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Terminals Australia

Parkes Intermodal Terminal - Concept Design

Design Brief for Road Transport Infrastructure

Final Report

June 2006

INFRASTRUCTURE | MINING & INDUSTRY | DEFENCE | PROPERTY & BUILDINGS | ENVIRONMENT

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1. Introduction

1.1 Study Purpose

Terminals Australia is proposing to develop a greenfield site in Parkes for the purpose of providing a national road and rail intermodal hub. This facility is identified in this report as the Parkes Intermodal Terminal (PIT).

GHD was engaged by Terminals Australia in 2005 to prepare an Engineering Masterplan for the proposed Parkes Intermodal Terminal, which was to include inputs required to seek development approval for an Ultimate Stage Concept Design.

This Engineering Masterplan was prepared to further develop an understanding of operational and functional requirements for the Intermodal Terminal, its associated facilities and the resulting road based transport infrastructure needs. Relevant findings from the engineering masterplan assessment were used as inputs into the concept design approval process.

The aim of this 'Traffic Assessment' or 'Design Brief for Road Traffic Infrastructure' is to identify the likely impacts from implementing the proposed PIT, as it is known to date, and present mitigation measures that would help to manage and minimise these potential effects.

This study has been undertaken as a desktop assessment, which included a review of background documentation, correspondence with key stakeholders and gaining further knowledge through discussions with other GHD team members.

This e level of analysis completed as part of this investigation exercise

This document provides guidance on Traffic and Transportation elements required as inputs into the Engineering Masterplan and Concept Design planning application.

1.2 Background Documentation

The following guidelines, policy and reports have been reviewed and used as background material in the development of this document

» '*Guide to Traffic Generating Developments'*, Version 2.2, October 2002 (RTA)

» '*Route Assessment Guidelines for B-Doubles and Road Trains'*, Edition 1, Revision 7, February 2000 (RTA)

» Parkes Intermodal Terminal – *'Operational and Functional Brief'*, prepared for Terminals Australia, May 2005 (GHD),

» Parkes Transport Hub – '*Local Environmental Study*', prepared by Parkes Shire Council, March 2002 & September 2003.

» Other relevant guidelines and standards (Austroads and Australian Standards).

1.3 Report Structure

This document as been structured as follows:

Table 1 **Document Structure**

Report Area	Title	Content
Section 1	Introduction	This Section
Section 2	Existing Conditions	Understanding of the existing context to form part of the Environmental Assessment.
Section 3	Project Description, Objectives & Delivery	Understanding of the project, client and stakeholder expectations, desirable outcomes as a result of delivering this facility, the proposed development stages and approval being sought.
Section 4	Understanding the Traffic Generation Potential	Examination of target throughput, standard traffic generation rates, likely travel patterns and justification of the approach taken.
Section 5	Relationships between Freight Movement and Land Use	Understanding of the target freight task of the proposed development, relationship between activity areas and inbound/ outbound movements by rail and road and potential opportunities to improve efficiency in freight movement by the industry.
Section 6	Project Impacts	Provides the proposed traffic generation in the initial and ultimate stages, road network impacts with and without the development and likely impacts on surrounding level crossings and an understanding of the proposed haulage routes.
Section 7	Relevant Design Standards and Guidelines	Provides an understanding of principles to be applied for the upgrade of the internal and external road networks, intersections and level crossings.
Section 8	Project Summary, Impacts and Recommendations	Identification of key project findings, associated impacts and recommended works and investigations.

2. Existing Conditions

The following section has been developed to provide an understanding of the existing situation.

2.1 Site Location

Parkes is a rural township with a population of approximately 10,000, which is situated approximately 365km west of Sydney. It has established transport connections with a State Highway, two key national rail lines and a regional airport located in the Local Government Area in close proximity to the urban centre. The road and rail networks offer direct connections to Sydney, Brisbane, Melbourne, Adelaide and Perth making Parkes a strategically important for the transporting of freight around Australia and to overseas destinations.

Table 3 presents the proximity and distance of State Capitals and regional centres to Parkes.

Table 2 Travel Distances from Parkes to Major Markets or Ports

Direction	Regional town	Approx Distance (km)	State capital and Ports	Approx Distance (km)
North	Dubbo	115	Brisbane	1000
South	Wagga Wagga Griffith Forbes	290 300 30	Melbourne	720
West	Condobolin	100	Adelaide Perth	1250 3500
East	Orange	95	Sydney	365

Note – all distances are broad estimates rounded to the nearest 5km.

The proposed site for the Parkes Intermodal Terminal (PIT) is located to the west of the township of Parkes in an area recently rezoned as the Parkes Transport Hub (Hub). The 'Hub' is zoned for industrial uses and covers an area of approximately 520 hectares. The Hub is located in close proximity to both the rail and road networks that run through Parkes. The 'Hub' is situated close to two main rail lines running between Parkes - Brisbane (via Dubbo/ Muswellbrook/ Maitland), Parkes - Sydney (via Orange or Cootamundra), Parkes - Melbourne (via Cootamundra), and Parkes - Adelaide or Perth (via Broken Hill). In terms of supporting road network infrastructure the site is situated in close proximity to the Newell Highway and the Parkes western ring road.

The proposed site is situated at the junction of the Parkes – Narromine and Parkes – Broken Hill rail lines and in the western corner of 'Hub'. Parkes Shire Council (PSC) envisaged that the ‘Hub’ is an appropriate location for accommodating transport facilities of regional, state and national importance.

Refer to **Figure 1** for further details of the site proximity to Parkes and the rail and road routes networks.

In terms of boundaries and proximity to Parkes, the site fronts Brolgan Road to the south and Condobolin Road (Main Road 61) to the north, and is situated approximately 4km west of the ring road or 5.5km west of the Newell Highway (State Highway H17) and Parkes CBD.

The proposed site has a 2.8km frontage to the northern side of Brolgan Road located west of the existing Parkes to Narromine rail level crossing. The site also has a 650m frontage to Condobolin Road, which is situated to the east of the Parkes to Narromine rail level crossing.

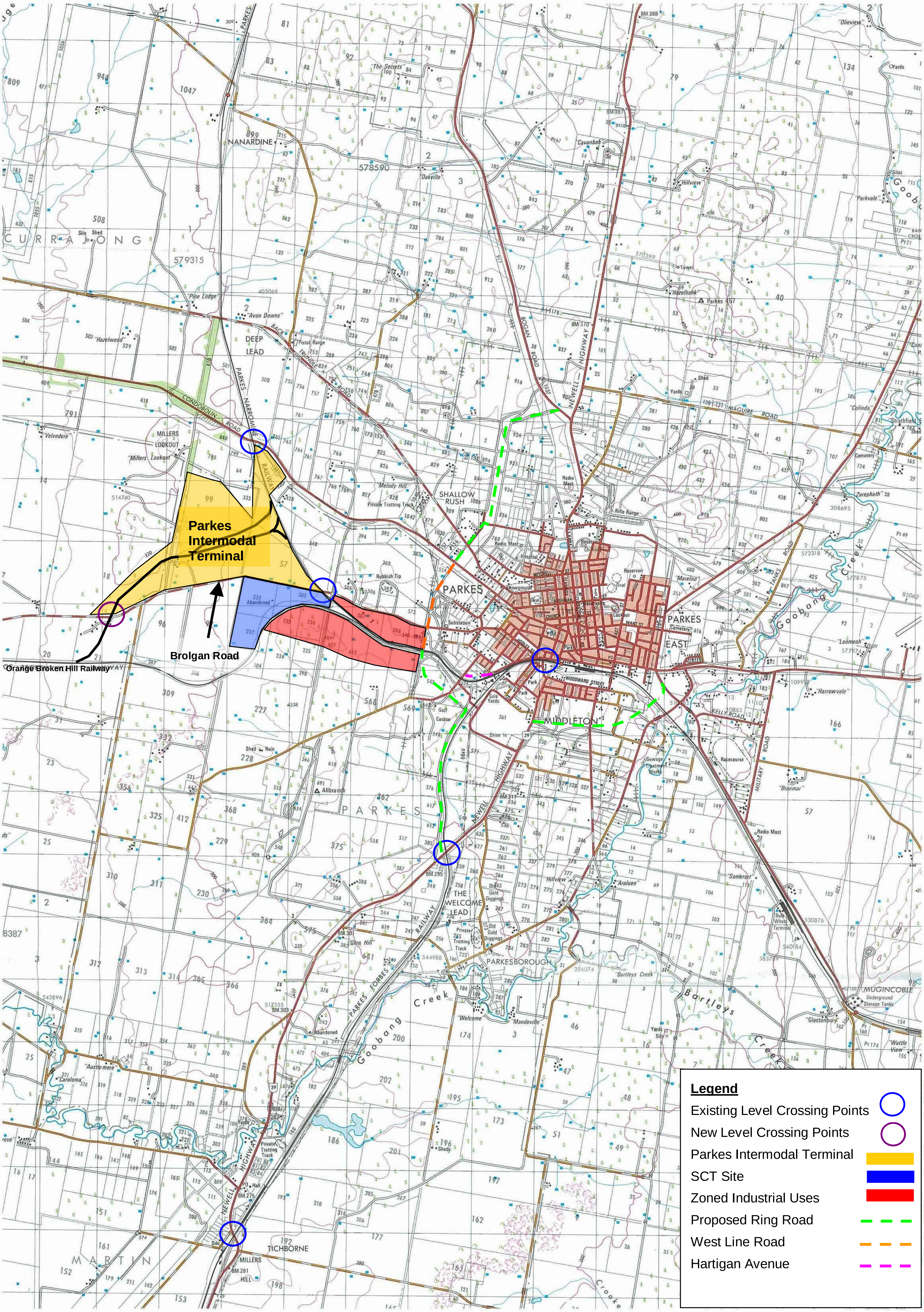

Figure 1 – Locality Plan

2.2 Local and Regional Road Network

Road freight travelling to and from the site is likely to use the State road network, completed sections of the western ring road and Brolgan Road (Refer to **Appendix B**). Currently, the major road freight movement through Parkes is north south along the Newell Highway with movement from the west and east representing significantly lower traffic movement. This report firstly assesses the current operating conditions along the study area road network, and then considers the traffic impacts from the proposed development of an intermodal terminal.

2.2.1 Existing Road Characteristics and Hierarchy

The classification of roads along the existing road network can be used as an indication of the functional role each road plays with respect to the volume of traffic they should appropriately carry.

The NSW Roads and Traffic Authority (RTA) has developed a set of road hierarchy classifications for urban situations, which have typical nominal volumes expressed in terms of average annual daily traffic (AADT) served by various classes of roads.

Table 3 RTA Functional Classifications of Roads

Type of Road	Traffic Volume (AADT)	Peak Hour Volume (vph)
Arterial Road	>15,000	1,500 – 5,600
Sub-Arterial Road	5,000 – 20,000	500 – 2,000
Collector Road	2,000 – 10,000	250 – 1,000
Local Road	<2,000	0 – 250

These classifications can be used in this study to assess the pre and post development capacity levels along urban type roads situated in Parkes. However, it should be noted that the majority of the road sections that are likely to be impacted have rural characteristics and will not attract high urban type traffic volumes.

Brolgan Road

Brolgan Road (Shire Road 40) is a rural road that is maintained under the control of Parkes Shire Council. The Brolgan Road route runs between Middleton Street in Parkes in the east, to Brolgan, Nelungaloo and beyond in the west. The proposed site is located approximately 4km west of the intersection with Coronation Avenue.

Brolgan Road is a typical rural road with a single carriageway and two traffic lanes, one in each direction. The route travels through an area, which is predominantly used for grazing and crops. The sealed carriageway width is approximately 7m with a 1m sealed shoulder for the majority of its length. The signposted speed limit is 100km/h in the vicinity of the site transitioning to 80km/h near to the level crossing with the Parkes to Broken Hill rail line and 50km/h to the east of the ring road (West Lime Road). The road alignment of Brolgan Road consists of a number of base curves that can be negotiated at high speeds and moderate changes in gradient. The pavement is described as suitable for current traffic loads, however, unlikely to be capable of supporting increases in heavy vehicle traffic.

Traffic approaching from the east, currently travel over the Parkes to Broken Hill rail line at a level crossing, which is situated to the southeast of the site. This crossing is currently controlled by type F flashing lights and is known to have some restricted sightlines.

Brolgan Road is planned to become a key road link that will serve the development of the 'Hub'

Brolgan Road is also understood to be influenced by seasonal traffic flows that are associated with agricultural uses and storage facilities situated near to the west of Parkes. These uses generate higher than average traffic volumes and would be expected to consist of heavy vehicles that are transporting goods to markets.

Condobolin Road

Condobolin Road is a State Road (known as MR 61) and falls under the control and maintenance of the Roads and Traffic Authority (RTA). The road is a designated B Double route, which permits road train movements under certain weather, time and period operating restrictions to travel west of Parkes. The alignment of the route runs predominantly east-west between Parkes and the township of Condobolin.

Condobolin Road is a typical rural road with a sealed carriageway width of approximately 8.5m, two 3.25m wide traffic lanes, 1m wide sealed shoulders and appropriate linemarking. The signposted speed limit is 100km/h in all rural areas transitioning to 80km/h then 50km/h in Dalton Street.

Newell Highway

The Newell Highway is known as SH 17 and is under the control and maintenance of the RTA. The route is one of NSW's longest highway stretches, which starts at the Victorian border near Tocumwal and runs north to Goondiwindi on the Queensland border. The highway passes through rich agricultural lands in the Riverina and Hay Plains, crop growing country around West Wyalong and vast sheep, cattle and crop plains near Moree.

The Newell Highway is a typical high quality rural highway with a single traffic lane in each direction and a speed limit of 110km/h in rural areas with a transitioning through to 80km/h and then 50km/h through Parkes. Overtaking opportunities are provided along the route and the typical sealed carriageway width is in the order of 10m including shoulders with generally good pavement conditions. All level crossing points along the Newell Highway are designed to accommodate daily traffic volumes in excess of 2,000 vehicles and B double type vehicles.

On entry to Parkes CBD, both heavy vehicles and through traffic are encouraged to travel along Bogan Street and the recently opened western section of the Ring Road between Condobolin Road and Hartigan Avenue via Brolgan Road.

Parkes Ring Road System

The long-term aim of Council is to protect the amenity of Parkes residents from traffic growth and facilitate the transporting of freight. The development of the Parkes ring road system will address these objectives and is planned to divert heavy vehicle traffic from the Newell Highway and east-west road routes running through existing residential and commercial areas of Parkes.

Refer to **Appendix C** for an understanding of the PSC planned ring road system around Parkes.

Table 4 Staged Development of Ring Road

Stage	Section	Link by colour – Appendix C	Timeframe
1	Hartigan Ave to Brolgan Rd	Dark Blue	Completed
2	Short St/ Clarinda St intersection	Red	Completed
3	Bogan Street	Yellow	Ongoing
4	Brolgan- Condobolin Rd Link (West Lime Rd)	Green	Completed
5	Blaxland St – Saleyards Rd – SH17 link	Brown	By Demand
6	Condobolin Rd – SH17 link (Northern)	Orange	By Demand
7	Rail overbridge and West Lime – Saleyard link road	Pink	By Demand
8	SH17 – MR61 east (Southern)	Purple	By Demand

Source - Parkes Transport Hub – Local Environmental Study, Parkes Shire Council (March 2002)

Note – refer to **Appendix C** for a reference to the road link colours mentioned above.

Table 5 indicates that the Hartigan Avenue and West Lime Road is already completed and provides a connection between the Newell Highway at Forbes Street and Condobolin Road.

The future development of the Northern and Southern sections of the Ring Road will provide significant benefit to the township of Parkes, in that it would improve amenity through the redistribution of existing heavy vehicle traffic movement to more suitably road links. The recent completion of the central Western Section of the ring road will assist in minimising the impact on residential amenity from both existing and future road freight movement through Parkes that could be generated by existing industrial uses, growth in the Goobang Junction Industrial Area and development of the Parkes Transport Hub.

Western Ring Road (completed section)

The western ring road currently consists of Hartigan Avenue and West Lime Road.

West Lime Road section is understood to have recently constructed and opened to traffic by Parkes Shire Council. The route runs north-south, providing access from Condobolin Road to Hartigan Avenue for traffic wanting to travel to the Goobang Junction Industrial Area and the Parkes Transport Hub. This road section of the future ring road system together with Hartigan Avenue has recently been identified in the RTA Classification Review for potential reclassification as a State Road.

The carriageway width is in the order of 10m including a 1m wide sealed shoulder. The completed western ring road section is a designated B Double route, which could in the future potentially accommodate road train movements under certain weather, time and period operating restrictions. The speed limit along the western ring road is 80km/h.

Hartigan Avenue

Hartigan Avenue has recently been extended and upgraded by Parkes Shire Council to become the designated truck route between the Newell Highway and the Goobang Junction Industrial Estate or the Parkes Transport Hub. The works were completed in early 2005 and aimed to provide a continuous route between the Forbes Street level crossing and West Lime Road. The route follows the existing Orange - Broken Hill rail alignment and was aimed at reducing impacts on residential amenity from additional heavy vehicle movement generated by the proposed FCL Intermodal Terminal.

