

Traffic Impact Assessment

Appendix G



Appendix G — Traffic Impact Assessment

G

Traffic impact assessment

Proposed Small Stock Abattoir, Mitchell Highway, Bourke

Prepared for CAPRA Developments Pty Ltd | 29 February 2016



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Traffic impact assessment

Draft Report

Report H15101RP1 | Prepared for CAPRA Developments Pty Ltd | 29 February 2016

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Date 29 February 2016

Date 29 February 2016

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1 Introduction

1.1 General

CAPRA Developments Pty Ltd (CAPRA) is seeking State Significant Development Consent under Part 4, Division 4.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for the construction and operation of a small stock abattoir (herein referred to as the Project), approximately 14 kilometres (km) north of Bourke in north-western New South Wales (NSW). The abattoir will have the capacity to process up to 6,000 head per day, comprising goat, sheep and lambs and will operate 24 hours per day, 7 days per week.

The Project also involves the construction and provision of ancillary infrastructure to support the abattoir, including reticulation of power, water and telecommunication services, vehicular access off the Mitchell Highway, heavy vehicle manoeuvring and turning areas, livestock holding yards, car parking, administration office, staff amenities and a wastewater treatment system. A 560 m long private road will connect the site buildings and the car park area to the Mitchell Highway.

EMM Consulting Pty Ltd (EMM) has assessed traffic impacts of the Project. The Secretary's Environmental Assessment Requirements (SEARs) issued by the Department of Planning and Environment requires the following items to be defined or addressed in relation to traffic and transport:

- a traffic impact study in accordance with the Roads and Maritime Services (RMS) *Guide to Traffic Generating Developments* (RTA 2002);
- proposed vehicular access locations and intersection treatments;
- the project traffic and transport demand during construction and operations;
- a description of haul routes, vehicle types and daily trip numbers;
- details of any utility services which affect the Mitchell Highway route; and
- the compliance of the internal site roads and car parking with Australian Standards.

1.2 Context

The roads and traffic environment relevant to the Project are the Mitchell Highway and the other connecting routes to the Mitchell Highway within and around the township of Bourke, including North Bourke, which are shown on the map in Figure 1.1.

Approval is sought to operate the abattoir 24 hours per day, 7 days per week. However, activities during the hours of 11 pm - 6 am, and during the day on weekends, will generally involve regular maintenance and cleaning, operation of the wastewater treatment plant, and stock delivery, removal of waste and product dispatch to destinations either north or south of the site via the Mitchell Highway and other routes.

The abattoir workforce will generally be working a single shift during the daytime hours, typically from 7.00 am around 3.00 pm.

