.

The most crashes occurred on the Newell Highway, which is to be expected given the higher volumes of traffic compared to other roads. The high proportion of serious and moderate injury crashes is also noted, most likely a factor of higher vehicle speeds on rural roads.

Table 3-6 Crash history 2009-2013

	Fatal	Serious	Moderate	Minor	Total
Newell Highway[2]					
Dubbo - Tomingley	3	10	6	0	**19**
Tomingley - Peak Hill	0	4	3	0	**7**
Peak Hill (town)	1	1			**2**
Peak Hill - Alectown	1	3	1	3	**8**
Alectown - Parkes	0	3	2	5	**10**
Newell Highway Total	***5***	***21***	***12***	***8***	**46**
Other roads					
Old Backwater Road	0	1	0	0	**1**
Tomingley Road	0	2	1	1	**4**
Plowman Lane	0	1	0	0	**1**
Bogan Road	0	0	2	0	**2**
Henry Parkes Way	0	2	2	0	**4**
Brolgan Road	0	1	1	1	**3**

[2] Excludes urban areas in Dubbo and Parkes

4. The proposal

The proposal is generally located in the existing rail corridor between the towns of Parkes and Narromine, via Peak Hill (as shown in Figure 1-1).

The proposal would involve upgrading the existing rail line between Parkes and Narromine, including:

- Upgrading the existing track and track formation.
- Providing a new five kilometre long section of rail line near Parkes to provide a new north to west connection between inland rail and the Broken Hill line (Parkes north west connection), including three connections between the rail lines, and a new road bridge over the rail corridor at Brolgan Road (see further detail in Section 4.2).
- Providing three new crossing loops within the rail corridor at Goonumbla, Peak Hill, and Timjelly.
- Realigning the track within the existing rail corridor to minimise the radius of tight curves.
- Replacing bridges/culverts where the rail corridor crosses watercourses.

The following ancillary works would also be undertaken:

- Upgrading, closing or consolidating level crossings
- Upgrading signalling and communications
- Establishing new fencing or upgrading existing fencing along the rail corridor
- Relocating/protecting services and utilities.

4.1 Level crossing upgrades

There are 71 existing level crossings which are crossed by the proposal, including 38 of which are on private roads. The preferred approach to level crossings consists of a mix of retaining, upgrading and investigating the potential consolidation of level crossings, as summarised in Table 4-1. Upgrades of the type of protection to boom barrier controls has been proposed at 11 public crossings. 19 level crossings, primarily on private roads have been identified as requiring further investigation in relation to crossing consolidation. Any crossing consolidation will not be finalised unless there is a legal alternative means of access and the local Council, Roads and Maritime or landowner (in the case of a private crossing) have consented to the proposed consolidation.

Table 4-1 Quantity and type of level crossing changes

Action	Number of public crossings affected	Number of private crossings affected	Total
Consider crossing consolidation based on the outcomes of further investigation and stakeholder endorsement	2	17	19
Retain existing passive protection (stop sign)	20	19	39
Retain existing active protection (railway crossing flashing signal and boom)	0	0	0
Upgrade from flashing lights to flashing lights and boom barriers	5	0	5

Action	Number of public crossings affected	Number of private crossings affected	Total
Upgrade from stop signs to flashing lights and boom barriers	6	0	6
Gated crossing with administrative controls such as the requirement to phone train control prior to use	0	2	2
Totals	**33**	**38**	**71**

4.2 Parkes north west connection

4.2.1 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 new 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 to the existing Broken Hill line.

4.2.2 Cooper Road

Coopers Road is an unsealed local road that intersects with Brolgan Road to the north, London Road about midway along, and Watts Lane to the south. Brolgan Road and London Road provide access to Parkes, and Watts Lane connects to the Newell Highway. The eastern branch line 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 railway line, 845 metres to the south of Coopers Road's intersection with Brolgan Road, and 2.8 kilometres to the north of its intersection with London Road. Any road realignment as a result of Parkes north west connection would be determined during the detailed design phase where further investigations and consultation with stakeholder will be undertaken.

4.2.3 Millers Lookout Road

The northern section of Millers Lookout Road is an unsealed local road that intersects with Henry Parkes Way. The southern section is a narrow unsealed track that intersects with Brolgan Road via an access gate near Brolgan Road.

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.