The Hartigan Avenue route fronts residential properties in the east, the rail corridor to the south, land zoned for industrial uses in the west and open space situated to the north. The design of the route is intended to limit access between Forbes Street level crossing and West Lime Road to the collector road system, this being Blaxland Street, Best Street and Hooley Street. Under section 8.2 of the 'Review of Environmental Factors – Access Road for the Goobang Junction Industrial Area' prepared by Parkes Shire Council and through further discussions with Council, it has been identified that the intended upgrade of Hartigan Avenue was for it to act as an arterial road for movement between the Newell Highway and industrial land uses situated to the west.

Hartigan Avenue together with West Lime Road form part of the future Western Ring Road (Newell Highway Bypass) and as a result are constructed to a heavy vehicle standard suitable for B Double access. The road is appropriately linemarked and has a 9 metre sealed carriageway with two 3.5m wide traffic lanes and 1m shoulders. The road is signposted at 50km/h along urban sections of the route.

Proposed Saleyards Road Ring Road Connection (Interim Option)

Blaxland Street crosses a level crossing situated on the Orange – Broken Hill rail line near to the intersection with Hartigan Avenue. This access point offers an alternative road connection via Saleyards Road and Ackroyd Street to the Newell Highway and avoids the level crossing on the Newell Highway to the south of Hartigan Avenue.

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This interim ring road route requires traffic to travel over two level crossings, the first crosses the Orange – Broken Hill railway near to the intersection with Hartigan Avenue and the second is situated on Saleyards Road and crosses the Parkes – Forbes Railway near to the intersection with Ackroyd Street.

The key movement at the Hartigan Avenue with Blaxland Street intersection is known to be the movement along Hartigan Avenue, however, the priority at the intersection is currently given to Blaxland Street and is to compensate for the lack of storage space between Hartigan Avenue and level crossing.

The Blaxland Street level crossing is understood from the 'Baker Saran Pty Ltd - Road Safety Audit' report to be situated close to Hartigan Avenue and consists of approach warning signs, flashing lights and boom gates. The audit report was included Council's traffic committee meeting minutes dated February 2005. The minutes from this meeting indicate that the Council Committee recommended that priority at the intersection be changed from Blaxland Street to Hartigan Avenue and that the intersection be widened with turning lanes to provide adequate storage for road train movement.

It was also noted in discussions with Council that the section of Saleyards Road between Blaxland Street and Ackroyd Street is narrow and currently not of a suitable standard for B Double type vehicles. It was also noted that a review of the Saleyards Road level crossing maybe required as part of introducing this connection as part of the proposed Parkes Ring Road.

2.3 Road Performance

A criteria for evaluating the operational performance of mid block rural road sections is provided in the *AustRoads - Guide to Traffic Engineering Practice: Part 2 –Roadway Capacity, section 3.4.*

The Level of Service (LOS) is a qualitative measure describing the operational conditions within a traffic stream taking into consideration the perception of motorists and/or passengers and is typically based on typical volume/capacity (V/C) ratio. The characteristic conditions for each level of service can be graded on several measures from level of service A (good) to level of service F (unsatisfactory).

Table 5 Operating Conditions with LOS and V/C comparisons

Level of Service	Description	Volume to Capacity Ratio (V/C)
A	Free flow conditions with drivers unaffected by other movements in traffic stream	<0.65
B	Stable flow with drivers having reasonable freedom	0.65 to 0.75
C	Stable flow, but drivers somewhat restricted	0.75 to 0.85
D	Approaching stable flow limits with drivers significantly restricted	0.85 to 0.95
E	Unstable flow, traffic at or close to capacity with drivers severely restricted	0.95 to 1.0
F	Forced flow, over capacity limits	> 1.0

The following section provides an evaluation of current traffic operations along both rural and urban roads likely to be directly impacted by traffic generated from the proposed development. The criteria for evaluating the operational performance of the road network are provided in **Tables 5** and **7.**

2.4 Rural Road Performance Criteria

The performance guideline used in this assessment for rural roads is taken from the traffic volume design ratio of between 10% and 12% for peak hour traffic against average daily traffic with road conditions being typically flat terrain.

The below performance criteria presented in the table below will be used to evaluate traffic conditions on all rural road approaches into Parkes which includes: the Newell Highway, Condobolin Road, Brolgan Road, Wellington Road, Orange Road and Eugowra Road.

Table 6 **Level of Service Criteria for Two Lane Two-Way Rural Roads**

Level of Service	Description	Maximum AADT
A	Free flow with low volumes with little or no delay	2,400
B	Stable flow with minimum delays and spare capacity	4,800
C	Stable conditions with spare capacity	7,900
D	Close to the limit of stable flow, operating near capacity	13,500
E	At capacity with high delays for motorists	22,900
F	Forced flow capacity exceeded unsatisfactory operating conditions	>22,900

Source: Austroads (Table 3.9): assuming two lane two-way road, level terrain, K factor = 0.10 and 60/40 directional split

2.4.1 Urban Road Performance Criteria

The below performance criteria presented in **Table 8** will be used to evaluate traffic conditions on the urban road sections within Parkes likely to be impacted by the proposed development. Roads that are urban in character and are evaluated as part of this assessment include Hartigan Avenue, Bogan Street and Dalton Street. All three of these roads are classified under the capacity thresholds for roads as '*urban undivided highways with interrupted flows'*.

Typical mid-block capacities for various lane configurations for urban roads are listed in **Table 7.**

Table 7 Level of Service Capacity Thresholds for Roads

Road Type	Capacity per Lane (veh/hr)	Max V/C for Los D	Max Service Flow Rate per lane for LoS D
Urban Divided/Undivided Highways with Clearways and signal coordination	1,600	0.90	1,440
Urban Divided/Undivided Highways with Interrupted Flow	1,000	0.90	900
Residential Streets	700	0.90	630

The information above indicates that each traffic lane along urban road sections through Parkes can cater for traffic levels of up to 900 vehicles per hour. The performance guideline used in this assessment for urban roads is based on the peak hour representing approximately 10% of the overall average daily traffic volume and a traffic directional split of 60/40.

2.4.2 Study Area Road Network Performance Assessment

Table 8 presents the performance levels of relevant road routes through the Local Government Area of Parkes using traffic volumes provided by the RTA, Council and the LOS criteria set in **Tables 6 and 7.**

Table 8 Performance Level of Key Approach Routes to Parkes (2005)

Rural/ Urban	Road Name	Count Location	Performance Level (LOS)	Traffic Volumes (AADT or ADT)
Rural	Brolgan Road	East of the site and west of the level crossing	A	188
Rural	Condobolin Road	At level crossing, west of Parkes	A	1036
Rural	Newell Highway – north	Parkes, 3.2km north of Court St	B	5337
Rural	Newell Highway – south	At Forbes/Parkes boundary	B	5620
Rural	Orange Road	Parkes, at Billabong Ck bridge	A	2031
Rural	Wellington Road	Parkes, 8km north of SH17, Newell Hwy	A	408
Rural	Eugowra Road	At Forbes/Parkes boundary	A	488
Urban	Hartigan Avenue	West of Forest Street	A	450
Urban	Bogan Street	North of Hartigan Avenue	A	5427
Urban	Dalton Street	West of Bogan Street	A	1943

Sources – AADT volumes for state roads have been taken from RTA Western Region traffic data. ADT volumes for Brolgan Road, Hartigan Street, Bogan Street and Dalton Street have been obtained from Parkes Shire Council supplied information.

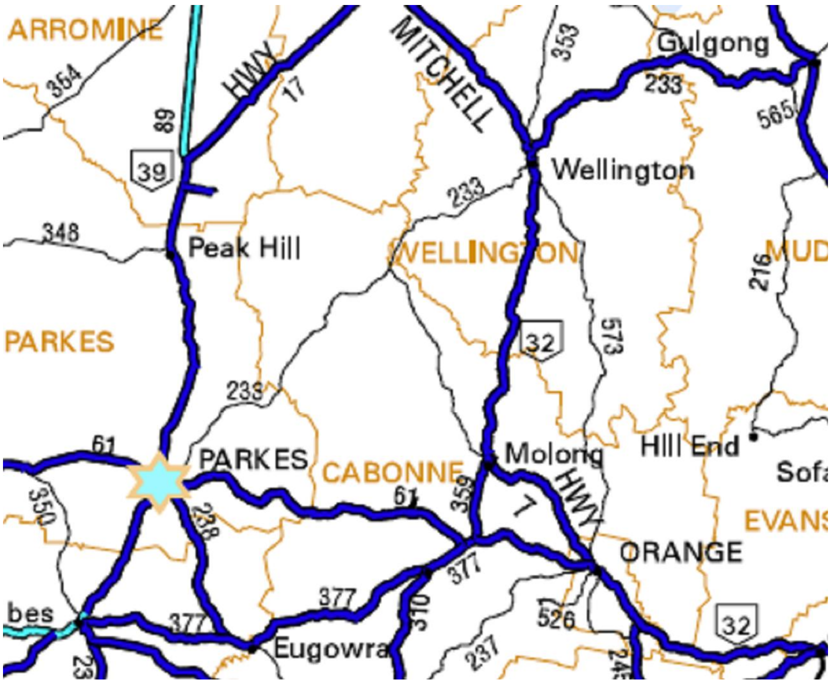
Note - Traffic volumes and performance levels have been factored up for 2005 traffic levels and include estimated per annum (pa) growth rates for background light traffic and a 3.6% pa increase in road freight.

Generally, a road with an operating performance (Level of Service) of A or B is desirable and a road section with an operating performance of Level of Service C is viewed to be acceptable. Using this evaluation criteria, it appears that currently both urban and rural road sections that could potentially be impacted by traffic generated from the proposed development operate satisfactorily.

2.5 Haulage Routes

Access routes in NSW for B Double trucks up to 25m in length and road trains up to 36.5m in length can be obtained from RTA's website. Information for the Parkes area is contained in the country towns and Hunter Valley sections and is presented in **Figures 2** and **3**.

Figure 2 Designated B Double and Road Train Routes in the Region



Source - RTA website – www.rta.nsw.gov.au

Notes

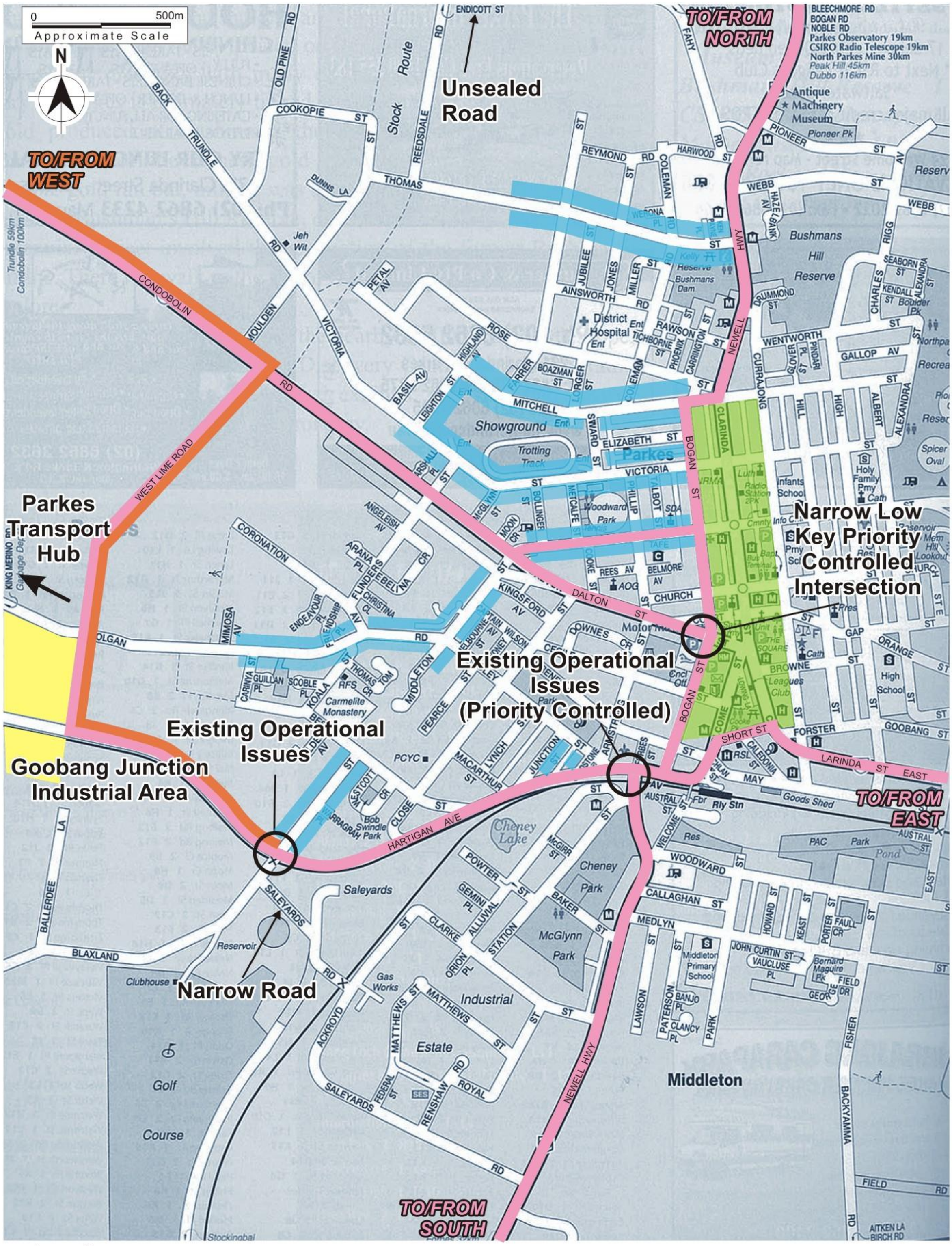
» red bold lines represent roads that are designated B double routes (upto 25m).

» yellow bold lines represent roads that are designated road train routes (upto 36.5m).

Figure 2 indicates that the township of Parkes has good access to the regional road network with the following roads designated as having the ability to accommodate B Double vehicles:

- State Highway (SH) 17 - Newell Highway south of Parkes;
- SH17 - Newell Highway north of Parkes;
- Main Road (MR) 61 – Condobolin Road west of Parkes;
- MR61 – Orange Road East of Parkes; and
- MR 238 – Eugowra Road south east of Parkes.

RTA mapping also indicates that the road network to the west of the Newell Highway at Forbes and to the north of Peak Hill is able to accommodate road trains upto 36.5m in length.



Legend

Source: Copyright Universal Publishers Pty Ltd

- Approved B Double Truck Routes
- Approved Road Train Truck Routes
- CBD
- Sensitive Land Use (Residential, Recreational, Educational)
- Industrial Uses

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Parkes Intermodal Terminal

Approved Truck Routes Through Parkes

job no	21-13701-08
file ref	2113701-08_LTN_02.cdr
scale	as shown
date	24 May 2006

Figure 3

Figure 3 provides an understanding of B double routes through the township of Parkes. These routes have recently changed as a result of opening western sections of the Parkes ring road system.

It is noted from the review of Council's Traffic Committee Meeting Minutes that authorisation has been granted by the Regional Traffic Committee for the use of road trains along roads situated in Parkes. This authorisation for the operation of road trains along public roads is usually restricted to selected road routes, to a haulage operator, a set time period and days of operation. The method for obtaining approval for the use of road trains is provided in RTA's '*Route Assessment Guidelines for Restricted Access Vehicle'* and should be used if a section or a number of sections of the state or local road network is required to be opened for restricted vehicle access.

3. Project Description, Objectives & Delivery

The following section provides a summary of the proposed development, its operating parameters, the client's and key stakeholder expectations, development staging and approval being sought. A conceptual site layout presenting the size and location of functional areas in the initial and ultimate stages is presented in **Appendix A**.

3.1 Project Outline

This section presents relevant information in terms of GHD's understanding of the client's (Terminal Australia) expectations of the PIT. All of the below information has been obtained from a review of the Parkes Intermodal Terminal – *'Operational and Functional Brief'* prepared by GHD.

3.1.1 Functions

The Parkes Intermodal Terminal will provide the following features:

» The most efficient infrastructure for attracting operators, freight forwarders and distributors to the site;

» Open access to common user facilities for both Customers and Clients of Terminals Australia;

» A full range of best practice container handling, storage, warehousing, and logistics facilities;

» Fixed and leading edge technology to support the supply chain transactions;

» Compliance systems for accommodating goods being imported or exported; and

» Appropriate infrastructure linkages to rail and road networks.

3.1.2 Operating Parameters

The operations of the Parkes Intermodal Terminal are likely to be targeted towards the following:

» 6 days a week operation or 312 days per annum;

» A market share of total container movement through Parkes of 25% in the initial stage and 45% at the ultimate stage.

» An average annual growth in market share of approximately 2% per annum between initial and ultimate stages;

» Throughput at the PIT of approximately 240,000 TEU per annum in the initial stage and approximately 530,000 TEU per annum at the ultimate stage;

» Handling between 12 (Initial) and 24 (ultimate) container rail services during a typical week or between 2 to 4 a day;

- Rail services from the west, as the container terminal is likely to be an attractive site for building and dismantling double stacked container services with origins or destinations in the west; and
- Access points that offer vehicle operating cost savings, minimise delay and have functional purposes for entry/exit to/from specific areas of the site.