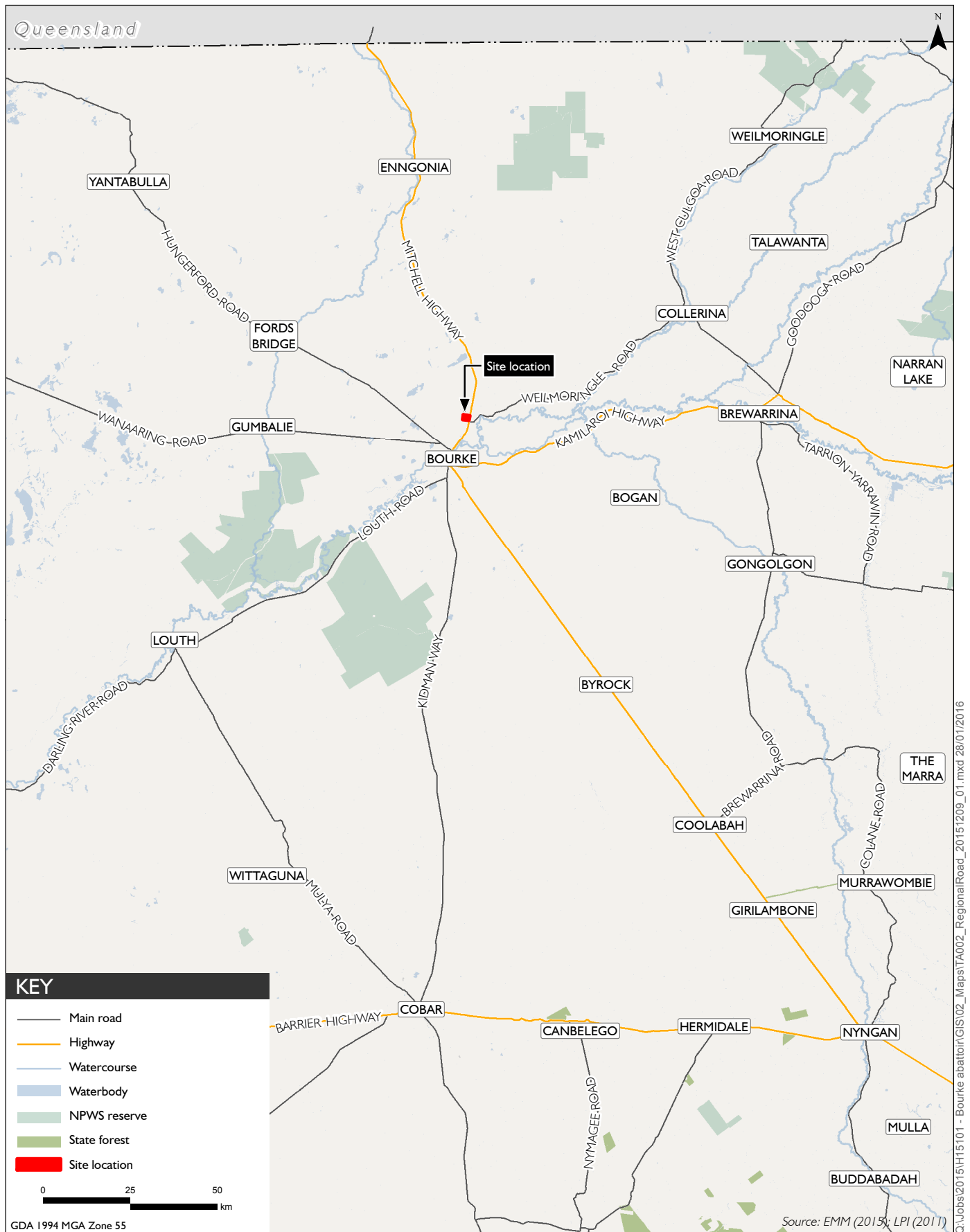
The Mitchell Highway is a major regional highway which connects regional areas of north western NSW via Bourke and Nyngan to the major regional centres of Dubbo, Orange and Bathurst in central western NSW. Beyond Bourke, the route continues northwards and crosses the Queensland border at Barrington (134 km north of Bourke), proceeding to Cunnamulla (257 km north of Bourke) and Charleville where it connects to the Warrego Highway and other regional centres throughout Queensland.

Within the localities of Bourke and North Bourke, the Mitchell Highway is generally a two lane sealed road which has marked edge lines but minimal sealed shoulders.

As the Mitchell Highway route generally has low traffic volumes, additional turning traffic lanes are not normally required at most intersections, including the intersections with other major roads at North Bourke, where the Mitchell Highway connects to the roads to Hungerford and Wanaaring (MR 404 and MR 405) and the intersections within the main township of Bourke with the roads to Brewarrina and Walgett (the Kamilaroi Highway), and to Cobar (Kidman Way). From Cobar other routes continue west to Wilcannia and Broken Hill (via the Barrier Highway) or south to Melbourne.

Within the locality of the project area, the general speed limit on the Mitchell Highway is 110 km/hr. This speed limit reduces to 50 km/hr within the urban areas of Bourke and North Bourke and also through the small rural settlement of Enngonia (97 km north of Bourke).

The nearest existing intersection to the project area on the Mitchell Highway is at Collierina Road (also known as Weilmoringle Road) which is approximately 1 km south of the site. At this intersection, the connecting road is unsealed and there are no additional turning lanes on the Mitchell Highway.