Any road realignment as a result of Parkes north west connection would be determined during the detailed design phase where further investigations and consultation with stakeholders will be undertaken.

5. Impact assessment

5.1 Risk assessment

The risk assessment process involved consideration of the consequence and likelihood of the risks associated with each issue identified. The criterion upon which this assessment was based is given in Table 5-1. A consequence and likelihood were selected from Table 5-1 that best represented the likely outcome if the potential hazard actually did occur. For each consequence, the likelihood was considered in terms of the most likely outcome and not the "absolute worst case". Using this information, the risks were then rated using the matrix in Table 5-2 that gave a result in terms of high, significant, moderate or low risk.

Table 5-1 Risk assessment

Consequence		Qualitative measures of consequence or impact	OH&S risk classification
A	Extreme	• Unacceptable impact to the performance of the network • Intersection performance operates at a Level of Service (LoS) of F • Total property damage	• Permanent and severe disablement • One or more fatalities
B	Major	• Major impact to the performance of the network. • Intersection performance operates at a Level of Service (LoS) of E • Major property damage	• Significant injuries • Hospitalisation required
C	Moderate	• Moderate impact to the performance of the network • Intersection performance operates at a Level of Service (LoS) of D • Moderate property damage	• Medical treatment required • Lost time injury
D	Minor	• Minor impact to the performance of the network • Intersection performance operates at a Level of Service (LoS) of C • Minor property damage	• Minor medical treatment required • Not a lost time injury
E	Not significant	• No impact to the performance of the network. • Affected intersection leg operates at a Level of Service (LoS) of A or B • No property damage	• Minor first aid treatment required • Immediate return to work
Likelihood		Description	
1	Almost Certain	An event or situation that is happening more or less all the time, including continuous situations	
2	Likely	An event or situation that occurs or is likely to occur about 10 times or more per year	
3	Possible	An event or situation that occurs or is likely to occur about once per year	
4	Unlikely	An event or situation or event that occurs or is likely to occur about once every 10 years	
5	Rare	An event or situation that occurs or is likely to occur less frequently than once every 10 years.	

Table 5-2 Risk rating

Risk Assessment Matrix	Consequence				
Likelihood	Not significant	Minor	Moderate	Major	Extreme
Almost Certain	Medium	Medium	High	Very high	Very high
Likely	Low	Medium	High	High	Very high
Possible	Low	Medium	Medium	High	High
Unlikely	Low	Low	Medium	Medium	High
Rare	Low	Low	Low	Medium	High

Table 5-3 summarises this risk assessment for both construction and operation phases of the proposal.

Table 5-3 Risk assessment

Risk	Likelihood	Consequence	Risk Rating
Construction			
Delays on road network • Due to increased construction traffic	Unlikely	Minor	Low
Safety • Crashes between construction traffic and general traffic	Unlikely	Major	Medium
Operation			
Increased delays at level crossings • Due to increased train activity	Likely	Moderate	High
Safety • Crashes between vehicles and trains at level crossings	Possible	Extreme	High

5.2 How potential impacts have been avoided

To most road users, with the proposal in place there will be little obvious changes that would affect their behaviour, or interpretation of a situation. That is, level crossings would continue to operate as normal, with warning devices and other controls installed as per ARTC policy. Interactions between vehicles on the road network would continue to be defined by road rules and the physical configuration of the road, which in most cases will not change from existing conditions.

In most cases construction activities will be located clear of the existing road network. Any short-term impacts associated with construction vehicle access or works at particular sites will be governed by specific traffic management arrangements.

5.3 Construction impacts

5.3.1 Vehicle movements

Construction activity will generate additional vehicle movements including light and heavy vehicles. Light vehicles will generally be construction workers moving to and from specific construction activity areas. Heavy vehicle movements will generally be trucks delivering materials; including fill, ballast, sleepers and culverts, and removing spoil. It is expected that some material, particularly sections of rail, will be delivered by train.

Timing and Staging

An indicative construction program is shown in Figure 5-1. Construction along the existing rail corridor would be undertaken in three stages. For each stage, rail traffic would be diverted as described in Table 5-4. The Parkes to Narromine line is used on an average rate of three to four trains per day (both directions), with up to 10 trains on a peak day.

Construction of the Parkes north west connection and the Brolgan Road overbridge would be undertaken in parallel with stages one and two along the existing rail corridor.