3.2 Stakeholder Expectations

Consultation was undertaken during April and May 2005 with key stakeholders as part of the processes for assembling the operational and functional brief. The stakeholders involved in these meetings consisted of Parkes Shire Council, Roads and Traffic Authority, Australian Rail Track Corporation (ARTC) and Country RIC (RIC). Comments made by RIC and ARTC will not be considered in this part of this report as they are not deemed to be relevant to road infrastructure upgrades, except in the case of level crossings. Refer to section 5 of the Terminals Australia PIT - Operational and Function Brief for further information on stakeholder consultation during this period.

A review of the key findings from the consultation process has identified the following expectations and concerns:

Parkes Shire Council

- Currently seeking to improve road infrastructure in Parkes by developing a bypass system around Parkes CBD to cater for the future growth in road freight;
- Recognises that both Brolgan and Condobolin Roads currently accommodate low volumes of heavy vehicle traffic and that any future increase in road freight may require the upgrading certain sections of these road links in order to support this type of movement;
- Requires the report to provide an understanding of the potential increases or change in heavy vehicle traffic movement through Parkes as a result of the staged development of the PIT;
- Requires the study to investigate the potential benefits from constructing an alternative local road route through the site for Brolgan Road traffic when the proposed western level crossing is fouled by a freight train;
- Requires the masterplan study to review the minimum upgrade requirements for Brolgan Road from West Lime Road to the western side of the proposed site as a result of its proposed use. Council have suggested that as a minimum two 3.5m wide traffic lanes and 1.5m wide shoulders should be;
- Requires the study to provide an understanding of upgrade requirements at the Brolgan Road level crossing with the Parkes-Narromine Rail line;
- Requires the concept design for the PIT facility ensure that there is no fouling of Brolgan Road by trucks entering and exiting the site; and
- Wants the study to minimise both road safety risks and loss of amenity along Brolgan Road through investigation of the possible benefits from reducing the current signposted speed limit.

Roads and Traffic Authority

- Requires the design to consider access to the site via a single point of access located along Brolgan Road;
- Requires the study to investigate the potential benefits from providing a northern access point to Condobolin Road and the possible timing. However, the authority does not consider that an access to MR 61 (Condobolin Road) would be necessary as the number of trucks moving west are minimal and could be adequately served by a Brolgan Road access;
- Requires the study to investigate the minimal level crossing upgrade requirement as a result of the development. The authority suggested that it expected that a type F level crossing was required as a minimum at level crossing points adjacent to the site. Consideration for boom gates and advanced warning systems should be based on a risk assessment of approach sight distances and heavy vehicle volumes. The authority also indicated that the existing Brolgan Road level crossing is known to be narrow with poor sight distances to the west as a consequence of the angle that the rail line and road cross. This presents a potential need for an early warning system;
- That the '*RTA Guide to Traffic Generating Developments'* be used in the assessment of road infrastructure needs as a result of developing an intermodal facility at Parkes; and
- Requires the study to provide future traffic volumes and freight tonnage values for consideration in the upgrade of Brolgan Road.

3.3 Major Project Elements

The Parkes Intermodal Terminal is understood to comprise of the following elements:

- Site entrances that provide sufficient capacity and allow direct and safe access from Brolgan Road to various operating areas of the site;
- A possible site entrance on Condobolin Road for traffic travelling to and from the north and west;
- A safe and efficient internal road network that services all on-site activities and minimises conflict;
- Nearby off street car parks to support all on-site activities;
- Warehouses and storage areas for truck traffic;
- Stack areas;
- Container transfer vehicles;
- On site level crossings;
- Yards operational depot;
- Administration and security offices;
- Heavy Engineering Facility Area (operations not assessed as part of this application);

- A possible containerised fuel area (operations not assessed as part of this application);;
- New rail lines and spurs to support the proposed activities;
- Upgrade to level crossings situated along Brolgan Road;
- Upgrade to Brolgan Road to a suitable standard that is sufficient for accommodate the worst type vehicles likely to be attracted to the site during normal operations; and
- Other ancillary items to support the overall operation of an Intermodal Terminal.

3.4 Advantages of the Proposal and Desirable Outcomes

The following provides a summary of the cited advantages of the proposed PIT and the client's desired outcomes from the project.

3.4.1 Advantages of the Proposal

The Parkes Intermodal Terminal is expected to provide for a growing freight demand and fulfil a number of strategic aims of State and Federal Governments. Advantages of the proposal include:

- There is an expectation that road and rail freight movement around Parkes will grow at a steady rate in line with what was presented in the *Auslink White Paper 2004*. The *Austlink White Paper 2004* indicates that road freight will grow by 3.6% and rail freight by 3.4% per annum;
- This growth in road and rail freight movement around Parkes will occur with or without the establishment of an intermodal terminal in Parkes;
- The operation of the intermodal terminal in Parkes is likely to capture some of this existing and future movement;
- The facilities at the PIT will offer an opportunity to redistribute, consolidate, store and shift containers between rail and road systems;
- The PIT key operations are unlikely to generate significant volumes of additional road container freight movements along the regional or local road networks, but instead concentrate on the redistribution of existing and identified future demand; and
- The facilities at the PIT will provide State and Federal Government with an opportunity of achieving an improved road rail freight movement mode split.

3.4.2 Desired Outcomes

The land area and design of the proposed PIT and associated infrastructure will offer the following advantages:

- Development approval for large multi purpose industrial type uses;
- Designed in a manner that minimises the impact on established surrounding uses;
- Designed in such a way that it offers clear advantages in supporting efficient and safe movement for freight and other associated hub uses;

- Meet '*Auslink Policy'* objectives in providing national and regional benefits for the efficient movement of container freight; and
- Provides a sufficient area to allow for expansion and attracting other essential uses.

3.5 Project Implementation, Staging and Approval

This sub section provides an overview of the tasks to be delivered as part of this project, the planned staging of the proposed development and the assumed target throughputs of which approval is being sought.

3.5.1 Project Implementation Tasks

The proposed development involves the following:

- The rezoning land from rural to allow industrial type uses (completed);
- Development of new buildings, plant or machinery that will enable the site to achieve the required containerised throughput to both initial and ultimate stage targets;
- Construction of warehouses that will both support the intermodal terminal operations and other associated uses; and
- Installing new structures and equipment that both support and expand on the associated services provided.

3.5.2 Staging of the Facility

The project is expected to be implemented over two time horizons:

- Initial Stage - infrastructure for this stage will be delivered over a 0 to 5 year period with a current target year of 2010.
- Ultimate Stage - infrastructure for this stage will be delivered over a 10 to 15 year period with a current target year of 2020.

3.5.3 Approval Sought

Concept Design approval is sought for an intermodal terminal, which permits a combined rail and road containerised freight throughput of:

- 240,000 Twenty Foot Equivalent Units (TEUs) of road and rail freight in the Initial Stage of development, planned to be operational around approximately 2010 or 5 years after receiving development approval; and
- 530,000 Twenty Foot Equivalent Units of road and rail freight in the Ultimate Stage of development, planned to be construct overtime and fully operational around approximately 2020 or 10 to 15 years after receiving development approval.

4. Understanding the Traffic Generation Potential

This section aims to provide an understanding of the likely traffic generation from the proposed Parkes Intermodal Terminal (PIT) both in the interim and ultimate stages of development.

4.1 Target Throughput

GHD in February 2006 developed an '*Engineering Masterplan'* for planned delivery of internal infrastructure for the PIT. The analysis completed for this exercise examined the likely market demand for this type of facility. This analysis indicated that the target market is current and planned freight movement along the Newell Highway and the transfer of container traffic between east-west and north-south rail corridors. Based on this approach a low and high capture rate was developed. The low capture rate was based on capturing anticipated growth in freight road and rail freight movement and the higher capture rate based on the generation of additional road and rail traffic movement that would be attracted to the site from other transport routes. Based on the high capture rate the throughput potential of freight was calculated to be:

» 240,000 TEU throughput per annum in the '*Interim Stage'* from road and rail; and

» 530,000 TEU throughput per annum in the '*Ultimate Stage'* from road and rail.

The high capture rate for this facility si assumed to be the worst-case scenario in terms of traffic impacts.

4.2 Standard Traffic Generation Rates

The '*RTA Guidelines'* implies the following traffic generation rates for each proposed land use type and land area planned within the PIT under both the initial and ultimate stages are as follows:

Table 11 Daily and Peak Hour Trip Rates – RTA Guideline

Land use	Initial Development			Ultimate Development		
	GFA m^2	Two way veh trips		GFA m^2	Two way veh trips	
		Daily	Peak hour		Daily	Peak hour
Warehousing	20,000m^2	800	100	50,000m^2	2,000	250
Road Transport Terminal	50,000m^2	2,500	500	120,000m^2	6,000	1,200
Office	1,000m^2	100	20	4,000m^2	400	80

Note – That all GFA measurements are assumed to be 50% of total area available.

The above information indicates that the site has the following traffic generation potential:

- It will create a total of 3,400 two-way daily vehicle trips or 620 two way peak hour vehicle trips in the initial stage; and
- It will create a total of 8,400 two-way daily vehicle trips or 1,530 two-way peak hour vehicle trips in the ultimate stage.
- Under the above scenario, it can be assumed that the traffic levels for the transport terminal itself are capable of transferring a throughput of approximately 1,290,000 TEUs per annum. The throughput calculation is based on an average truck carrying 1.5 TEUs (conservative estimate), trucks being empty on one leg of their trip, 500 of the vehicle trips being generated by staff and that all freight will be transferred by road. This TEU throughput is more than what is predicted for the Intermodal Terminal under the Ultimate Stage high capture rate scenario.
- The vehicle generation rate for the warehousing area planned in PIT indicates that it is capable of transferring a throughput of approximately 235,000 TEUs per annum. The throughput is based on an average truck carrying 1.0 TEUs (conservative estimate), trucks being empty on one leg of their trip, 500 vehicle trips are generated by staff and that all freight will be transferred by road. It should be noted that a major supplier to the warehousing situated within the PIT will be both road and rail traffic travelling to the Intermodal Terminal, once this facility is fully operational.

4.3 Likely Travel Patterns Generated from the Site

It should be highlighted, that the land use related average traffic generation rates provided in the '*RTA Guide to Traffic Generating Development'* (RTA Guideline) are not based on an understanding of the terminals purpose and its complex internal relationship between each land use and rail. Generally the traffic generation rates provided in the '*RTA Guideline'* are not associated to an inland intermodal terminal based next to a country town with the following operational characteristics:

- Limited local market catchment area;
- Focused on servicing existing and planned regional and national freight movement to urban markets or ports and between major urban centres;
- On-site freight storage facilities reducing the need to move goods off site. This concentration of facilities and freight movement will be contained onsite for the following inbound freight movement scenarios:
  - road to rail;
  - rail and rail (double stacked to single stacked trains and vice versa); and
  - rail to storage then back to rail.
- Provides access to both rail and road routes of nationally and state importance;
- Not aimed at capturing 'Just In Time' deliveries or high turnover goods due to its proximity to key urban catchments;
- Aimed at attracting goods that benefit from storage space and cost savings from bulk long haul movement by rail or road;
- Aims at offer opportunity to access the rail network from road and improve the current mode split between rail and road; and
- Aimed at benefiting from the potential construction of an inland rail route between Melbourne and Brisbane via Parkes.

4.4 Justification For Approach

When examining the land use traffic generation rates included in the '*RTA Guideline'*, it is apparent that these sites do not operate with similar characteristics to that of the proposed Parkes Intermodal Terminal. This is demonstrated by the proposed development having a maximum target market throughput potential, which is not linked to land area, but instead to market changes and future improvements in National and Regional Infrastructure.

The '*RTA Guideline'* also does not appear to provide a guide average traffic generation rate for an Intermodal Terminal, which is the key activity generator within the Parkes Intermodal Terminal. The '*Guideline'* indicates when source information is not available then a case study and surveys should be undertaken. However, this is not possible due to the following factors:

- The site is unique and does not share similar characteristics with any other known Intermodal Terminal, as it is likely to serve mostly statewide and nationwide distribution of container type freight opposed to local urban area distribution. This is supported by the facility being situated on several key strategic road and rail corridors, in a rural setting and surrounded by an area with potentially limited direct market opportunities.
- The proposed Intermodal Terminal is also unique as it is supported by 'back of house' warehousing and other associated facilities, which are both linked to road and rail access. For instance, in some cases the throughput movement to the facility may just attract rail-to-rail movement via the warehousing, and therefore will not generating

road traffic. In these circumstances, this target throughput should be discounted from the anticipated traffic generation as a result of the proposed development.

In order to consider the above demand limitation and target market it is considered appropriate to estimate traffic demand for facilities within PIT, which is based on the maximum market potential throughput (high capture rate).

5. Relationships between Freight Movement & Land Use

This section aims to provide an understanding of the relationship between land uses situated with the proposed Parkes Intermodal Terminal (PIT) and freight movement through the facility.

In providing this understanding it indicates the maximum target throughput levels the facility is likely to achieve (Refer to **sections 4.1)** and how a proportion of this throughput will be contained on-site or be transported by rail only (refer to **section 5.1**) and therefore will not generate any traffic on the external road network. It is also noted that a high proportion of the expected throughput of the facility travelling through the intermodal terminal will pass through associated land uses such as the warehousing. This throughput interconnection means that each of the associated land uses will not generate significant levels of traffic on the external road network, which is not already accounted for by the intermodal terminal.

5.1 Understanding of Freight Movement through the PIT

Figure 4 presents a breakdown of PIT TEU throughput being transferred and handled in the facility after arriving by rail for both the initial and ultimate stages, and **Figure 5** shows a similar breakdown of PIT throughput transfers after arriving by road. These diagrams are used to understand the complex relationships between inbound and outbound road and rail freight movements and associated on-site land uses under the high capture rate scenario.