2 Existing traffic conditions

2.1 Road network

Livestock are proposed to be transported directly to the abattoir site near Bourke from a wide regional area of North Western NSW. The future meat products produced at the facility would primarily be transported to the major capital cities of the eastern states of Australia.

The road network where there could potentially be changes to existing traffic volumes as a result of the project is shown on Figure 1.1, the regional road network plan and the locality road network plan is shown in Figure 2.1.

2.2 Project access intersections

The most relevant intersection which would be used by the proposed project traffic, for livestock, product and workforce traffic movements, would be the future site access intersection on the Mitchell Highway, located approximately 14 km north of the Bourke urban area, 700 m north of the Weilmoringle (Collerina) Road intersection) (Figure 2.1). The alignment of the Mitchell Highway is straight and level at this location, which is shown in Photographs 2.1 and 2.2.

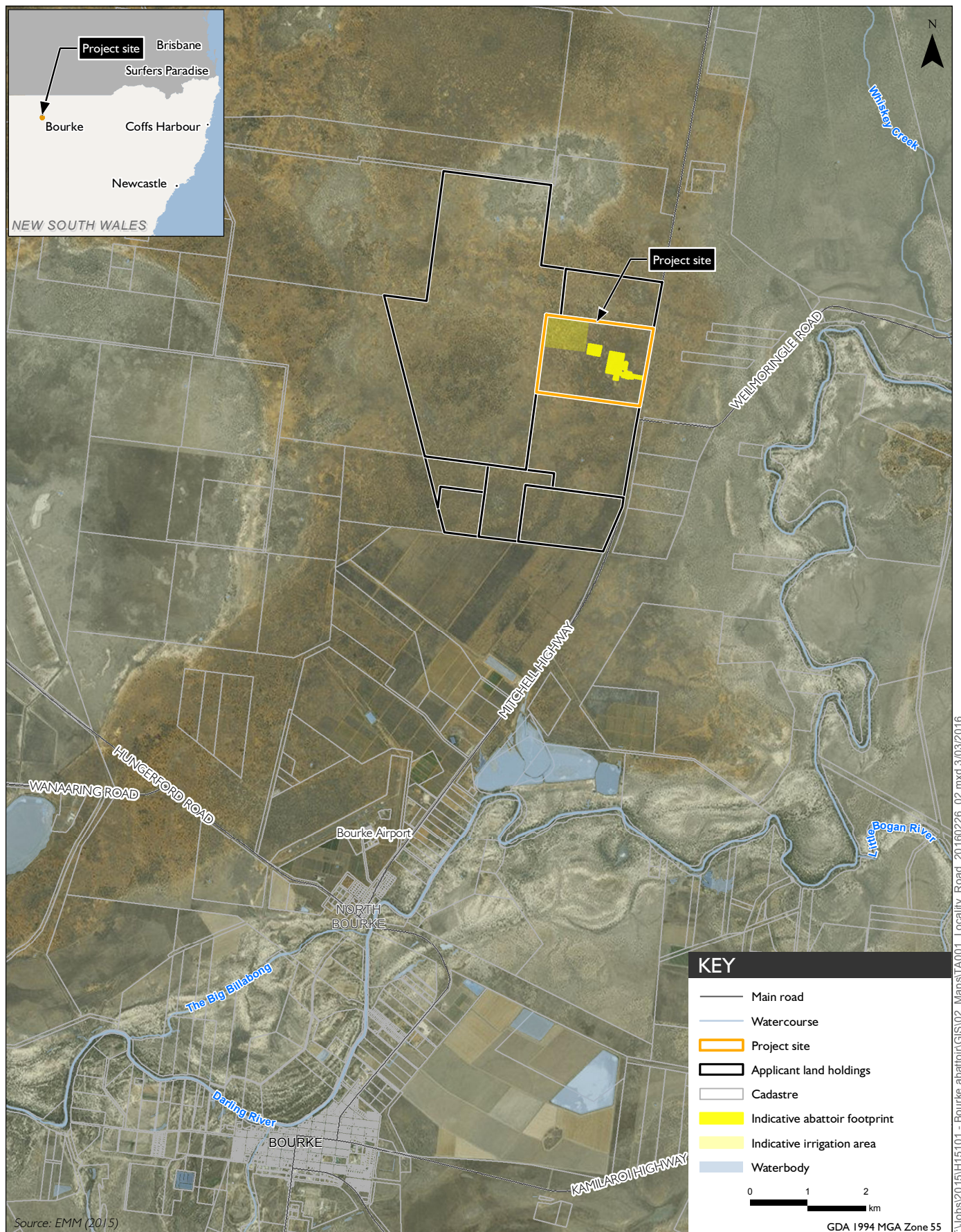
On the Mitchell Highway route, as it passes through the urban areas of Bourke and North Bourke, most intersections are currently unimproved T-intersections or cross intersections, with no additional left or right turning lanes. However there are generally wide sealed shoulders at the township intersections which enable the major road traffic to pass other vehicles which are waiting to turn either right or left from the major road at the intersection, provided the manoeuvre is undertaken at lower than normal traffic speed.