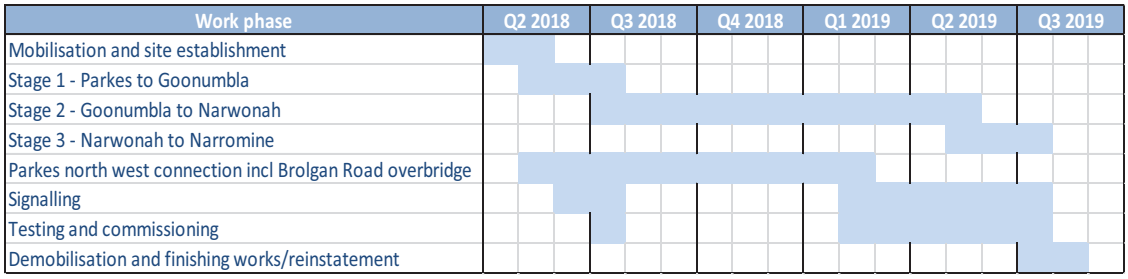


Figure 5-1 Indicative construction program

Table 5-4 Construction staging for work in the existing rail corridor

Stage	Location	Distance (km)	Rail traffic
1 – Parkes to Goonumbla	Located between the southern end of the proposal site (described in section 2.2 and including the Parkes north west connection) and the Goonumbla siding, which is located about 17 km north of the southern end of the proposal side, just north of Bogan Road	17	Redirected north through Narromine via the Main Western line
2 – Goonumbla to Narwonah	Located between the Goonumbla siding, and the Narwonah grain siding, which is located about 5 km south of Narromine	85	Redirected south from Goonumbla and north from Narwonah
3 – Narwonah to Narromine	Located between the Narwonah grain siding and the northern end of the proposal site (described in section 2.2)	5	Redirected south from Narwonah

Working Hours

Construction work would be undertaken during the following hours:

- Monday to Friday: 6 am to 6 pm
- Saturday: 6 am to 6 pm
- Sundays and public holidays: 6 am to 6 pm.
- 24 hours during possessions

Work during possessions

Some minor works may also be undertaken during scheduled rail corridor possession periods (that is, the times that the movement of trains along the rail corridor are stopped for maintenance). This could include, for example, the connection of the tracks at either end of each stage, and some finishing works. During possessions, works may need to be undertaken on a 24 hour basis.

Workforce

For the majority of the construction period, the workforce would average about 150 people. For some limited items of work an additional short-term workforce may be required.

Workers would travel to the site each day in either one of three 25-seat buses or for local workers their own vehicles. Materials would be delivered to the site by a mixture of small and large trucks. Typical total traffic generation is summarised in Table 5-5.

Table 5-5 Construction traffic generation

Vehicle type	Movements per day	Indicative peak hour (one-way)
Light vehicles (cars and utes)	170	75
Light trucks and buses	30	11
Haulage and delivery trucks	200	28
Total heavy vehicles	***230***	***39***
Total vehicles	**400**	**114**

Any movement of oversize or over-mass vehicles will, if required, be subject to specific route planning and road authority approvals. Such movements may be required to utilise the local road network in preference to the Newell Highway and other major roads, in order to minimise traffic impacts. The timing of oversize vehicle movements may also be restricted to minimise impacts.

5.3.2 Access Routes

For the works along the existing rail corridor, the general approach to construction would be to delineate the proposal site into a number of discrete construction work areas, each about 4.5 to five kilometres in length. Each 4.5 to five kilometre section would take about eight to 10 weeks to construct.

Potential access routes to each part of the proposal are identified in Table 5-6. Note that generally access to the southern areas (lower chainages) will be from Parkes, and the northern areas will be accessed from Narromine or Dubbo. Some locations will have two access points, and some will have alternative routes available, depending on the origin.

Note that the route between Dubbo and Narromine has been excluded from this table, for clarity.