Figure 4 Annual PIT TEU Throughput by Inbound Rail

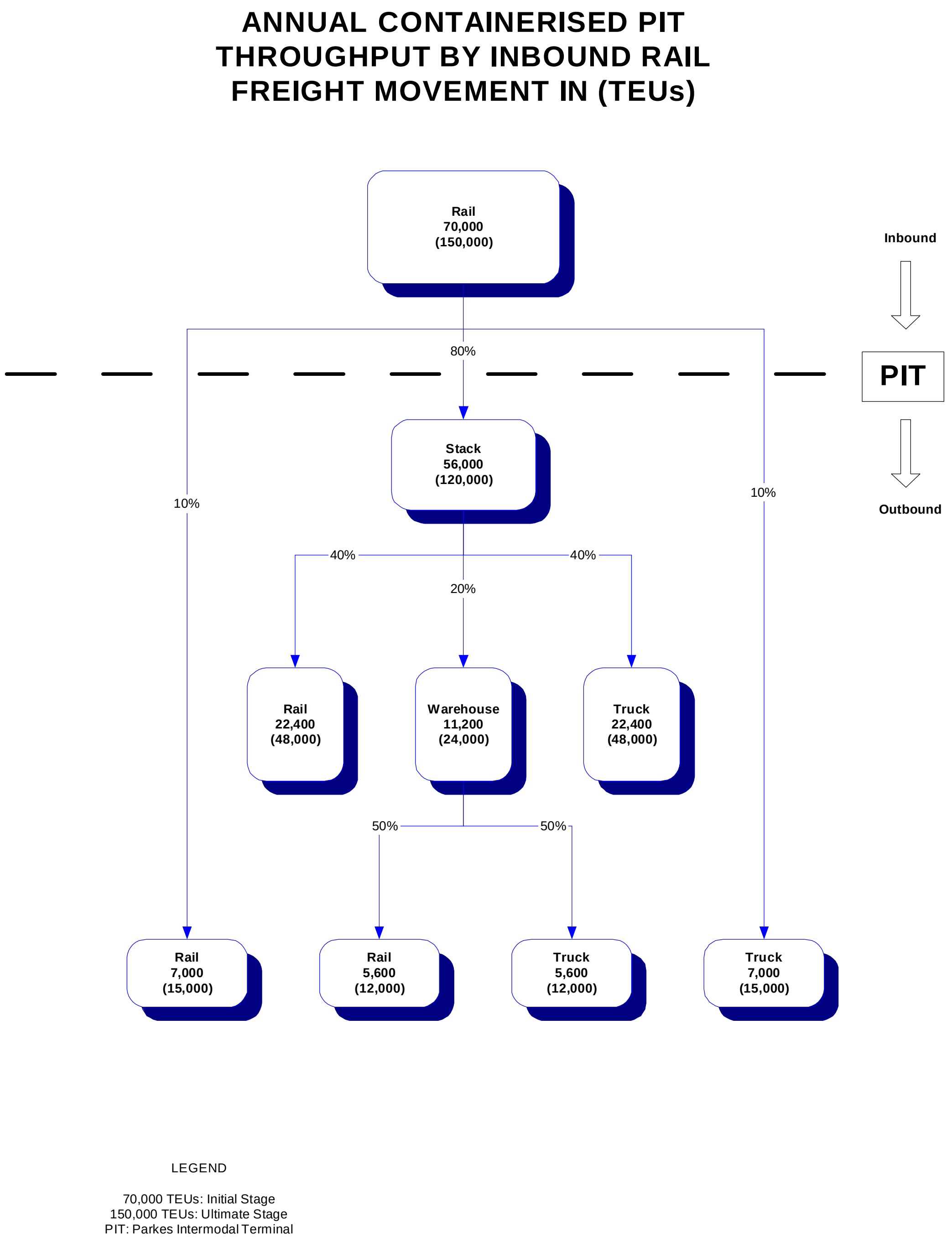
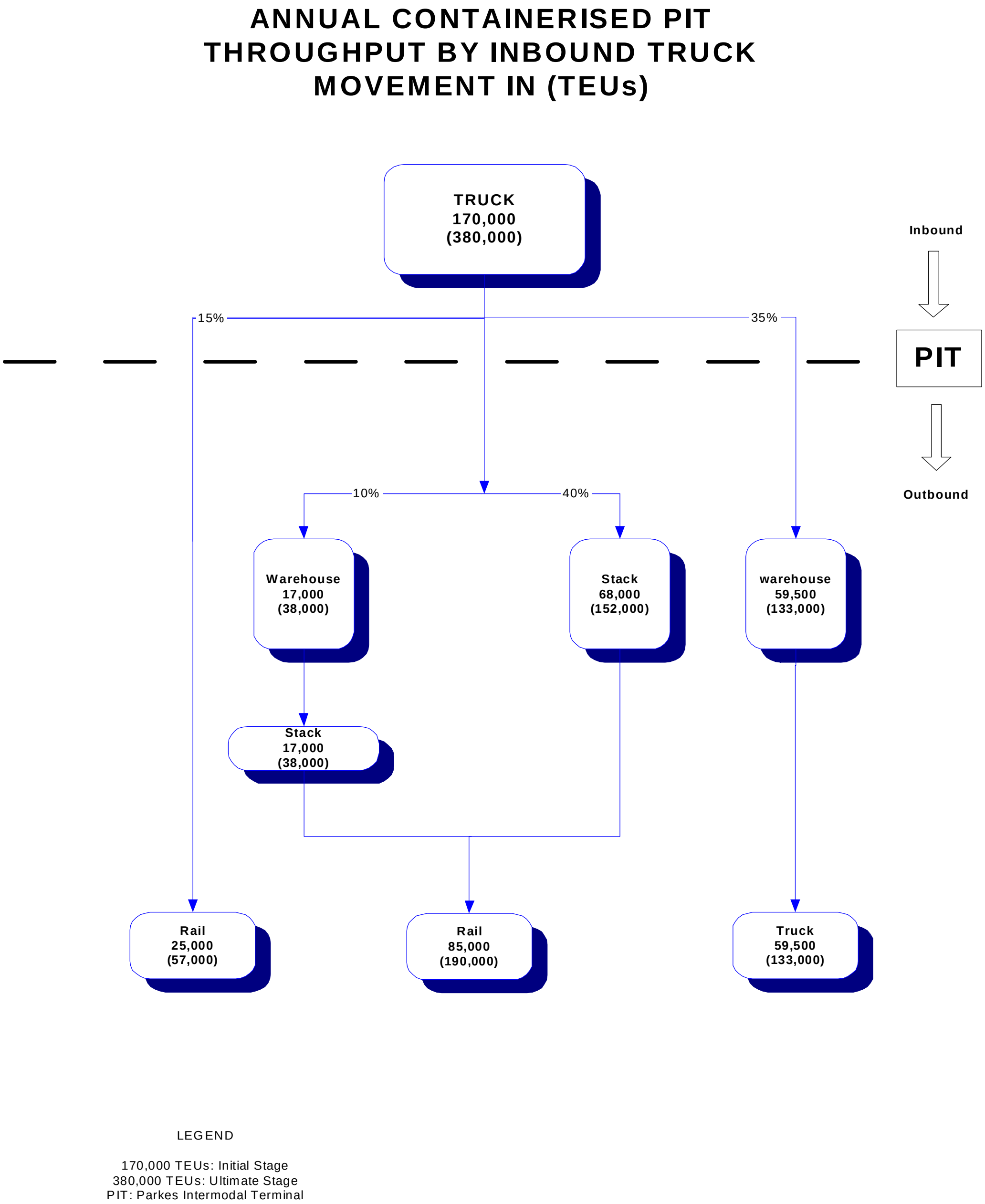


Figure 5 Annual PIT TEU Throughput by Inbound Road



In order to establish the potential infrastructure needs for the proposed facility, we must firstly obtain an understanding of the likely inbound, internal transfers and outbound movements. This can be obtained by further evaluation of the assumed operational movements generated from the arrival of TEU by rail and road, which is presented in **Figures 4** and **5**. The following key movement assumptions and volumes have been obtained from the analysis of on-site transfers and outbound freight movement.

» Inbound Rail

- 10% of TEU arriving by rail will depart directly by truck
  - 80% will go to stack, from the stack 32% of the total volume will be transferred onto truck and 32% on to rail and 16% will be transferred to the warehouse areas. The volume transferred to warehouses will be stored and transferred at a later date with a split of 8% going to rail and 8% to road. Thus, 40% is transferred off site via rail and the other 40% by truck.
  - 10% will be loaded back onto trains.
  - Inbound movement in TEUs by rail will be transferred via a number of activity areas, which leads to the outbound split being shared 50/50 by road and rail.
- Inbound truck
  - 55% will go directly to the terminal (rail or stack) and then transferred off site by rail.
  - 45% will go to the warehousing with 10% transferred to the terminal and then rail and the remaining 35% will be transported off site by truck at a later date.
  - Inbound movement in TEUs by road will be transferred via a number of activity areas, which will lead to the outbound split being 65% by rail and 35% by road.
- The inbound movement in TEUs by rail represents approximately 30% of all inbound freight movement, whilst road provides 70%.

5.2 Comparison of Inbound and Outbound Truck Movement

This section provides an understanding of the major differences between the projected inbound and outbound road and rail movements that could potentially provide load carrying opportunities for other on-site uses. This information is presented in **Table 13,** which provides inbound and outbound movements in TEUs by rail and road and then converts the volume into likely truck movements.

Table 12 Comparison of PIT Inbound & Outbound Movements by Rail & Road

	Throughput Period	Initial Stage		Ultimate Stage	
		Rail	Road	Rail	Road
Inbound	Peak hour movement by mode	N/A	25	N/A	56
	Daily Movements by mode (approx)	1	250	3	560
	Annual TEU throughput	70,000	170,000	150,000	380,000
	% of TEU Annual throughput	29%	71%	28%	72%
Outbound	Peak hour movement by mode	N/A	14	N/A	31
	Daily Movements by mode (approx)	3	140	5	305
	Annual TEU throughput	145,500	94,500	322,000	208000
	% of TEU Annual throughput	61%	39%	61%	39%
Difference	Peak hour movement by mode	N/A	-11	N/A	-25
	Daily Movements by mode	2	-110	2	-255

Note

- Numbers are based on the high market capture rates for all freight movement via the terminal in both the initial and ultimate stages.

The results indicate that there is a significant imbalance between rail and road movement from the facility in both the initial and ultimate stages. This predicted mode shift in freight will result in an approximate 30% imbalance between rail or road inbound and outbound movements with the road/ rail split being approximately 70/30 in favour of road for inbound movements and altering to 40/60 in favour of rail for the outbound movements.

This imbalance indicates that the terminal may not optimise the opportunity offered by outbound road freight movements if it was just based on Intermodal Terminal generated freight movements.

5.3 Planned Improvements in Efficiency

In additional to the TEU throughput at the PIT facility, market trade imbalances are likely to generate traffic through the need to transfer empty containers back to their point of origin. The majority of this movement is assumed to occur by rail with most destinations being interstate or overseas, however, some may be generated as a result of a container being returned to a distributor within the terminal's local catchment. All empty containers being returned locally are likely to be inaccessible by rail and therefore transferred by road. The movement of empty containers to local distributors could be utilised by the PIT as there is an imbalance between the number of trucks required to carry freight to the site and the number of trucks required to move freight off the site.

It is expected that the facility will be operated by either one of the existing stevedores, large haulage companies or rail freight operators. This will mean that the movement of freight into and out of the facility will be coordinated in an attempt to optimise available road and rail resources generated by inbound trips. Haulage companies using this facility are likely to be locked into large national contracts with road trips planned to fit into time slots at the facility and in most cases allowing the truck operator to both drop off and pick up containers in a single visit to the PIT. The warehousing areas that are proposed to be located at the PIT could also take advantage of the spare capacity that is available on outbound road trips.

It can be assumed that the predicted spare or available capacity for outbound movement by road and inbound movement by rail is likely to be utilised to move empty containers or move other warehouse goods not included in the terminal operation calculations.

5.4 Inbound and Outbound Truck Movement to Warehouse

The purpose of this section is to identify traffic movement that is likely to be generated by warehousing situated within the PIT under the high road capture rate scenario. The information presented in **Table 14** provides likely truck movements to and from the warehousing that is associated with the operation of the Intermodal Terminal and has been estimated using inbound and outbound TEU models for rail and road.

Table 13 PIT Generated Vehicle Trips via the Warehouse Areas

PIT Movement Type	Movement Measures	Initial Stage	Ultimate Stage
Inbound Internal and External	Daily One Way Truck Movements (approx)	130	290
	Total TEUs Moved	87,700	195,000
	Proportion of total PIT TEU throughput	37%	37%
Outbound Internal and External	Daily One Way Truck Movements (approx)	130	290
	Total TEUs Moved	87,700	195,000
	Proportion of total PIT TEU throughput	37%	37%
Inbound External Only	Daily One Way Truck Movements (approx)	115	250
	Total TEUs Moved	76,500	171,000
	Proportion of total PIT TEU throughput	32%	32%
Outbound External Only	Daily One Way Truck Movements (approx)	100	215
	Total TEUs Moved	65,100	145,000
	Proportion of total PIT TEU throughput	27%	27%

Note - Numbers are based on the high market capture rates for all road freight movement via the terminal in both the initial and ultimate stages. The internal vehicle movements are assumed to occur within PIT, i.e. between warehouse and rail or stack areas or vice versa. The traffic generation rates are based on an average carrying capacity of 2.18 TEUs per vehicle. All vehicle numbers quoted above are approximate numbers and have been rounded up or down.

The key findings from the information presented above is as follows:

- PIT TEU throughput that will be transferred via the warehouse areas and then travel along Brolgan Road is estimated to comprise of approximately 215 daily and 21 peak hour two way vehicle movements in the initial stage and 465 daily and 46 peak hour two way vehicle movements in the ultimate stage.
- External traffic generation from the warehousing, which is linked to throughput activity generated by the Intermodal Terminal is estimated to represents approximately 80% of the total traffic generated by PIT and transferred via the warehouse areas, with internal truck movements representing 20%. These volumes have been incorporated into the TEU demand based traffic generation for the Intermodal Terminal and should be discounted from the traffic generation calculation for on-site warehousing.

6. Project Impacts

The purpose of this section is to provide a summary of the projects potential impacts on the external road network in terms of traffic generation, road operations and suitability of routes.

6.1 PIT Traffic Generation

The following section provides an understanding of the traffic generation rates used for the assessment of land uses situated within the PIT.

6.1.1 Intermodal Terminal

The intermodal transport terminal is a multi modal facility, which as explained in previous sections will operate under the following conditions:

- Provide an operation that targets existing and estimated growth in road rail freight movement along key transport corridors that travel through Parkes. This will lead to traffic being redistributed along the local road network and minimal changes to predicted traffic levels along the regional road network.
- Provide an operation that targets repackaging of goods and the storage of bulk goods that can be stored for long periods of time,
- Will have a limited market catchment that is focussed on statewide and nationwide freight distribution, thus its market limitations are not associated with the size of the area being developed;
- Aims to carry a large proportion of freight by rail, which will not impact on the external road network; and
- Is demonstrated to generate some level of internal movement, which will also not impact on the external road network.

Based on the above and information presented in previous sections, it is understood that the worst case estimate for truck traffic visiting the Intermodal Terminal can only be based on the set throughput target (i.e. 240,000 TEU in the initial stage and 530,000 TEU in the ultimate stage) for capturing freight. Thus, the traffic generation potential of the proposed Intermodal Terminal has been estimated based on the maximum road freight throughput target plus staff and delivery movements.

The heavy vehicle traffic generation for the proposed intermodal terminal is shown in **Table 22.**

In addition to the above traffic generation for heavy vehicles the site will generate light vehicle movements, which have been estimated to consist of both staff and deliveries movements. The following provides an understanding of likely generation from these activities:

- Initial stage: Assumes 2 shifts of 20 staff travelling to the site during the shift changeover period, which equals 40 vehicle movements during this period. There is expected to be 3 shifts per day, which will generate in total approximately 120 two-way vehicle trips per day plus 6 daily light vehicle delivery movements.

» Ultimate stage: Assumes 2 shifts of 50 staff travelling to the site during the shift changeover period, which equals 100 vehicle movements during this period. There is expected to be 3 shifts per day, which will generate in total approximately 300 two-way vehicle trips per day plus 20 daily light vehicle delivery movements.

It is currently not known if the shift changeover periods will impact on the proposed development, however, for the purpose of this assessment and in order to understand the worst case scenario, the shift changeover period is assumed to occur during the AM and PM peak on the external road network.

Based on the above, the following adjusted rates are presented in **Table 22.**

Table 21 Daily and Peak Hour Two Way Vehicle Trips (Intermodal Terminal)

	Initial Development				**Ultimate Development**			
Period	**Daily**		Peak Hour		**Daily**		Peak Hour	
Vehicle Type	HV	LV	HV	LV	HV	LV	HV	LV
Staff		120		40		300		100
Deliveries		6		0		20		0
Internal movements	200		20		440		44	
External Movements associated with PIT	472		47		1,110		110	
Total per Vehicle Class	672	126	67	40	1,550	320	154	100
Combined Total	***798***		***107***		***1,870***		***254***	
After discounting internal movements	***598***		***87***		***1,430***		***210***	

Notes

» LV represents light vehicles and HV represents heavy vehicles.

» Peak hour heavy vehicle traffic has been estimated to represent 10% of daily heavy vehicle traffic generated by this use.

» Internal movement for the intermodal terminal has been calculated from the following:

- Initial stage = 125,400 TEUs being transferred between land uses with an assumption that rail to stack and vice versa is undertaken by on-site cranes & the average carrying capacity of each truck is 2 TEUs.
- Ultimate stage = 274,000 TEUs being transferred between land uses with an assumption that rail to tack and vice versa is undertaken by on-site cranes & the average carrying capacity of each truck is 2 TEUs

6.1.2 Warehousing

It is expected that a large proportion of the on-site warehousing will act as storage facilities for the Intermodal Terminal. As a result, the warehousing has a relationship with the intermodal terminal (refer to Figures 4 and 5), which indicates that approximately 20% of its total demand will be made from internal movements (i.e. TEU movements from rail and stack areas). This internal movement will not impact on the external road network and is not a typical characteristic for warehouse operations. It can therefore be assumed that the average traffic generation rates provided in the *RTA Guideline* for warehousing will not provide a true representation on expected traffic movement for warehousing situated within the proposed development.

Based on the operating characteristics for this type of facility, it is reasonable to assume that the average traffic generation rate for warehousing could be discounted due to internal vehicle movements associated with other PIT uses, and other factors such as:

- Being attractive to bulk transfers by rail,
- Targeting large trucks carrying higher TEU loads;
- Offering the market a facility for long term storage,
- Having good connectivity with the rail system, which increase its ability to capture more goods being transported by rail;
- Having only a small local market catchment;
- The target market being limited to state and nationwide freight movement; and
- Requiring only a small workforce due to the provision of new heavy loading technology to handle the movement of goods.

The heavy vehicle traffic generation for warehousing is based on the above assumptions and shown in **Table 23.**

Apart from the transport of freight by heavy vehicles the site will generate other vehicle movements, which have been estimated to consist of staff (assumed to be all light vehicles) movements. The following provides an understanding of likely generation from this activity:

- Initial stage: Assumes 2 shifts of 30 staff travelling to the site during the shift changeover period, which equals 60 vehicle movements during this period. There is expected to be 3 shifts per day, which will generate in total approximately 180 two-way vehicle trips per day. The overall parking requirement will be based on 67 parking spaces, as specified in the '*RTA guideline*'.
- Ultimate stage: Assumes 2 shifts of 80 staff travelling to the site during the shift changeover period, which equals 160 vehicle movements during this period. There is expected to be 3 shifts per day, which will generate in total approximately 480 two-way vehicle trips per day. The overall parking requirement will be based on 167 parking spaces, as specified in the '*RTA guideline*'.

A similar assumption has been applied for staff working at the proposed warehousing to that shown for the intermodal terminal with the worst case scenario being adopted, which assumes the shift changeover period occurs during the AM and PM peak on the external road network.

Table 23 presents traffic generation rates for the proposed warehousing areas that will be situated within the proposed development.