The sight distance for traffic approaching the Mitchell Highway, at all the intersections in the Bourke and North Bourke urban area, is adequate as the major road and connecting roads are all generally straight and level on their approaches to intersections, which provides the optimum visibility for the traffic which is turning at the intersection. There are generally low traffic volumes using the Mitchell Highway in the locality of the site. These traffic volumes are described further in section 2.3.

2.3 Traffic volumes

Baseline traffic volumes for the Mitchell Highway, 12 km north of Bourke were recorded by an RMS traffic survey during July 2011, the results of which are included as Appendix A. The traffic survey also included heavy vehicle classification. The traffic count recorded the following average weekday traffic volumes:

- There are low average weekday peak hourly traffic volumes using the Mitchell Highway at the future intersection location which vary between 32 vehicles hourly (two-way) during the morning peak hour (which is 9.00 am to 10.00 am normally) and 25 vehicles hourly (two-way) during the afternoon peak hour (which is between 12.00 to 1.00 pm normally); and
- At the times of the day which are likely to correspond to the future abattoir site peak traffic movements, the current prevailing Mitchell Highway traffic volumes are lower still, being no more than five vehicles hourly (two-way) during the future site morning traffic peak hour (which would be 6.00 am to 7.00 am typically) and 24 vehicles hourly (two-way) during the future site afternoon traffic peak hour (which would be around 3.00 pm to 4.00 pm typically).





Photograph 2.1 **Visibility on the Mitchell Highway at proposed site access looking south**



Photograph 2.2 **Visibility on the Mitchell Highway at proposed site access looking north**

On the Mitchell Highway, near the site, the surveyed average daily traffic volume in 2011 was 293 vehicles and the proportion of heavy vehicles in traffic was 29% (85 out of 293 daily vehicle movements).

On the other major roads in the Bourke area, an indication of the existing daily traffic volumes is given by the Historic RTA/RMS daily traffic volumes survey data, which was last published in 2005 for the western region of NSW.