Table 5-6 Potential construction access routes

Chainage	Primary route	Secondary route	Tertiary route
Parkes north west connection	Dalton Street	Middleton Street	Brolgan Road
449.2-453km	Dalton Street	Middleton Street	Brolgan Road
	Dalton Street → Henry Parkes Way		
453-457.5km	Dalton Street → Henry Parkes Way	Moulten Street	Back Trundle Road
457.5-462km	Dalton Street → Henry Parkes Way	Moulten Street	Back Trundle Road → Nanardine Lane
	Newell Highway	Bogan Road	Wyatts Lane
462-466.5km	Newell Highway	Bogan Road	
466.5-471km	Newell Highway	Bogan Road	Plowman Lane → Access Track
471-175.5km	Newell Highway	Alectown West Road	
	Newell Highway	Bogan Road	Plowman Lane
475.5-480km	Newell Highway	Alectown West Road	
	Newell Highway	Alectown West Road	Mickibri Road → Barber Lane
480-484.5km	Newell Highway	Alectown West Road	Mickibri Road
	Newell Highway	Claremont Lane	
484.5-489km	Newell Highway	Claremont Lane	Mickibri Road
489-493.5km	Newell Highway	Trewilga Road	
	Newell Highway	Access Track	
498.5-498km	Newell Highway	Access Track	
	Newell Highway	Whitton Park Road	
498-502.5km	Newell Highway	Whitton Park Road	Access Track
	Newell Highway	Kitto's Bridge Road	
502.5-507km	Newell Highway*	Access Track	
507-511.5km	Newell Highway*	Sharah's Access Road	
511.5-516km	Newell Highway*	Tomingley West Road	Back Tomingley West Road → Access Track
	Newell Highway*	Tomingley West Road	
516-520.5km	Newell Highway*	Tomingley West Road	Peak Hill Railway Road
520.5-525km	The McGrane Way	Peak Hill Railway Road	
	Newell Highway	Tomingley West Road	Peak Hill Railway Road
525-529.5km	The McGrane Way	Peak Hill Railway Road	
	Newell Highway	Tomingley Road	Wyanga Road
529.5-534km	The McGrane Way	Peak Hill Railway Road	
	Newell Highway	Tomingley Road	Wyanga Road → Peak Hill Railway Road
534-538.5km	The McGrane Way	Peak Hill Railway Road	

Chainage	Primary route	Secondary route	Tertiary route
	Newell Highway	Tomingley Road	Wyanga Road → Peak Hill Railway Road
538.5-543km	The McGrane Way	Peak Hill Railway Road	
	Newell Highway	Tomingley Road	Wyanga Road → Peak Hill Railway Road
543-547.5km	The McGrane Way	Peak Hill Railway Road	
	Newell Highway	Tomingley Road	Narwonah Road
547.5-552km	The McGrane Way	Access Road	
552-556.5km	The McGrane Way	Access Road	
	Dandaloo Street	Old Backwater Road	

* From Narromine, access to the Newell Highway would be via Tomingley Road

5.3.3 Traffic impacts

Construction of the proposal would result in temporary impacts to traffic and access within the study area, and an increase in both heavy and light vehicle movements on the local road network. The extent of impacts will depend on the location of the works, and the origin of material and/or workers. A worst-case assessment is detailed below.

Daily traffic generation associated with construction is some 400 individual vehicle movements, including 230 heavy vehicle movements. The peak hour for traffic generation would occur at the beginning and end of each shift, with up to 114 vehicle movements (one way), including some 39 heavy vehicles.

The Newell Highway is the busiest of the roads likely to be used for construction access, and as described in Section 3.3 has a peak hourly volume of approximately 260 vehicles in one direction. An additional 100 vehicles per hour (a 38 percent increase, noting that trucks have a disproportionate impact compared to light vehicles), even if they were added to the peak hour, would bring the total volume to around 360 vehicles per hour. This is well within the threshold for Level of Service B, as listed in Table 3-3. The anticipated maximum hourly volume on all of the roads expected to be used for access is within the threshold for Level of Service B.

Even if the peak hourly volume were to be increased by 50 percent, for example due to seasonal variation, Level of Service B would be maintained.

Proposed works on level crossings may also result in disruptions to local traffic and temporary access restrictions to private property. Where this occurs, alternative access arrangements would be provided and/or appropriate traffic controls implemented. These will be detailed in a Construction Traffic Management Plan (see further discussion in Section 6).

5.3.4 Access and egress

Construction vehicle access to the proposal site would be via the existing road network and access tracks within the rail corridor. Access points from the public road network must be chosen such that adequate sight distance and a safe access/egress path is available. Further investigation of access locations is required once further detail around the construction methodology is known. All construction site access points will be designed in accordance with Australian Standards with adequate sight lines to ensure they operate in a safe and efficient manner. In addition, where possible access will be provided from secondary roads to minimise the potential disruptions to the nearby arterial road network.