Table 22 Daily and Peak Hour Two Way Vehicle Trips (Warehousing)

	Initial Development				**Ultimate Development**			
Period	**Daily**		Peak Hour		**Daily**		Peak Hour	
Vehicle Type	HV	LV	HV	LV	HV	LV	HV	LV
Staff		180		60		480		160
Internal movements	45		5		115		12	
External Movements associated with PIT	215		22		465		47	
External Movements not associated with PIT	30		3		68		7	
Total per Vehicle Class	290	180	30	60	648	480	66	160
Combined Total	***470***		***90***		***1,128***		***226***	
Discounted from associated PIT traffic	***210***		***63***		***548***		***167***	

Note

- LV represents light vehicles and HV represents heavy vehicles.
- Peak hour heavy vehicle traffic has been estimated to represent 10% of daily heavy vehicle traffic generated by this use.
- The 68 truck movements that are not associated with the PIT have been estimated to be able to carry approximately 45,000 TEU per annum. This throughput calculation is based on each truck in the future carrying 2.18 TEU per trip. It has also been assumed due to future efficiency improvements in the road freight industry from the planning and scheduling of container freight movements both inbound and outbound movements being fully utilised and the warehousing would be operational 312 days a year.

Based on the above calculations and information presented in **Table 23** the throughput potential for the warehousing area is 195,000 TEU from intermodal terminal related activities plus 45,000 TEU from activities not associated with the Intermodal Terminal.

6.1.3 Offices

The assumed traffic generation rates for office uses situated in the proposed development are as follows:

- Initial stage: Assumes 20 staff travelling to the site during the peak commuter period along the external road network. The total traffic generation from offices uses situated within the proposed development is expected to be approximately 40 two-way vehicle trips per day plus 4 daily light vehicle delivery movements. The overall parking requirement will be based on 25 parking spaces, as specified in the '*RTA guideline*'.
- Ultimate stage: Assumes 80 staff travelling to the site during the peak commuter period along the external road network. The total traffic generation from offices uses situated within the proposed development is expected to be approximately 160 two-way vehicle trips per day plus 10 daily light vehicle delivery movements. The overall parking requirement will be based on 100 parking spaces, as specified in the '*RTA guideline*'.

6.1.4 PIT Traffic Generation

The combined daily and peak hour traffic generation predicted for all the above uses situated within the proposed development is as follows:

Table 23 Total Traffic Generation from the Proposed PIT

Traffic Generators	**Initial Stage**		**Ultimate Stage**	
	Peak Hour	Daily	Peak Hour	Daily
Intermodal Terminal Throughput (HV)	48	472	111	1110
Additional Warehouse Movements (HV)	3	30	7	68
Workers and deliveries (LV)	120	350	340	970
Total	***171***	***852***	***458***	***2148***

6.2 Impact on the Regional Road Network

As explained in the previous sections the potential target market for the proposed development is both existing and predicted state and nationwide freight movement travelling along key transport corridors (i.e. Newell Highway and Orange- Broken Hill Railway, Parkes to Forbes Railway and Parkes to Narromine Railway) through Parkes. The following section provides an understanding of the likely distribution of traffic and the resulting impact on both local and regional roads from traffic travelling to the proposed development.

6.2.1 Traffic Distribution

The current distribution of heavy vehicle traffic has been evaluated and is shown in **Table 25.**

Table 24 Daily Truck Movements Through Parkes

Road link	Total Daily HV Traffic (2005)	Proportion of HV Traffic through Parkes
SH17 Newell Hwy (N)	888	33%
SH17 Newell Hwy (S)	1510	56%
MR 61 (W) Condobolin Rd	82	3%
MR 61 (E) Orange Rd	111	4%
MR 233 Wellington Rd – NE	41	2%
MR 238 Eugowra Rd – SE	53	2%
Total	2685	100%

Source: Traffic Volume Data for Western Region, RTA 2002.

Note - Values used for HV movement along the Newell Highway south have been adjusted.

It is clear from **Table 25** that the Newell Highway is key route for road freight travelling through Parkes and represents 89% of all road freight movement along rural sections of the Parkes regional road network.

The following assessment is based on both light and heavy vehicle traffic, which is anticipated to be generated by land uses situated within the proposed development. The estimated vehicle distribution resulting from the operation of proposed development is assumed to be as follows:

Table 25 Assumed Traffic Distribution from PIT for Different Vehicle Types

Roads	Light Vehicles	Heavy Vehicle
Brolgan Road	100%	100%
MR 61 (W) Condobolin Rd	5%	3%
SH17 Newell Hwy (N)	10%	33%
SH17 Newell Hwy (S)	10%	56%
MR 61 (E) Orange Rd	5%	4%
MR 233 Wellington Rd – NE	0%	2%
MR 238 Eugowra Rd – SE	0%	2%
Hartigan Avenue	25%	97%
Bogan Street	40%	33%
Dalton Street	70%	0%

It has been assumed that the majority of workers associated with the proposed development will live within or around Parkes LGA and that 100% will use Brolgan Road to travel to the site. It is expected that the majority of this traffic will then travel to Dalton Road and Bogan Street before accessing the local road network.

Refer to **Figures 2** and **3** for an understanding of designated B double and road train routes within Parkes. Similar to the assumption applied for light vehicle movements, heavy vehicles will access the external road network via Brolgan Road, however due to current road network vehicle restrictions and the location of some sensitive land uses, it has been assumed that all traffic travelling to the Newell Highway and beyond will use Hartigan Avenue. This will result in 97% of the expected heavy vehicle movement traveling to and from the site using the Hartigan Avenue route and only 3% using the West Lime Road and Condobolin Road route.

Refer to **Figure 3** for an understanding of current deficiencies located along the route and **Figure 6** for an understanding of upgrades proposed by Parkes Shire Council. These upgrades are required as a result of the rezoning of a significant area of land for industrial uses, which includes the Parkes Intermodal Terminal and Parkes Transport Hub.

6.2.2 Anticipated Traffic Growth Without PIT

Table 27 presents an estimation of future daily total traffic and truck movements along all road routes likely to be impacted by the proposed development. The estimated traffic volumes through Parkes have been calculated for both 2010 (Initial PIT Stage) and 2020 (Ultimate PIT Stage) by applying annual traffic growth rates as shown in **Appendix H.**

Table 26 Estimated Daily Traffic Movement Without PIT (Two-Way)

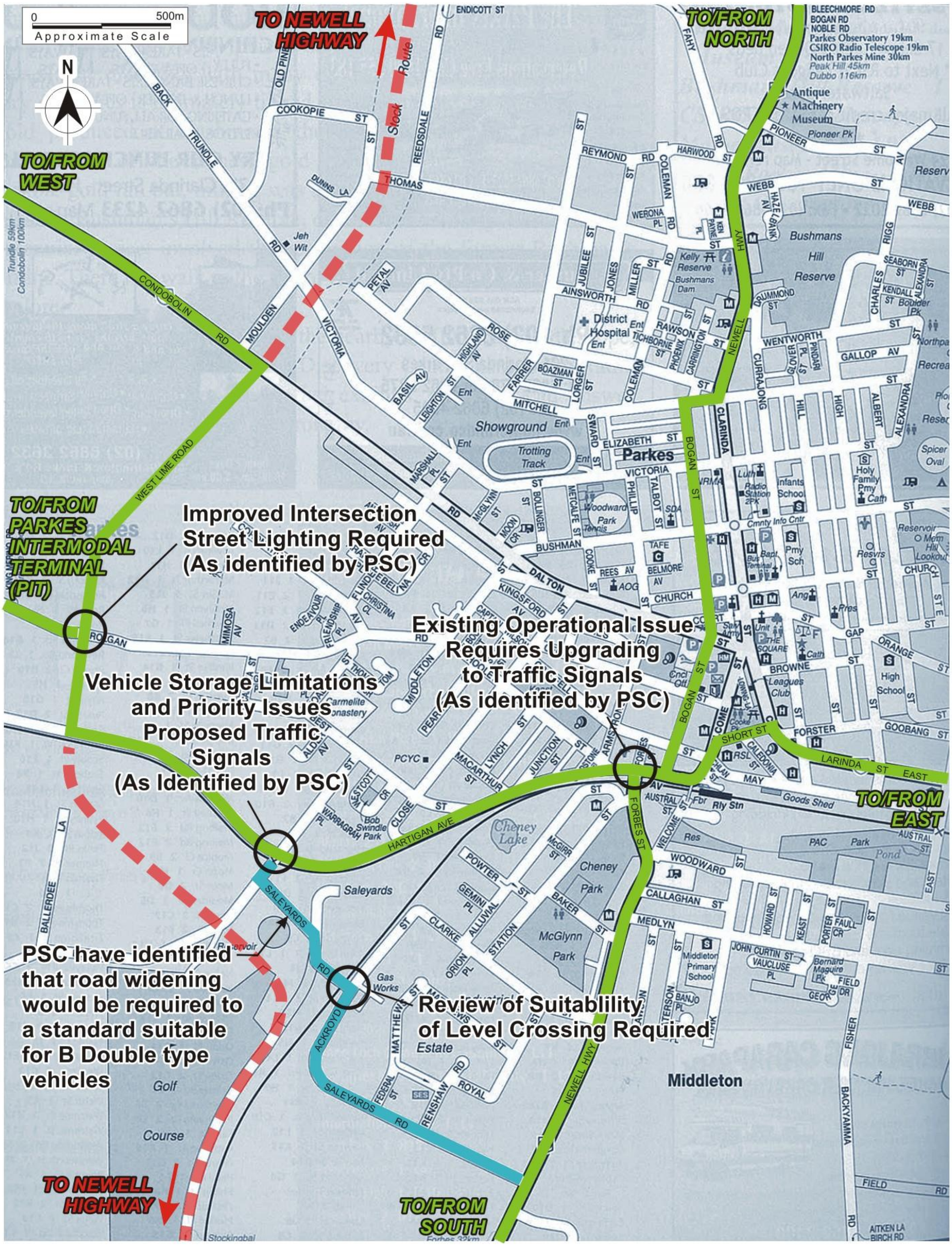
Year	**2010**			**2020**		
Road link	Total	HV	HV%	Total	HV	HV%
Brolgan Road	200	4	2%	227	5	2%
MR 61 (W) Condobolin Rd	1064	97	9%	1138	127	11%
SH17 Newell Hwy (N)	5685	1048	18%	6597	1367	21%
SH17 Newell Hwy (S)	5914	782	13%	6684	2325	35%
MR 61 (E) Orange Rd	2099	131	6%	2276	171	8%
MR 233 Wellington Rd – NE	417	49	12%	441	64	15%
MR 238 Eugowra Rd – SE	500	62	12%	529	81	15%
Hartigan Avenue	690	140	20%	762	155	20%
Bogan Street	5789	984	17%	6587	1252	19%
Dalton Street	1992	100	5%	2094	105	5%

Source: Traffic Volume Data for Western Region, RTA 2002 for all sites situated along regional roads and PSC traffic data for roads situated within Parkes.

It is clear from the above table that the Newell Highway including Bogan Street is predicted to continue to be the key route for road freight traffic travelling through the Parkes LGA.

6.2.3 Proposed Truck Routes

Designated B Double and Road Train Routes that are proposed to be utilised by heavy vehicle traffic travelling to and from the proposed development are shown in **Figure 6.**



Legend

- Proposed Truck Routes to PIT
- Proposed Ring Road
- Interim Truck Route (Option)

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Parkes Intermodal Terminal

Proposed Truck Routes to the Parkes Intermodal Terminal

scale	as shown
date	24 May 2006
job no	21-13701-08
file ref	2113701-08_LTN_01.cdr

Figure 6

10 Bond Street Sydney NSW 2000 T 61 2 9239 7100 F 61 2 9239 7199 E sydmail@ghd.com.au W www.ghd.com.au

6.2.4 Future Traffic Levels With PIT

Table 28 provides an understanding of future traffic volumes along the road network with and without the proposed development.

Table 27 PIT Future Road Freight Capture - Two Way Movement 2010

Year	**Without PIT**			**High Capture**		
Road link	Total	HV	HV%	Total	HV	HV%
Brolgan Road	200	4	2%	1052	506	48%
MR 61 (W) Condobolin Rd	1064	97	9%	1087	102	9%
SH17 Newell Hwy (N)	5685	1048	18%	5775	1103	19%
SH17 Newell Hwy (S)	5914	782	13%	6043	876	14%
MR 61 (E) Orange Rd	2099	131	6%	2123	138	6%
MR 233 Wellington Rd – NE	417	49	12%	420	52	12%
MR 238 Eugowra Rd – SE	500	62	12%	503	65	13%
Hartigan Avenue	690	140	20%	1264	627	50%
Bogan Street	5789	984	17%	5984	1039	17%
Dalton Street	1992	100	5%	2237	100	4%

Table 28 PIT Future Road Freight Capture - Two Way Movement 2020

Year	**Without PIT**			**High Capture**		
Road link	**Total**	**HV**	**HV%**	**Total**	**HV**	**HV%**
Brolgan Road	227	5	2%	2375	1183	50%
MR 61 (W) Condobolin Rd	1138	127	11%	1198	139	12%
SH17 Newell Hwy (N)	6597	1367	21%	6824	1497	22%
SH17 Newell Hwy (S)	6684	2325	35%	7001	2545	36%
MR 61 (E) Orange Rd	2276	171	8%	2340	187	8%
MR 233 Wellington Rd – NE	441	64	15%	449	72	16%
MR 238 Eugowra Rd – SE	529	81	15%	537	89	17%
Hartigan Avenue	762	155	20%	2147	1298	60%
Bogan Street	6587	1252	19%	7105	1382	19%
Dalton Street	2094	105	5%	2773	105	4%

Both **tables 28 and 29** indicate the following in terms of expected impacts resulting from the full development of the site:

» Significant growth in heavy vehicle traffic along both Brolgan Road and Hartigan Avenue; and

» Small percentage increases in heavy vehicle traffic above that expected by 2010 and 2020 along Bogan Street and the northern and southern section of the Newell Highway.

It is apparent from this information that the majority of growth in truck movements will occur along the Newell Highway and that this will occur with or without the proposed development. It is also noted that the proposed development of the site is likely to lead to increased heavy vehicle traffic levels along Hartigan Avenue and Brolgan Road.

6.3 Impact on Traffic Network Operations

The purpose of this section is to evaluate the impact on the operation of the road network from the staged development of the proposed development.

Table 30 presents current and future road performance levels along Brolgan Road, urban freight routes through Parkes and approaching regional haulage routes to Parkes without the development of the PIT.

Table 29 Future Performance of Road Freight Routes Without PIT Traffic

Road Type	Road Name	Count Station	2005		2010		2020	
			AADT/ ADT	LoS	AADT/ ADT	LoS	AADT/ ADT	LoS
Rural	Brolgan Road	East of the site and west of the level crossing	188	A	200	A	227	A
Rural	Condobolin Road	At level crossing, west of Parkes	1036	A	1064	A	1138	A
Rural	Newell Highway (N)	Parkes, 3.2km north of Court St	5337	B	5685	B	6597	B
Rural	Newell Highway (S)	At Forbes/Parkes boundary	5620	B	5914	B	6684	B
Rural	Orange Rd	Parkes, at Billabong Ck bridge	2031	A	2099	A	2276	A
Rural	Wellington Rd	Parkes, 8km north of SH17, Newell Hwy	408	A	417	A	441	A
Rural	Eugowra Rd	At Forbes/Parkes boundary	488	A	500	A	529	A
Urban	Hartigan Avenue	West of Forest Street	450	A	690	A	762	A
Urban	Bogan Street	North of Hartigan Avenue	5427	A	5789	A	6587	A
Urban	Dalton Street	West of Bogan Street	1943	A	1992	A	2094	A

Notes

Future predicted traffic levels are based on an annual growth of 3.6% applied to road freight and the average annual growth factor as shown in **Appendix F** has been applied to all light vehicle traffic on each haulage route.

It is noted from the findings presented in the above table that all current road freight routes perform satisfactorily under 2010 and 2020 traffic condition without the proposed development.

The increase in traffic assumes that the haulage routes identified in **Figure 6** will be impacted by trucks travelling to the proposed development. An assessment of road performance has been completed for the worst-case 'with proposed development scenario' and is shown in **Table 31.**

Table 30 Future Performance of Road Freight Routes With PIT Traffic

Rural/ Urban	**Road Name**	**Count Station**	**2010**		**2020**	
			ADT/AADT	LoS	ADT/AADT	LoS
Rural	Brolgan Road	East of the site and west of the level crossing	1052	A	2375	A
Rural	Condobolin Road	At level crossing, west of Parkes	1087	A	1198	A
Rural	Newell Highway – north	Parkes, 3.2km north of Court St	5775	B	6824	B
Rural	Newell Highway – south	At Forbes/Parkes boundary	6043	B	7001	B
Rural	Orange Road	Parkes, at Billabong Ck bridge	2123	A	2340	A
Rural	Wellington Road	Parkes, 8km north of SH17, Newell Hwy	420	A	449	A
Rural	Eugowra Road	At Forbes/Parkes boundary	503	A	537	A
Urban	Hartigan Avenue	West of Forest Street	1264	A	2147	A
Urban	Bogan Street	North of Hartigan Avenue	5984	A	7105	A
Urban	Dalton Street	West of Bogan Street	2237	A	2773	A

It is apparent from the above assessment that all identified road freight routes will operate with a satisfactory level of service in the future with or without the development.

6.4 Train Frequency and Time Delay at Level Crossings

The following level crossings are situated in close proximity to the proposed development and are likely to be directly impacted by the redistribution of trains and trucks to the site:

- The existing level crossing situated along Brolgan Road to the east of the site;
- A new level crossing to be situated along Brolgan Road to the west of the site; and
- The existing level crossing situated along Condobolin Road to the west of the site access.