At all site access points traffic on the existing road network will have priority, with construction traffic required to give way before turning. This will minimise any delays to general traffic associated with these intersections.

Encroachment of construction works into existing road reserves is not anticipated.

5.3.5 Impacts to train paths

Construction activities will result in temporary impacts on existing rail operations. During each construction stage, rail operations would be altered as outlined in Table 5-4. It is possible that on some parts of the rail network there would be additional train activity, either in terms of train length or frequency. This may increase the frequency of delays at some level crossings. However the maximum length of trains would still be restricted according to ARTC operational restrictions for each line, and therefore the length of delays at crossings are not likely to increase significantly (assuming train speeds are not lower).

5.3.6 Parking impacts

Where required, parking for construction workers will be generally within the construction compounds and therefore not impact on surrounding roads. Adequate parking will be provided on site to accommodate the peak demands associated with the construction phases of the proposal, including parking for buses where necessary. Based on the worker numbers detailed in Section 5.3.1, parking may be required for up to eight buses per lot. If buses are not used, car parking demand may be up to 150-180 vehicles.

5.3.7 Road network impacts

The greater road network is not expected to be significantly impacted by the construction activities. This is because the roads have sufficient capacity to absorb the increased traffic, and delays or closure at crossings will have localised affect only due to the low volumes on affected roads. During the peak construction activity, Level of Service B is expected to be achieved on all affected roads.

Although the volume of construction activity may be relatively high across the day, it is expected that construction vehicle movements will be spread out across the day, particularly delivery trucks. This will also assist in minimising any additional delays for vehicles turning from side roads at intersections along the construction access routes.

Construction of the Brolgan Road overbridge over the Parkes north west connection may have localised impacts on Brolgan Road traffic, including access to Coopers Road, although the new bridge will be primarily constructed on a separate alignment which will minimise disruption. Specific traffic control arrangements will be developed, and the necessary road and rail authority approvals will be obtained.

5.3.8 Pedestrian and cyclist impacts

Given the low volume of pedestrian and cyclist activity in the study area, there is not expected to be any significant impacts to pedestrian and cyclists. Localised management measures will be implemented where necessary around construction sites and access points.

5.3.9 Public transport impacts

Coaches between Parkes and Condobolin will cross the Henry Parkes Way level crossing. While construction works are occurring in this area, there may be some short-term delays to some services.

As with other traffic, public buses may be impacted by the increase in traffic on the road network. However, given the relatively small number of services in the area, it is expected to be a minor impact.

More detailed measures to minimise impacts to public transport, including school buses, will be incorporated into the Construction Traffic Management Plan.

5.4 Operation impacts

5.4.1 Existing and forecast travel demands

Road

During operation, there will be some maintenance/operational traffic generated, however this will be minimal and is not expected to create an adverse impact on the operation of the road network.

Increase in the road freight task that may be required to service the additional freight demand at Parkes and Narromine has not been considered in this assessment.

Rail

Existing train operations along the Parkes to Narromine line would continue prior to, during, and following construction. Inland Rail as a whole would be operational once all 13 sections are complete, which is estimated to be in 2025. It is estimated that, once operational, 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 traffic would be in addition to the existing rail traffic using the Parkes to Narromine line (average four trains per day).

5.4.2 Traffic and intersection impacts

As described in Section 5.4.1, there is expected to be minimal increase in traffic volumes as a result of the proposal, with no material impact on operation of the network.

5.4.3 Level crossings

The key traffic impact of the proposal will be impacts on travel time as a result of increased train activity at level crossings. The duration of delays will in some cases be reduced due to increased train speeds that will be possible. Table 5-7 lists the outputs of a model of level crossing delay, where the maximum delay under existing conditions is 122 seconds. By 2040, with an increase in line speed, this delay would be reduced to 109 seconds per train.

Table 5-7 Level crossing delays per train

Scenario	Maximum delay at crossing (sec)
Existing with 1800 m maximum train length	122
Year 2040 with 1800 m maximum train length	109

The modelled delays detailed in Table 5-7 are based on an existing train speed of 90 km/hr, increasing to 110 km/hr by 2040. In all cases, at level crossings with active controls a 45 second pre-train warning has been assumed, along with a 5 seconds after the train has passed, where road traffic is prohibited from proceeding. These values are longer than the absolute minimum (refer Section 3.5), producing a conservative assessment of potential level crossing delays.

The frequency of trains, and therefore likelihood of being delayed, will also be increased over time as the freight task grows. Given the local nature of most affected roads, this impact is expected to affect a small volume of cars and have localised impact only. The potential for queued vehicles to impact on adjacent intersections is considered to be very low, even allowing for the additional length of road trains and other heavy vehicles that may use some of the affected roads.

On the busier roads crossed by the proposal, such as Henry Parkes Way, there is sufficient room for traffic to queue without obstructing any major junctions.

The proposal also includes upgrade of several level crossings along the site, as referenced in Section 4.1.

5.4.4 Access and egress

During operation, minimal impacts to access are anticipated as access to the rail line, if required, would be via existing corridor access points.

5.4.5 Impacts to train paths

The upgrades will not have any negative impacts to train paths when in operation.

Proposed freight train speeds would vary according to axle loads, and range from 80 kilometres per hour (30 tonne) to 115 kilometres per hour (21 tonne). This is an improvement on existing train speeds that are limited to a maximum of 90 to 100 kilometres per hour, with local speed restrictions due to existing track condition.

5.4.6 Parking impacts

Given that there is no existing parking provision, and no expected increase in parking demands as a result of the freight trains, there is not expected to be any impacts on parking as a result of the proposal.

5.4.7 Road network impacts

As discussed in Section 5.4.1, there is expected to be minimal increase in traffic on the road network as a result of the proposal. The increased delay at level crossings is expected to have a localised impact only, and in particular through movements on the Newell Highway will not be affected.

Overall, the proposal is expected to have a positive impact on the road network by relocating some of the road freight task to rail, thereby reducing the heavy vehicle freight traffic on roads within the study area.

Brolgan Road Overbridge

The alignment of the Brolgan Road 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, and to provide access to Coopers Road. The configuration of the connection between the old Brolgan Road alignment (including connection to Coopers Road) and the new alignment is yet to be finalised.

Coopers Road

If access across the rail line is not available, traffic currently using Coopers Road will be able to use the alternative route via Brolgan Road or London Road. The existing travel distance to Parkes is approximately the same via London Road or Brolgan Road at a location approximately 2.1 kilometres south of the Broken Hill line. That is, for any trips starting south of this point, the route via London Road, which is not affected by the proposal, is already shorter than the alternative via Brolgan Road. Based on a review of aerial photography and mapping, there are only 1-2 properties whose distance to access Parkes may increase, up to 2.1 kilometres longer than under existing conditions. This increase is not considered a significant impact, in the context of the number of people who will be affected, and the distances involved in travel in rural areas such as this.

Millers Lookout Road

The section of Millers Lookout Road that would be crossed by the Parkes north west connection is effectively a farm access track, with a locked gate at the Brolgan Road end indicating minimal traffic activity. If access across the rail line is not available, an alternative route is available via Henry Parkes Way. Based on a review of aerial photography and mapping, the majority of traffic activity in Millers Lookout Road is north of the rail line, where access to Parkes via Henry Parkes Way is currently shorter than via Brolgan Road.

5.4.8 Pedestrian and cyclist impacts

Given the low volume of pedestrian and cyclist activity in the study area, there is not expected to be any significant impacts to pedestrians and cyclists as a result of the proposal. An increase in the number of trains will result in an increase in the potential for a pedestrian or cyclist to encounter a train, however the likelihood of adverse impact remains very low.

5.4.9 Public transport impacts

Coaches between Parkes and Condobolin will cross the Henry Parkes Way level crossing. Due to the increased number of trains, there is a greater chance that these services will be stopped at a level crossing and experience some delay, up to three minutes. This is a minor delay for coach services travelling long distances (about 100 kilometres between Parkes and Condobolin) and is therefore expected to have minimal impact on overall travel time.

School bus services which use level crossings along the proposal will be similarly affected, resulting in the potential for a minor delay to these services.

5.5 Cumulative impacts

The assessment detailed above has taken into account growth in traffic volumes into the future, with forecast traffic volumes on roads in the study area within capacity. There are no further anticipated developments that would impact on the proposal.