Refer to **Figure 1** for an understanding of the location of existing and proposed level crossings likely to be impacted by trains and trucks travelling to the site.

Refer to **Appendix H** for further information on train frequencies and time delays. The following presents a worst-case scenario for train movements and resulting delays to traffic at level crossings with and without the implementation of the proposed PIT:

Initial Stage (Daily Movements)

» The existing Brolgan Road level crossing to the east of the site is expected to cater for approximately 4 train movements with travel speeds of approximately 115km/h and 2 train movements with travel speeds of between 20km/h - 50km/h. The total delay to traffic per day would be approximately 20 minutes with the PIT and approximately 10 minutes without. The longest anticipated delay to road traffic would be approximately 7 minutes and caused by a 1800m long train travelling from the intermodal terminal.

» The existing Condobolin Road level crossing to the west of the site is expected to cater for approximately 4 train movements with travel speeds of approximately 115km/h and 1 train movement with a travel speed of between 20km/h - 50km/h. The total delay to traffic per day would be approximately 13 minutes with the PIT and approximately 10 minutes without. The longest anticipated delay to road traffic would be approximately 7 minutes and caused by a 1800m long train travelling from the intermodal terminal.

» The new Brolgan Road level crossing to the west of the site is expected to cater for 1 train movements with a travel speed of approximately 40km/h and 1 train movement with a travel speed of approximately 10km/h. The total delay to traffic per day would be approximately 16 minutes and the longest anticipated delay to road traffic would be approximately 12 minutes and caused by a 1800m long train travelling into the intermodal terminal.

Note that only the slower moving trains will travel via the new rail lines to the proposed development and of these trains only 4 movements are associated with the operations of the site. All other movements are anticipated rail movements along the existing rail network, some of which will travel through the site to obtain access between north-south and east-west rail lines.

Ultimate Stage (Daily Movements)

» The existing Brolgan Road level crossing to the east of the site is expected to cater for 10 train movements with travel speeds of approximately 115km/h and 4 train movements with travel speeds of between 20km/h - 50km/h assuming the inland rail line is built through Parkes. The total delay to traffic per day would be approximately 45 minutes with the PIT and approximately 25 minutes without. The longest anticipated delay to road traffic would remaining unchanged at approximately 7 minutes and caused by a 1800m long train travelling from the intermodal terminal.

» The existing Condobolin Road level crossing to the west of the site is expected to cater for 10 train movements with travel speeds of approximately 115km/h and 2 train movements with travel speeds of between 20km/h - 50km/h assuming the inland rail line is built through Parkes. The total delay to traffic per day would be approximately

35 minutes with the PIT and approximately 25 minutes without. The longest anticipated delay to road traffic would be unchanged at approximately 7 minutes and caused by a 1800m long train travelling from the intermodal terminal.

- The new Brolgan Road level crossing to the west of the site is expected to cater for 2 train movements with travel speeds of approximately 40km/h and 2 train movements with travel speeds of approximately 10km/h. The total delay to traffic per day would be approximately 33 minutes and the longest delay to traffic would be approximately 12 minutes and caused by a 1800m long train travelling into the intermodal terminal.

Note that only the slower moving trains will travel via the new rail lines to the proposed development and of these trains only 8 movements are associated with the operations of the site. All other movements are anticipated rail movements along the existing rail network, some of which will travel through the site to obtain access between north-south and east-west rail lines.

6.5 Road Network Strategy Issues

In understanding the impacts from truck movement, it should be noted that this proposal is one of several with an industrial focus. These proposed developments have emerged as a result of the rezoning of a substantial area of land in close proximity to the western section of the proposed Parkes Ring Road.

The western section of the ring road is described in the '*Road Improvement Strategy*' section of the '*Strategic Plan for Major Road and Transport Infrastructure for Parkes and Environs*' as being required as a result of '*traffic growth on the Newell Highway*'. This rolling road improvement programme is aimed '*at protecting the amenity of Parkes residents and facilitating freight movement in a manner that protects the integrity of the public roads and bridges*.' It appears that the strategy was developed in response to the impacts created by current heavy vehicle traffic levels on the Newell Highway, which is escalating with continued traffic growth. Recent forecasts by the Auslink program has indicated that this trend will continue resulting in increased pressure on existing infrastructure and a need to protect community (Refer to **Figure 3**) through the delivery of well planned infrastructure. The long term strategy of the traffic strategy mentioned above is to divert *'through highway traffic via a western Ring Road'*. Refer to **Figures 1** and **6** for an understanding of the alignment of the planned western Ring Road and other minor road improvement works.

6.5.1 Issues Identified along the Road Network

Refer to **Figure 6** for an understanding of the proposed access route to be used by trucks travelling to the site. It has been noted from discussions with Council and a preliminary review of the road network that the only desirable route for road freight travelling to the proposed development from the Newell Highway would be via the intersection with Hartigan Avenue. The intersection of Hartigan Avenue and Forbes Street (the Newell Highway) is already highlighted to have operational issues associated with a level crossing situated on the southern approach. The operational issues of this intersection are associated with the Newell Highway, which is planned to accommodate significant growth in road freight movement in the future.

Parkes Shire Council have proposed traffic signals at this intersection to resolve the current road safety issues, which are planned to cater for the anticipated growth in traffic both along the Newell Highway and Hartigan Avenue.

6.5.2 Possible Interim Route Option

A number of route options were examined as part of selecting the preferred freight routes through Parkes, these are shown on **Figure 6**. The examination of the existing conditions as highlighted on **Figure 3,** indicated that the only feasible route option for reducing traffic levels at the intersection of Forbes Street with Hartigan Avenue would be through the proposed upgrade of Saleyards Road route and associated intersections and level crossings. This route is currently not at a standard that can accommodate B double or road train traffic and would require widening along certain sections. This route also passes over two level crossings, one of these is situated in close proximity to the intersection of Hartigan Avenue and Blaxland Street and is identified to require modification by Parkes Shire Council (Refer to **Figure 6**) in order to improve current traffic operations along Hartigan Avenue.

The safety implications from providing this interim truck route, which caters for traffic travelling between the south section of the Newell Highway and the Parkes Transport Hub or Goobang Junction Industrial Area, should be examined as part of the strategy being developed to protect the amenity of Parkes residents, improve road access for regional traffic and access requirements to industrial lands situated to the west of Parkes. As noted in **Figure 6,** the ultimate arrangement would be the construction of the western section of the Parkes Ring Road, which is planned to provide connection from West Lime Road to the Newell Highway to the north and south of Parkes.

7. Relevant Design Standards and Guidelines

The following section provides of the design principles and recommended traffic management measures that will be applied when upgrading the surrounding road system and developing the internal road network.

7.1 Internal Road System

7.1.1 Proposed On-Site Design Principles

The following design principles are relevant to the design requirements of the internal road system only. The masterplanning team have set in place a number of design principles, which aim to minimise conflict, reduce energy consumption and control movement through the site, especially in areas that could potentially handle hazardous goods, require security clearance or are exposed to safety risks associated with conflict between rail and containerised road freight. Using these principles, the following design objectives were set:

- Road system to consist of two-way traffic flows to enable quick and easy access to all warehouse facilities on the site. This should also support the anticipated staged growth of the site;
- The road system should be designed to minimise conflict between pedestrians, through light vehicle and heavy vehicle movements, the movement of containers between the intermodal terminal and warehouses, vehicles manoeuvring in parking areas and the loading or unloading of goods;
- Limit the number of rail crossings;
- Limit the number of vehicles required to cross rail tracks by locating higher traffic generating land uses close to Brolgan Road and restricting access to locations across rail tracks;
- Restrict the number of vehicles required to cross the main rail line running through the site;
- Should provide direct access to warehouse areas;
- Should provide direct access to the intermodal terminal; and
- All parking areas and loading areas should be located within the property boundary.

Refer to **Appendix E** for a further understanding of access and road internal road network design principles developed for the site.

7.1.2 Internal Access Requirements

The internal traffic arrangements. The internal road layout should be designed with a 3.5m traffic lane and a shoulder width of 1.0m along straight roadway sections, where two-way traffic is permitted and where freight traffic is likely to be accommodated. Along one-way roads the traffic lane width should be increased to 4.5m. All dimensions should be adjusted for curved sections of the roadway with the specification being dependent of the inside radius curve. In all other situations where freight traffic is not expected to travel, a lower design specification can be provided.

7.1.3 Traffic management

Access on to the external road network and on site movement will be controlled through the following:

» Construction of appropriate internal access roads that directly service different functional areas of the site and can easily accommodate the worst case vehicle types;

» Construction of appropriate intersections along the external road network and internally that accommodate both the worst case vehicle type and peak hour volumes expected at the site during both the initial and ultimate stages and ensure that the impact on through traffic movement along Brolgan Road is minimised;

» Providing several alternative access points along Brolgan Road to both minimise delays to traffic entering the site and to ensure that the proposed site does not force vehicles to travel unnecessary distances to gain access to on-site facilities;

» Minimise the number of on-site level crossings and traffic that need to cross these conflict points to access on-site facilities;

» Separation of staff and heavy vehicle access points to on-site facilities along the internal road network;

» Containment of loading and unloading activities, parking and vehicle manoeuvres that are not in a forward direction off the internal and external road network;

» The use of on-site access control points at the entry to the Intermodal Terminal to both restrict access and limit movement across on-site level crossings and through the *Intermodal Terminal's* loading and unloading areas;

» The use of one way internal roads to circulate container traffic to and from the Intermodal Terminal and along loading and unloading areas for the temporary and long term stack areas; and

» If required, grade separation of a northern access road over the Parkes-Narromine rail line.

7.2 External Road System

The following details having been extracted from relevant road design standards and should be used to understand the resulting road upgrade needs of Brolgan Road.

7.2.1 Lane Widths

Both traffic lanes along Brolgan Road should be widened to 3.5 m, which is the desirable lane width on rural roads to accommodate B double and road train traffic. The carriageway width should include a shoulder width of at least 1.5m with 1.0m of this being sealed.

7.2.2 Auxiliary Lane Widths

The same widths as for through lanes should be applied for the upgrade of Brolgan Road. However, if the available carriageway width is restricted then the turning lanes widths would be reduced. A turning lane width of 2.5 m can be accepted in constrained situations.

7.2.3 Sight Distances at Intersections and Level Crossings

All external and internal intersections should be designed to meet the sight distance criteria as specified in the latest Austroads Intersection at Grade publication. It is also noted that the sight distance requirements are dependent on travel speeds and that a lower designated travel speed would result in a reduction in the sight distance specification. Therefore, the sight distance requirements for Brolgan Road are likely to be different if the signposted travel speed was reduced from 100km/h. Due to the high volumes of heavy vehicles anticipated to be generated by the site, it would be desirable to achieve the Truck Stopping Sight Distance (TSSD) as a minimum for all intersections and level crossing points.

7.2.4 Level Crossing Standards

Both Australian Standards and the Rail Infrastructure Corporation (RIC) Level Crossing Assessment Model provide guidelines for level crossing control treatments. The need for either manual or flashing lights control at a level crossing is determined by the railway level crossing assessment committee or rail authority. However, it is expected that active controls with flashing lights, boom gates, warning signs and pavement markings will be required to be installed at all three level crossings surrounding the site and the two crossings within the intermodal terminal when the ultimate stage land uses are delivered.

8. Construction Impacts

The proposed development will be built over a series of staged construction periods, which are likely to be dictated by market conditions. A preliminary understanding of the staged on-site construction activities and management techniques adopted to mitigate the impacts are provided in the following section.

8.1 Construction methods

The majority of the built structures to be erected on the site would involve the assembling prefabricated elements. Once the footings have been established, prefabricated beams and support structures would be transported to the site and erected prior to cladding being fixed in place.

Utilising prefabricated components will not only minimise the length of the construction period and the required number of construction vehicles, it will also reduce the potential for conflict between construction and operational activities during the ultimate stages of the development. This approach will enable normal 'Intermodal Terminal' and warehouse operations to continue whilst construction is in progress. The mixing of construction and normal operations has been successfully achieved on other similar large-scale industrial sites in rural areas around NSW, and is not expected to create conflict. Any areas on site that are identified to be potential conflict points will be managed, if possible through the separation from other site activities. The proposed site layout, the planned progressive development of the site and the size of the area appear to assist this approach.

8.1.1 Civil works

Civil works are expected to include minor excavation and filling will occur on parts of the site to provide a suitable building platform for the construction of foundations.

Earthworks are required to allow for the construction of new rail tracks, sidings and hardstand areas. In the later development stages, the removal of earth material is likely to be focused around areas identified to be part of the PIT 'ultimate stage' and is unlikely to impact on normal Intermodal Terminal operations. All excavations would be undertaken using conventional earthmoving equipment and blasting is not considered to be required. Spoil from this area would be re-used as subgrade material around different areas of the site.

All soil extracted, as part of the civil works is expected to be reused on-site and will therefore not generate off site traffic movements.

8.2 Timetable for development

The construction of all new initial stage elements is expected to occur before 2010 or 0 to 5 years after receiving development approval.

Construction elements in the initial stage is expected to consist of the following:

- Land Use
  - 4 hectare (ha) area for warehousing;
  - 10 ha area to be located on the southern side of the intermodal terminal sidings, of which approximately 50% is hardstand that will be used for the sorting and stacking of containers; and
  - 1000m^2 GFA of administration buildings.
- Rail Infrastructure
  - New master sidings running into the site from the Parkes-Narromine and Parkes-Broken Hill rail lines;
  - Rail sidings serving the intermodal terminal; and
  - A gantry crane.
- Road Infrastructure
  - A new level crossing and a level crossing upgrade on Brolgan Road;
  - An internal road network serving functional areas of the site to the south of the intermodal sidings;
  - New access points to Brolgan Road from the site; and
  - Widening of Brolgan Road between the western end of the site and West Lime Road and.

The modifications to the '*initial stage'* Intermodal Terminal and construction of new elements would occur in a staged manner for all '*ultimate stage'* facilities and would be in response to market demand.

On site alterations, expansion, duplication and new facilities will be undertaken in the following areas:

- Land Use
  - Expansion – additional 6 hectare (ha) area for warehousing;
  - Duplication - 14 ha area to be located on the northern side of the intermodal terminal sidings, of which approximately 50% is hardstand that will be used for the sorting and stacking of containers; and
  - Expansion – additional 3,000m^2 GFA of administration buildings.
- Rail Infrastructure
  - Rail sidings serving the heavy engineering facility;
  - Rail sidings serving the containerised fuel facility; and
  - Additional gantry cranes.
- Road Infrastructure
  - Expansion of the internal road links to serve additional land uses located in the southern section of the site,
  - The construction of new internal road links to serve new land uses located in the central and northern sections of the site;
  - New access points to Brolgan Road from the site; and

– Widening of Brolgan Road between the western end of the site and West Lime Road.

It is anticipated that all elements associated with the proposed upgraded would be operational by 2020 or 10 to 15 years after development approval is received. It is also expected that the '*ultimate stage'* would involve the construction of new internal level crossings and an access road to Condobolin Road, as well as a heavy engineering facility, stabling yards and containerised fuel centre if market forces indicate that these types of facilities would be beneficial.

8.2.1 Construction and Workforce Traffic Generation

The construction of the *'initial stage'* facility and then the staged upgrading of the PIT site's operating areas to deliver the '*ultimate staged'* developments will generate small increases in external traffic. The majority of these additional traffic movements will be as a consequence of delivering plant, track and machinery or construction staff shift movements.

As all construction activities would not be undertaken concurrently, and there will not be a defined period of intense construction traffic movement.

All construction activity and associated truck movement will occur before the PIT reaches the desired throughput of 530,000 TEU as these PIT site upgrades are required to enable the *Intermodal Terminal* to receive a higher throughput.

8.2.2 Work hours

Construction activities will generally be undertaken within the hours recommended in the DEC Environmental Noise Control Manual as follows:

» Monday to Friday: 7 am – 6 pm;

» Saturday: 8 am – 1 pm; and

» Sunday and Public Holidays: no work.

It is noted, that these proposed construction shift times may conflict with '*initial stage'* PIT operations and may need to be managed through the control of PIT shift periods and were possible a prohibited period for the movement of container freight by road and rail.

8.2.3 Construction vehicles and equipment

Table 25 provides an indicative list of construction vehicles and equipment that would be used during the construction and future staged upgrades of PIT operating areas. As the exact number of machines to be used on-site will only be determined when the works are planned in detail and a construction Contractor is selected, these details are unavailable at the time of the preparing this *Environmental Assessment*.

Table 32 Indicative List of Construction Equipment and Vehicles

Equipment	Purpose
Dozer	Stripping vegetation and constructing the building platform
Roller	Compacting the building platform
Scraper	Placement and leveling of the building platform
Grader	Leveling the surface
Water truck	Watering bare surfaces to suppress dust
Trucks	Transport of construction materials
Loader	Loading material into trucks
Mobile crane	Erecting buildings, structures and rail track, installing heavy plant and machinery
Asphalt paving machine	Leveling the surface of the asphalt
Bitumen sprayer	Applying bitumen to the road base
Cherry pickers	Installing equipment at high levels above ground
Forklifts	Loading, unloading and stacking building materials

8.2.4 Parking

Parking for construction equipment and staff vehicles would be accommodated on-site during the construction period and in the initial stage it would be situated in locations that are clearly separated from normal PIT operating areas. The proposed location of this parking area should minimise conflict between construction and '*initial stage'* PIT operating traffic.

8.2.5 Summary

From the information contained above the following is apparent:

» External construction traffic movement is unlikely to conflict with peak hour road or initial stage PIT operating periods and can be managed;

» The majority of traffic generated during the staged construction periods will be internal movement at the time of excavating material to provide a suitable building platform for the structures and hardstand areas; and

» The assessment of the throughput of 530,000 TEU per annum is the worst-case evaluation of external road network impacts for both construction and '*Intermodal Terminal'* operations. This is because the traffic movements during the construction periods are likely to be lower than those experienced during operation of the '*Intermodal Terminal's* at a throughput of 530,000 TEU per annum.

8.3 Traffic Management During Construction

An on-site traffic management plan will be prepared as part of the Construction EMP.

9. Key Findings and Recommendations

9.1 Project Summary

The following provides a summary of the proposed development, road freight market conditions and road network conditions around Parkes:

Proposed Development

» The proposed Parkes Intermodal Terminal (PIT) is a land parcel within the area rezoned by Council for industrial uses associated with "Multi Modal Transport Hub" activities;

» The PIT will be developed in two stages:

  – In the initial stage (2010) the facility will consist of a 10 hectares (ha) intermodal terminal (stack areas and rail sidings), 1000m^2 Gross Floor Area (GFA) of offices and 4ha of warehousing; and

  – In the ultimate Stage (2020) the facility will consist of an additional 14 hectares (ha) intermodal terminal (stack areas and rail sidings), 4000m^2 Gross Floor Area (GFA) of offices and 10ha of warehousing as the primary functional areas within the site.

» Other potential on-site uses in the ultimate stage, such as a containerised fuel centre, heavy engineering facility, stabling yards, etc.. would all be ideally suited to this type of site. However, due to the level of uncertainty on the type of facilities, their market need and potential size, for the purpose of this study these areas have been identified as being future potential uses and do not form part of this application.

» The assessment has indicated that the potential traffic generation of the site will be dictated by the likely target throughput, which can be used to assess the worst-case scenario for traffic impacts.

» The planned throughput of the Intermodal Terminal is 240,000 TEUs in the initial stage (2010) and 530,000 TEUs in the Ultimate Stage (2020), both targets are based on the planned growth in the movement of road and rail freight as indicated by Auslink and the potential for establishing a inland rail corridor via Parkes.

» The PIT key operations are unlikely to generate significant volumes of additional road container freight movements along the regional or local road networks, but instead concentrate on capturing and redistributing both existing and identified future demand;

» There will be a significant gain in the movement of containerised freight by rail in both the initial and ultimate stages with the predicted mode shift in freight being approximately 70/30 in favour of road traffic for inbound movements and 40/60 split in favour of rail for outbound movements.

» There is an imbalance between throughput generated inbound truck or rail movements and outbound truck or rail movements with road freight carrying approximately 70% of inbound freight movement to the facility and rail carrying approximately 60% of outbound freight movements from the PIT. Thus inbound truck movement with no return trip is assumed to be available to accommodate other goods that could be generated by the site.

» Road access arrangements to the PIT would be designed:
  – Via Brolgan Road only;
  – As separate access points to various on-site uses and enables light and heavy vehicles to be separated; and
  – To minimise the impact on through traffic.

Road Freight

» Growth in road and rail freight movement around Parkes will occur with or without the establishment of an intermodal terminal in Parkes. Federal Government's Auslink White Papers has predicted a 3.6% pa for growth in national road freight.

» The operation of the intermodal terminal in Parkes is likely to capture some of this existing and future containerised road freight movement.

» The facilities at the PIT will offer an opportunity to redistribute, consolidate, store and shift containers between rail and road systems.

» The facilities at the PIT will provide State and Federal Government with an opportunity of achieving an improved road rail freight movement mode split.

Road Network Conditions around Parkes

» B double and road train type vehicles are likely to be generated and attracted to facilities located in both the Parkes Transport Hub and Goobang Industrial Area.

» Similar to other future uses located within the 'Parkes Transport Hub', truck traffic from the proposed development is likely to travel along the six established haulage routes via Parkes. These routes consist of the following:
  – Newell Highway (SH17) south of Parkes;
  – Newell Highway (SH17) north of Parkes;
  – Orange Road (MR61);
  – Condobolin Road (MR61);
  – Wellington Road (MR 233); and
  – Eugowra Road (MR 238).

» All of the above routes are RTA designated B Double routes, except Wellington Road and Condobolin Road has the ability to accommodate road trains.

» Currently 89% of all truck traffic that travels through Parkes will use the Newell Highway, which is an existing designated B double route. It is estimated that the distribution of truck traffic from the proposed PIT would be similarly weighted to that of the existing conditions as the target market is to capture future demand along routes.

» Both intersection and level crossing are critical points along the road network, which could be impacted from growth in traffic levels. Both level crossings and intersection situated along the Newell Highway will be impacted by the anticipated future growth in both rail and road freight movement. The proposed development will target this anticipated demand and redistribute onto Hartigan Avenue and Brolgan Road. The impacts from this will be as a direct result of the proposed development and other industrial sites situated in the Parkes Transport Hub and Goobang Junction Industrial Estate.

9.2 Impact

- All traffic generated by the PIT will travel via Brolgan Road and will be in addition to the existing traffic volumes along the local road network.
- The proposed development will generate 350 two-way light vehicle movements per day in the initial stage and 970 light vehicle movements per day in the ultimate stage.
- The proposed development is expected to generate the following truck traffic volumes along the local road network:
  - Initial Stage - 502 daily two way truck movements, which could potentially generate approximately 50 truck movements during the peak hour along Brolgan Road; and
  - Ultimate Stage – 1,178 daily two-way truck movements, which could potentially generate approximately 118 truck movements during the peak hour along Brolgan Road.
- The proposed development is expected to generate 4 train movements (includes inbound and outbound movements) in the initial stage and 8 train movements in the ultimate stage.
- The site is likely to generate some additional traffic along regional road network as well as redistributing planned growth in road freight traffic. The worst-case increase in traffic on the regional road network is shown in **Tables 30** and **31.** These tables indicate both the regional and local road network will operate satisfactory with or without the proposed development in the future.
- The construction of a new level crossings on Brolgan Road to the west of the proposed development will lead to some delay to through traffic travelling along this route.
- Further delays will be experienced at the following two existing level crossings as a result of train movement to and from the site:
- The level crossing situated on Brolgan Road to the west of the proposed development; and
- The level crossing situated on Condobolin Road to the west of the proposed development.

9.3 Recommendations

The following assessments and infrastructure upgrades are likely to be required as a result of developing the Parkes Intermodal Terminal on Brolgan Road, Parkes and other similar traffic movement to industrial uses associated with the Parkes Transport Hub and Goobang Junction Industrial Area.

- The proposed truck route through Parkes is shown in **Figure 6** along with upgrades identified by Parkes Shire Council these recommendations should be further assessed as part of delivering of haulage route strategy for Parkes and its surrounding industrial development lands;
- Upgrade of existing level crossings situated along Brolgan Road to the east of the proposed development and along Condobolin Road to the west of the proposed development to incorporate road design specification to accommodate B double and road trains, advanced warning signs and flashing lights.
- Construct a new level crossing point on Brolgan Road to the west of the proposed development to assist train movement into the Parkes Intermodal Terminal. This level crossing should include advanced warning signs, boom gates and flashing lights.
- Upgrade Brolgan Road between the western section of the Parkes Ring Road system to the proposed western site access point to incorporate road design specification to accommodate B double and road trains. It is understood that it would be desirable to provide two 3.5m wide traffic lanes with a shoulder width of 2.0m and 1.0m of this being sealed and would also benefit other land uses situated along this route.
- Provide appropriate high quality intersections along Brolgan Road, which provide multiple opportunities to gain direct and efficient access to the internal warehouse service road and the intermodal terminal access points. These intersections should be designed to accommodate frequent movement with a worst-case vehicle design standard being a B double and road train type vehicle. Based on the guidelines specified in the *Austroads Part 5: 'Intersections at Grade'* it would be desirable to provide types 'AUR' and 'CH' intersection layouts for access points along Brolgan Road to the PIT.
- The location of proposed access point to the Parkes Intermodal Terminal should be planned in conjunction to access points with other surrounding development.
- Provide appropriate high quality intersection along Condobolin Road. The intersection should be designed to accommodate B double and road train type vehicle. Based on the guidelines specified in the *Austroads Part 5: 'Intersections at Grade'* it would be desirable to provide types 'AUR' or 'CH' intersection layout.
- All of the above except the new access point onto to Condobolin Road should be undertaken in the initial stage of site development with the Condobolin Road provided in the Ultimate Stage.
- Intersections that should be further evaluated and are deemed to be directly impacted by container movement generated or redistributed to the PIT are as follows:
  - Brolgan Road with the West lime Road (Western Section of the Parkes Ring Road);
  - Condobolin Road with West Lime Road;
  - Newell Highway (Forbes Street) and Hartigan Avenue; and
  - Hartigan Avenue with Blaxland Street.

- Further investigation into an interim or ultimate route option for trucks travelling between Hartigan Avenue to the southern section of the Newell Highway. The Saleyards Road route would reduce traffic impacts on the intersection of Hartigan Avenue with Forbes Street (Newell Highway), however this route is current not designed to B double or road train specifications and would require some upgrade.

The study identifies that the analysis was a desktop investigation based on a preliminary level of information and a series of assumptions, which will only be confirmed once an operator for the facility is identified. The proposed operator will provide further confirmation of the resulting traffic impacts produced from each stage of the proposed development. These impacts should be identified and addressed with the submission of Development Applications for each proposed activity to be located in the Parkes Intermodal Terminal. The supporting detailed traffic impact statement would address issues associated with the following:

- Proposed truck routes at each stage of the development;
- Traffic generation for each activity at both the initial and ultimate stages of development;
- Intersection upgrades required at each stage of the development; and
- Level crossing upgrades required at each stage of the development.

Appendix A

Site Layout

Development of the Site under Initial and Ultimate Stages

PRELIMINARY

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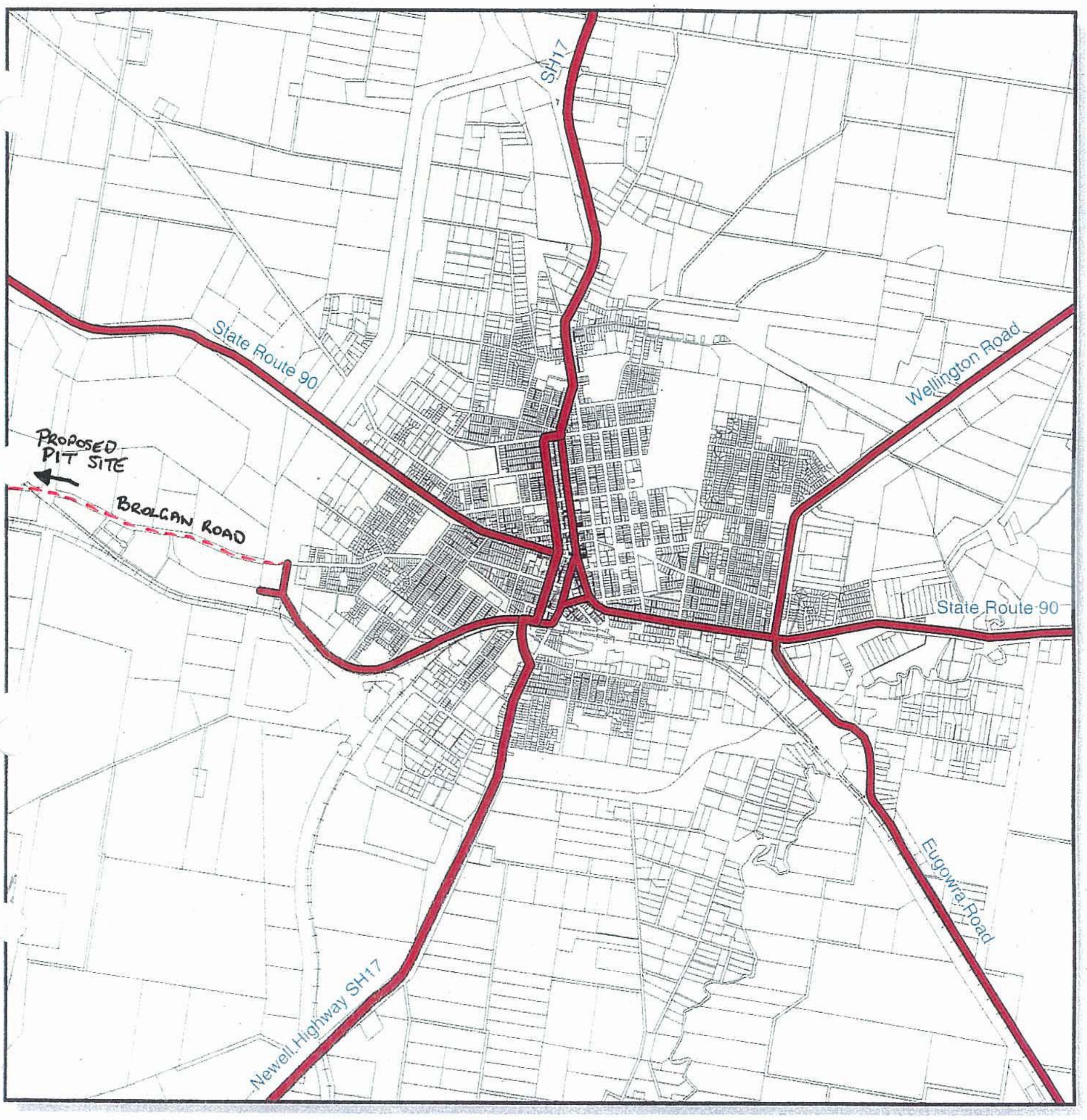
Appendix B

Existing Road Network – Parkes

Map taken from the Parkes Transport Hub (March 2002 & September 2003), Local Environmental Study, Parkes Shire Council.



N

0 0.5 1
kilometers

FIGURE
4.1

Parkes Existing Road Network

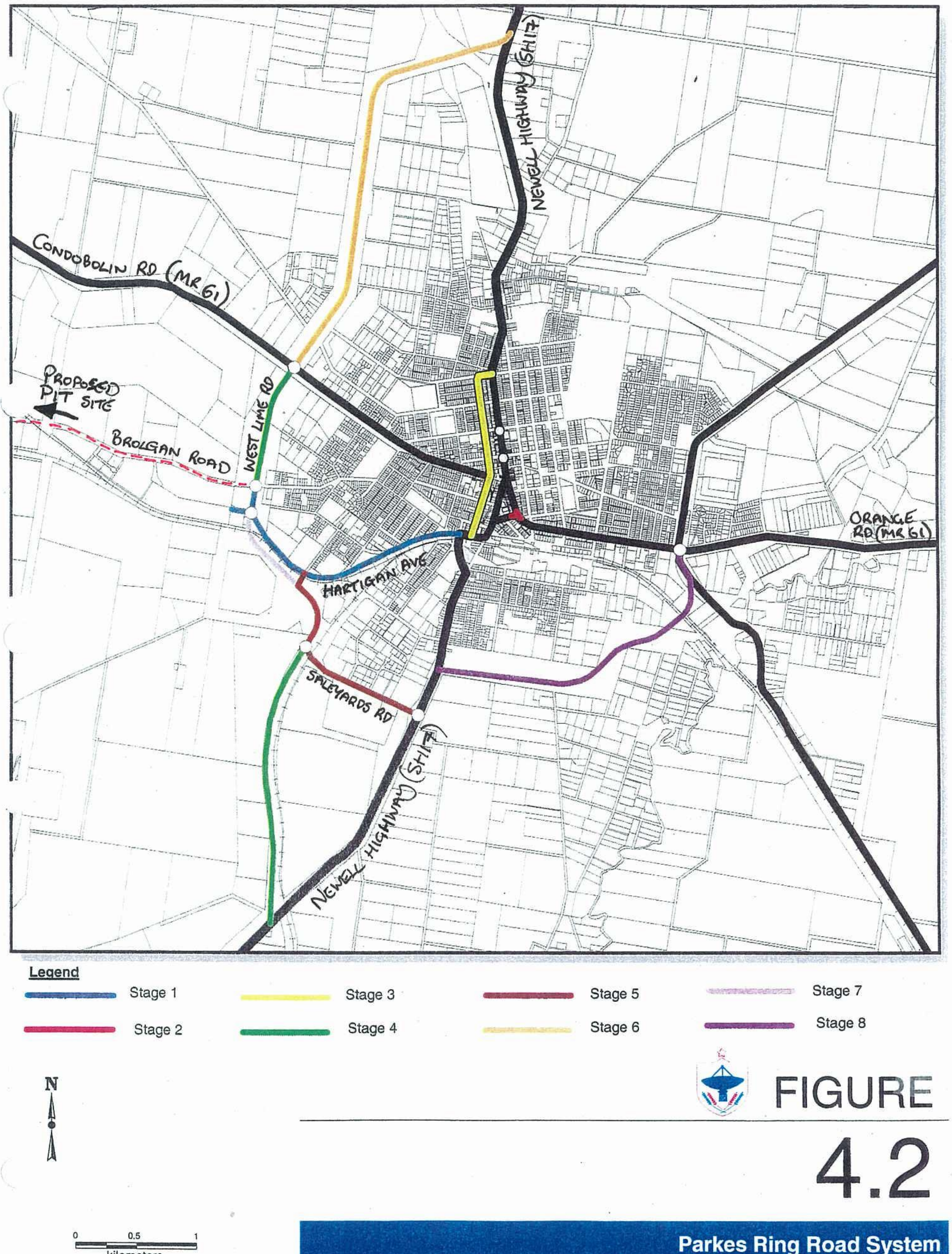
Appendix C

Planned Ring Road System for Parkes

Map taken from the Parkes Transport Hub (March 2002 & September 2003), Local Environmental Study, Parkes Shire Council.