6. Mitigation and management

6.1 Options for impact mitigation

The options for reducing the potential for increased delays to road traffic as a result of the proposal include:

- Maintaining current maximum train lengths:
  - With no change in train speeds, the duration of delays at level crossings would be similar to existing.
  - With improved train speeds, the duration of delays would be less than existing.
- Grade separation of the rail line at road crossings:
  - Delays to road vehicles would be removed entirely, and the safety risks associated with train/vehicle conflict eliminated.
  - This will require a significant variation to the proposal, and would have additional impacts in terms of construction footprint, costs and environmental issues.
  - Due to the small volume of vehicles that cross the rail line, grade separation is not likely to be feasible at most level crossing locations.

During construction, options for mitigation will depend on the specific activity being undertaken, and the location where it is occurring.

6.2 Recommended mitigation measures

6.2.1 During construction

It is recommended that a construction traffic management plan be developed as part of the construction environmental management plan, to guide the interaction of construction activities with the public road network. It should cover such aspects as:

- Access routes
- Driver behaviour/codes of conduct
- Traffic control procedures:
  - Development and implementation of traffic control plans
  - Temporary speed limit requirements
  - Temporary road closures and detours
- Construction site access:
  - Upgrades to be designed in accordance with Austroads Guide to Road Design and Roads and Maritime Supplements, and local council requirements where appropriate
- Road pavement condition
- Management of traffic under varying weather conditions
- Worker car parking
- Movement of oversize vehicles (if required)
- Management of public transport impacts (including school buses)
- Management of pedestrian and cyclist impacts

The construction traffic management plan should be developed in consultation with Parkes Shire Council, Narromine Shire Council and Roads and Maritime Services, and be subject to periodic review and update as agreed between the stakeholders.

6.2.2 During operation

It is not considered feasible to avoid any increase in potential delays to road users at level crossings as a result of the proposal. However, it is recommended that measures be put in place to manage any localised safety implications that may occur due to increased queueing. Recommended measures are as follows:

- Provision of all necessary and appropriate warning signage, line marking and other traffic controls at level crossings, in accordance with ARTC and Australian Standards. It is critical that controls at level crossings be consistently applied throughout the proposal.
- Review of traffic behaviour at level crossings once the proposed works are complete, to confirm that the available infrastructure is appropriate for the prevailing traffic conditions.
- Transport for New South Wales fund an ongoing program of ALCAM assessments in NSW in order to maintain the relevance of the ALCAM data.

7. Conclusion

The proposal will ultimately allow for faster and more frequent freight train services between Parkes and Narromine. The proposal is largely remote from the existing road network, except at level crossings. The majority of level crossings are of local roads, including private access ways.

The proposal will have different impacts during construction and during operation.

During construction, the main traffic and transport impacts will be related to the movement of construction vehicles to and from the construction site. Additional traffic associated with construction of the proposal will be up to 400 vehicle movements per day, with a peak one-way volume of 114 vehicles per hour. In the peak hour Level of Service B or better will be maintained on all affected roads. Access to construction sites and compounds will be subject to specific planning and traffic management arrangements. Accesses will need to be constructed in accordance with Austroads standards, and other requirements that may be set down by Roads and Maritime and/or Council. Access via the local road network is preferred over direct access from an arterial road, where this is possible.

Once the proposal is operational, minimal traffic generating activity is anticipated. The primary traffic impacts relate to more frequent train activity at level crossings, although the proposal will allow faster train speeds which will slightly reduce delays associated with individual trains. Road traffic activity at most level crossings in the study area is low, and the volume of traffic likely to be delayed by train activity is not substantial. There is capacity at each level crossing for delayed traffic to queue clear of adjacent intersections.

8. References

Roads and Maritime Services traffic volume data, obtained from *http://www.rms.nsw.gov.au/about/corporate-publications/statistics/traffic-volumes/aadt-map/index.html#/?z=10&lat=-32.651295430365316&lon=148.2410363046874*

Roads and Maritime Services rest area maps, obtained from *http://www.rms.nsw.gov.au/roads/using-roads/trip-information/rest-areas/restareasmap/index.html*

Transport for NSW Centre for Road Safety crash statistics http://roadsafety.transport.nsw.gov.au/statistics/interactivecrashstats/nsw.html?tabnsw=3

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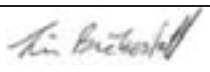
1	M.Kluver-Jones	T.Bickerstaff		S.Page		21.06.2017

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