Rezoning Submission

Parkes Transport Hub



FIGURE

4.2

Parkes Ring Road System

Appendix D

Site Road Access Plan

Plan showing site access needs and critical control points

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Appendix E

Design Considerations For Parkes Intermodal Terminal

The following section reviews the design criteria for the proposed PIT facilities and evaluates both the internal and external road infrastructure needs as a result of its proposed operations.

Key Operator Characteristics of Intermodal Terminals

The NSW Sea Freight Council produced a document dated 8th March 2004 and titled Regional intermodal terminals – Indicators for commercial sustainability. The appendices for this report highlights time sensitivity issues associated with the operation of typical intermodal terminals, which should be used in the planning of intermodal terminals.

The document implies that typically existing intermodal facilities are set up to service the movement of heavy and not particular time sensitive products. The report also indicates the following observations from the transfer of goods via such a facility:

» Rail has the ability to move more weight per vehicle journey than that offered by road.

» Multiple handling activity of intermodal operations means that time sensitivity can be an important service issue, affecting the viability of rail for perishables and the competitive movement of consumer goods to/ from rural areas.

» Storage, internal movement and sorting are an important component of this type of facility.

» Most rail-based journeys exceed 7 hours, with average transit times of 18 hours or have average trip distances in the order of 600km. The actual use of rail is particularly sensitive to rail line height restrictions, the number of rail services and the quality of the rail line, which impact on the availability of the line and journey speeds.

» Goods that are attracted to rail are likely to be transported in large quantities and stored for longer periods than those that are typically transported by road.

» Road freight provides the operator and producer greater flexibility, control of delivery timings, minimal diversions, choice of direct routes to the market place and minimal interference from external factors. However, the unit cost associated with transporting by road is higher.

Access Needs of Onsite Facilities

Primary function of an intermodal terminal facility is to provide a network that efficiently serves the movement of containers by road and rail. **Table 26** provides an indication of the required access arrangements for each of the proposed on-site facilities served by rail and/or road during both the initial and ultimate development stages of PIT.

Function Areas and Access Requirements

Function areas	Access Needs			Road Traffic Demand
	Road	Rail	Road Access Restrictions	
Initial stage				
Container stack and intermodal terminal sidings	Yes	Yes	Yes– due to rail conflict/ operational and safety issues.	Significant
Warehousing and distribution facilities	Yes	No	No	Significant
Administration Buildings	Yes	No	No	Significant
Ultimate stage				
Container stack and intermodal terminal sidings	Yes	Yes	Yes – due to rail conflict/ operational and safety issues.	Significant
Warehousing and distribution facilities	Yes	No	No	Significant
Administration Buildings	Yes	No	No	Significant
Storage and wagon inspection sidings (potential use only)	Yes	Yes	Yes – due to rail conflict	Low
Temporary fuel storage and distribution centre (potential use only)	Yes	Yes	Yes – due to rail conflict	Low
Heavy engineering facilities (potential use only)	Yes	Yes	Yes – due to rail conflict	Low
Yards operations depot (potential use only)	Yes	Unknown	Yes – due to rail conflict	Unknown

Based on the above information the following can be understood:

» Both warehousing and distribution facilities and administration buildings do not require linkages to rail and would benefit direct access to the external road network.

» Storage and wagon inspection sidings, temporary fuel storage and distribution centre, heavy engineering facilities generate low volumes of road traffic and would be suited to be better situated away from land uses that generate high volumes of traffic and in close proximity to rail.

» The container stack and intermodal terminal sidings is primary functioning area of the site and requires direct access to both road and rail.

Access routes within the site;

Refer to **Appendix C** for an understanding of the vehicle access plan for the site. The following principles have been applied for access around the site:

- All roads that are proposed to be situated in the southern section (i.e., warehouse and office areas) of the site will be have two way options to allow flexibility to all users of this area. This applies to all roads in the southern section except in the case of the designated western and eastern access routes to the intermodal terminal, which will be one way and designed to accommodate oversized vehicles.
- One-way road operations will operate between the southern section of the site and the central section of the site. This will be implemented in order to control movement into areas that should be restricted due the potential for conflict with large vehicles loading and unloading containers, rail movement through the site and the machinery used to transport containers. A one way restricted route would ensure that security level are sufficient, movement around the site is safe, controlled and coordinated in the most efficient manner with all vehicles moving forward in a single direction around critical areas of the site.
- Two-way road operation will be allowed north of the Intermodal Terminal (ultimate stage stack areas), were access will be provided via a single access road, which travels between the heavy engineering facility, containerised fuel and distribution centre and the stabling yards. All these facilities will generate low levels of traffic activity and require a higher level of restricted access.

Appendix F

RTA Traffic Counts Information

Approach Road Traffic Count Summaries and Estimated Vehicle Classification Breakdowns.

RTA WESTERN REGION

July 2004 update

Traffic Count Summary and Estimated Vehicle Classification Breakdowns

MetroCount information
Estimated values - no information available
ESA's calculated using Method 2 - Austroads Pavement Design Guide

							Average Annual Daily Traffic (AADT)							*Heavy Vehicle Breakdown - ESA's*		
Road No.	**Site No.**	**RoadLoc Distance (km)**	**LGA**	**From**	**Towards**	**Description of Site**	**1976**	**1992**	**1996**	**1999**	**2002**	**pa %'age trend**	**%'age cars**	**%'age Rigids**	**%'age Semis**	**%'age Multi Artics**
17	93.122	15.87	Parkes	Forbes	Parkes	At Forbes/Parkes bdy	2430	3900	4442	4517	5241	1.91%	*73.9%*	*4.0%*	*16.0%*	*6.0%*
17	93.002	3.27	Parkes	Parkes (Town)	Dubbo	Parkes, 3.2km north of Court St	2120	3337	4339	4509	4945	2.07%	*67.3%*	*4.9%*	*17.5%*	*10.3%*
61	93.238	96.45	Parkes	Orange	Parkes	Parkes, at Billabong Ck bridge	1380	*1299*	1631	1637	1957	0.78%	*83.9%*	*8.8%*	*6.3%*	*1.0%*
61	93.243	5.91	Parkes	Parkes (Town)	Condobolin	At level crossing, west of Parkes	880	*1034*	965	964	1009	0.45%	*86.9%*	*6.9%*	*5.4%*	*0.7%*
233	93.388	101.10	Parkes	Wellington	Parkes	Parkes, 8km north of SH17, Newell Hwy	250	*359*	319	*389*	*389*	1.33%	*88.9%*	*6.4%*	*4.7%*	*0.0%*
238	93.883	21.63	Forbes	Eugowra	Parkes	At Forbes/Parkes boundary	*213*	445	470	474	456	2.13%	*88.4%*	*4.5%*	*6.8%*	*0.2%*

Brolgan Road
Analysis of Brolgan Road is based on a 7 day 24 hour classification counts conducted between 9 December 2005 and 16 December 2005

ADT	188
%HV	9%
Growth Rate /Annum	1%

Time Period	2005			Assumed Annual Growth Rate	Road Type
Vehicle Category	Total	HV	%HV		
Brolgan Road	188	4	2%	*Assume 1% growth from 2005 to 2020	Rural 100km/h
MR 61 (W) Condobolin Rd	1036	82	8%	0.5%	Rural 100km/h
SH17 Newell Hwy (N)	5337	888	17%	1.3%	Rural 100km/h
SH17 Newell Hwy (S)	5620	1510	27%	1.0%	Rural 100km/h
MR 61 (E) Orange Rd	2031	111	5%	0.7%	Rural 100km/h
MR 233 Wellington Rd – NE	408	41	10%	0.4%	Rural 100km/h
MR 238 Eugowra Rd – SE	488	53	11%	0.5%	Rural 100km/h
Hartigan Avenue	450	32	7%	*Assume 1% growth from 2010 to 2020	Urban 50km/h
Bogan Street	5427	868	16%	* Assume same growth as Condobolin Road	Urban 50km/h
Dalton Street	1943	97	5%	*Assume same growth as Newell Highway North	Urban 50km/h

Appendix G

Growth in Road Freight

Background Information

The purpose of this section is to provide an understanding of the potential trip capture and generation from the Parkes Intermodal Terminal (PIT). This document will provide inputs into the likely facility needs in terms of 'road infrastructure standards' being set in the engineering masterplan and traffic volume data required for comparison purposes in the environmental assessment being prepared for the 'concept design'.

National Road Freight

The Federal Government through the Auslink section of the Department of Transport and Regional Services (DOTARS) has published a White Paper, which identifies the Nation's future road and rail freight requirements. These requirements are currently being pursued and in some cases implemented in the form of the 'Auslink Policy'. The DOTARS White Paper indicated that the predicted growth in national road freight is likely to be 3.6% per annum. This estimated annual growth rate in future road freight will be used in this assessment to understand the infrastructure needs of the facility and affects on surrounding road network.

Definition of Non-Bulk Freight

Non-bulk freight is defined in the DOTARS White Paper as being "Containerised or packaged freight cargo, generally transported on pallets". This type of freight is typically referred to in terms of a "Twenty Foot Equivalent Unit" (TEU), which is the standard unit of measure for palletised or packaged goods.

The primary function of the PIT is the handling of non-bulk freight and thus road infrastructure will need to be related to growth in TEU and the shifting of freight between rail, road and on-site storage areas. The terminal operations will also include the breaking down of shipments and repackaging of containers, this will occur in the warehouse areas.

Appendix H

Level Crossing Specifications and Rail Movements

Expected Train Frequencies

The following table presents a broad level understanding of existing and future daily rail movements of both passenger and goods trains using the existing rail network without the PIT and passing over level crossings in close proximity to the site. The existing train movements have been sourced from the ARTC Standard Working Timetables for each appropriate rail line. The future estimates are based on current train volumes factored by the 3.4% pa, which is the anticipated growth for rail freight as presented in the 'Auslink White Paper'.

Estimated Growth in Daily Train Frequency without Proposed Terminal

Year	Orange -Broken Hill Line (Approx)	Parkes-Narromine Line without inland rail line (Approx)	Parkes-Narromine Line with inland rail line (Approx)	New Master Siding (Linking Western Line to Parkes-Narromine Line)
2005 (Present)	5+1*	2 + 1*	2 + 1*	N/A
2010 (Initial Stage)	6+1*	3 + 1*	3 + 1*	1
2020 (Ultimate Stage)	7+1*	4 + 1*	9 + 1*	2

Notes:

» 5+ represents the maximum number of goods train movements operating along the line.

» 1* represents the number of passenger train services operating along this line.

» N/A indicates that trains travelling along these lines do not impact on level crossings surrounding the site during that time period.

» The Parkes – Narromine railway with the inland rail link (Brisbane to Melbourne) assumes that 50% of freight trains currently using the coastal line will be transferred on to the Parkes – Narromine rail line when opened. It is assumed that if the inland route is constructed, then it will be operational by the Ultimate Stage.

» The train frequencies also assume that some trains would be diverted through the site as a consequence of opening of the master siding to general rail traffic and providing a direct rail link between the Parkes - Narromine (Brisbane) and the Orange – Broken Hill (Sydney - Adelaide - Perth) rail lines.

Additional Train Movements Generated by the Proposed Terminal

Based on information presented in the '*Operations and Functional Brief*' it can be assumed that the proposed Parkes Intermodal Terminal will generate the following:

» 2 additional inbound daily rail movements in the initial stage; and

» 4 additional inbound daily rail movements in the ultimate stage.

The following table presents a broad level understanding of existing and future daily rail movements of both passenger and goods trains using the existing rail network with the PIT.

Estimated Growth in Daily Train Frequency with the Proposed Intermodal Terminal

Year	Orange Parkes-Broken Hill Line (Approx)	Parkes-Narromine Line without inland rail line (Approx)	Parkes-Narromine Line with inland rail line (Approx)	New Master Siding (Linking Western Line to Parkes-Narromine Line)
2005 (Present)	5+1*	2 + 1*	2 + 1*	N/A
2010 (Initial Stage)	6+1*+ 2^	3 + 1* + 2^	3 + 1* + 2^	1 + 1^
2020 (Ultimate Stage)	7+1*+ 4^	4 + 1* + 4^	9 + 1* + 4^	2 + 2^

Note – 2^ represents the number of additional train movements generated from the proposed development.

Based on the above information and operation scenario assumptions, the following is apparent:

» The busiest level crossings will be on Brolgan Road to the east of the site and on Condobolin Road to the west of the site where 6 train movements will occur during the initial stage and 9 during the ultimate stage without the inland rail line;

» If the inland rail line was built and the chosen route passed through Parkes then the number of train movements at the above level crossings would increase to 14 train movements in the ultimate stage; and

» The number of train movements on the new level crossing on Brolgan Road to the west of the site would be 2 during the initial stage and 4 during the ultimate stage.

Assumed Time Delay to Traffic at Level Crossings

The assumed level of delay for traffic at level crossings is dependent upon the following:

» Travel speed of trains passing through the level crossing:

» The length of the train passing through the level crossing;

» The number of trains passing through the level crossing; and

» The number of vehicles that could potentially want to pass through the level crossing during the closure.

The assessment assumes that the following level crossings will be impacted by general growth in rail and road movement generated by the site and growth in background road and rail traffic:

» The existing level crossing situated along Brolgan Road to the east of the site;

» A new level crossing to be situated along Brolgan Road to the west of the site; and

» The existing level crossing situated along Condobolin Road to the west of the site.

The assessment assumes that all the above level crossings will be upgraded to active controls with flashing lights. The following table presents likely overall delay to road based traffic as a result of the level crossing being closed and is based on an assumption that all trains would be 1800m in length with train travel speeds across the level crossings varying between 10km/h and 115km/h. The travel speed of trains is likely to vary and is dependent origin and destination of the train movement, train type and track design.

Assumed Time Delays to Traffic from Level Crossing Closures

Travel speed (km/h)	Pre Train Delay time	Train Crossing Delay time	Reopening Delay Time	Total delay time
10	1min 0 secs	10min 48 secs	0min 30 secs	12min 18 secs
20	1min 0 secs	5min 24 secs	0min 30 secs	6min 54 secs
40	1min 0 secs	2min 42 secs	0min 30 secs	4min 12 secs
50	1min 0 secs	2min 10 secs	0min 30 secs	3min 40 secs
115	1min 0 secs	0min 56 secs	0min 30 secs	2min 26 secs

Notes

» Pre train Delay Time – time delay caused by the lights starting to flash at the level crossing before the arrival of a train.

» Train Crossing Delay Time - time delay caused by the train passing over the level crossing at the specified travel speed.

» Reopening Delay Time – time delay caused by the time taken for the lights to stop flashing at the level crossing after the train has passed over the level crossing.

Based on discussions with stakeholders, review of rail track designs and expected operations at the PIT the following is understood to be the worst-case scenario for resulting delays at level crossings from anticipated train movements. The worst-case scenario assumes that the inland rail route is constructed and as a result expected number of train movements increases.

Appendix I

Freight Routes for Oversized Vehicles

Heavy Vehicle Routes

Assessment criteria for proposed B-Double routes.

Appendix 3 of the *'Route Assessment Guidelines for B-Doubles and Road Trains'* indicates the assessment criteria for proposed B-Double routes.

The appendix provides a section on dimension capacity and consists of the following elements:

» Lane and shoulder widths.

» Vehicle swept path requirements

» Railway level crossings and adjacent intersections

» Terminals

All of the above have a common theme in that the route should be adequately designed for accommodating vehicles of this size and provide allowance for their mobility deficiencies.

Under the dimensional capacity section of this document, a number of desirable standards for lane and shoulder widths for B Double routes are presented.

According to the RTA '*Route Assessment Guidelines for Restricted Vehicle Access'* when daily traffic levels increase above 500 vehicle per day (vpd) and up to volumes of 6,000vpd, it is desirable to provide traffic lane widths of 3.0m and shoulder widths between 1.0m-1.2m in order to provide suitable conditions for B Double type vehicles; and

Based on Austroads '*Rural Road Design Guide'*, the desirable traffic lane width on rural roads should be in the order of 3.5m. Lane widths as narrow as 3.0m may, however, be used on low volume roads. The '*Austroad Rural Road Design Guide'* also indicates that the minimum width of a road shoulder on a two lane rural road should be 1.0m, it also indicates that a width of between 1.5m-2.0m ensures that capacity of the adjacent lane is unaffected by obstructions outside the shoulder. If the road reserve is restricted then the lane width may be reduced to a minimum of 3m.

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