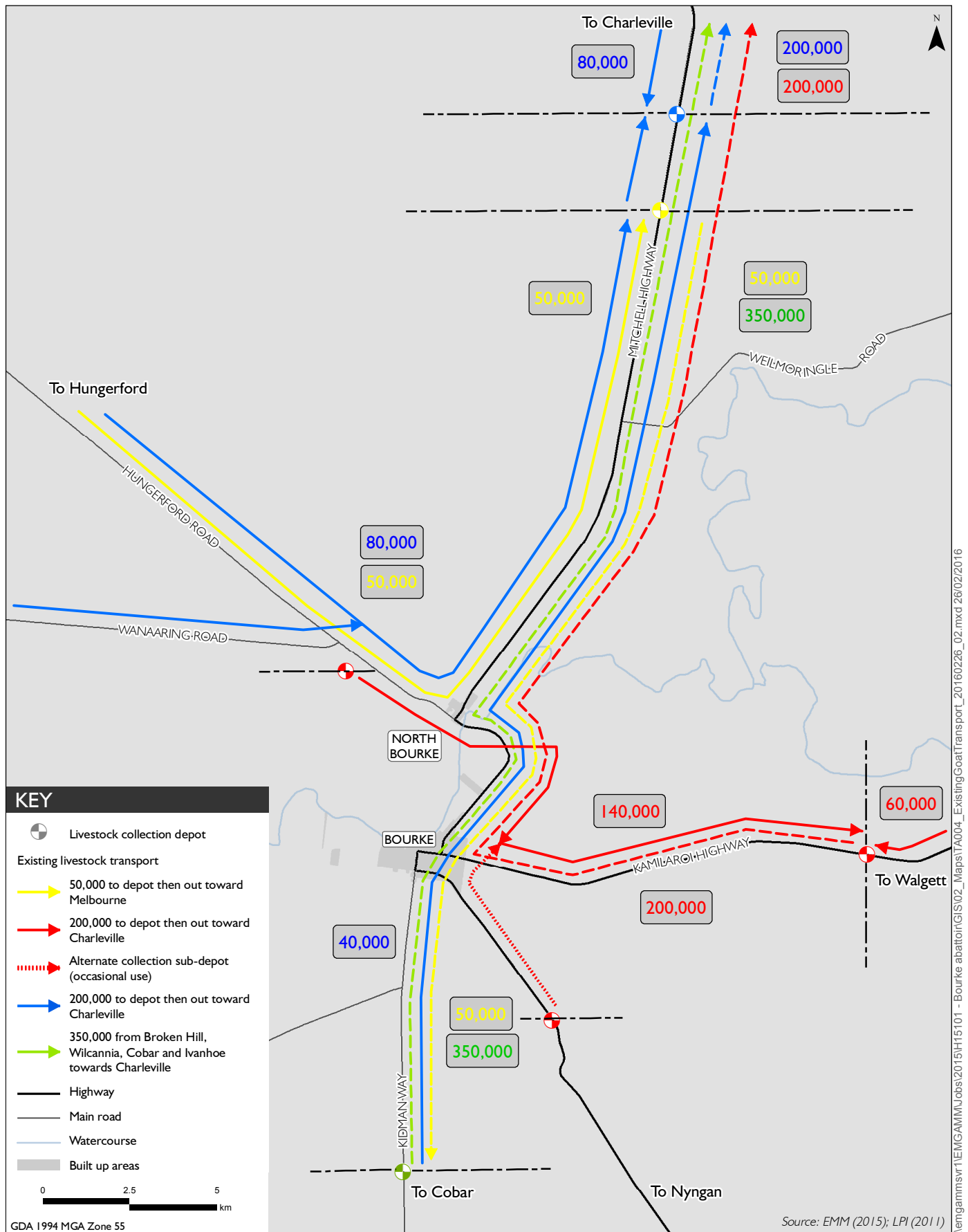
The prevailing locality traffic growth rates for most roads in the western region of NSW are +1% annually or less, so the prevailing (year 2015/6) current daily traffic volumes for these routes would be approximately 10 percent higher than the most recent RMS surveyed traffic volumes which were generally recorded in 2005, as follows:

- STN 96.180, Kamlaroi Highway, 6 km east of Bourke, 337 daily vehicle movements;
- STN 96.110, Kidman Way, at Priory Tank, 157 daily vehicle movements;
- STN 96.173, Mitchell Highway, at Queensland Border, 170 daily vehicle movements;
- STN 96.186, Mitchell Highway, north of MR 404 Hungerford Road, 591 daily vehicle movements;
- STN 96.179, Mitchell Highway, south of MR 404 Hungerford Road, 1,215 daily vehicle movements;
- STN 96.368, Mitchell Highway (Bourke Town), north of Anson Street, 2,010 daily vehicle movements;
- STN 96.186, Mitchell Highway, 8 km south of Bourke, 249 daily vehicle movements;
- STN 96.057, Mitchell Highway, 8 km north of Nyngan, 309 daily vehicle movements;
- STN 96.172, MR 404 Hungerford Road, west of Mitchell Highway, 530 daily vehicle movements;
- STN 96.181, MR 404 Hungerford Road, north of Wanaaring Road, 68 daily vehicle movements;
- STN 96.186, MR 405 Wanaaring Road, west of Hungerford Road, 262 daily vehicle movements; and
- STN 96.175, Collierina Road, E of Mitchell Highway, 24 daily vehicle movements (last survey 1992).

2.4 Existing livestock transport movements in the Bourke area

It is understood there are currently around 800,000 head of livestock transported through or around the township of Bourke per year. This number varies depending on market demand; however is considered to be a conservative estimate of movements to allow a 'worst case' assessment of impacts as a result of the project. The majority of these animals are collected at a range of depots, north, east and west of the town, on route to the abattoirs at Charleville, Nyngan and Melbourne.

Some of this livestock is transported through the town in both directions as they are taken firstly to the collection depot outside the town before they are later transported back through the town en route to the abattoirs at Charleville, Nyngan and Melbourne. The effective indicative annual livestock transport movements which are understood to currently occur through the township of Bourke are illustrated graphically by Figure 2.2.



Indicative existing livestock movements around Bourke

Bourke Small Stock Abattoir
Traffic Assessment

Figure 2.2

The indicative annual livestock transport movements which are illustrated in Figure 2.2 show that, although there are approximately 800,000 head of livestock in total each year transported through the town, due to the double movements on some of the transport routes, there are actually around 910,000 movements per year through North Bourke and approximately 780,000 livestock movements per year through the main town of Bourke.

The sizes of the vehicles which are used to transport these animals can vary. However, the largest road train type vehicles are normally used. These vehicles have a capacity of approximately 1,200 small stock, so for the existing annual transport operations through the townships of Bourke and North Bourke, when the animals are on their final journey to market, the approximate 800,000 livestock transported require around 667 annual trips by loaded road trains, which represents approximately 2.67 loaded road train movements each day, for an approximate 250 day per year transport operation.

2.5 Public transport

There are no operating rail services in the Bourke area. The former railway line between Bourke and Nyngan was severed during flooding, approximately 25 years ago, and the rail tracks were never reinstated. There are no public bus services or coach operating via the Mitchell Highway north of Bourke. Therefore public bus services are unlikely to be used by persons working at the proposed abattoir.

2.6 Traffic safety

Current traffic safety in the vicinity of the Project site is considered acceptable. There is excellent intersection visibility in both directions along the Mitchell Highway at the proposed site access road intersection location (Photographs 2.1 and 2.2). The minimum future intersection sight distances to the north and the south of the site access road would be at least 1 km due to the generally straight and level alignment of the Mitchell Highway in this locality.

2.7 Pedestrian and cycle access

Access by pedestrians and cyclists to and from the surrounding area to the proposed abattoir site is unlikely due to the distance from the nearest regional population centres, which are at Bourke (14 km south) and North Bourke (10 km south), or the smaller local settlement at Enngonia (85 km north).

3 Traffic and parking demands for the proposal

3.1 Site access and circulation

Access to all the facilities at the abattoir site will be via the site access road from the Mitchell Highway. The main site entry gatehouse will be located 300 m from the Mitchell Highway intersection, with additional lockable entry gates set back about 30 m from the current road alignment. The locations of the various facilities at the abattoir site are shown on the site plans in Appendix A. Generally the site will include the following facilities:

- a main processing building with freezer area, dispatch area, admin area and maintenance area, with helipad area adjoining;
- loading dock areas for the product dispatch constructed around the southern and western sides of the buildings;
- a covered stockyard area, with delivery bays for the incoming livestock constructed around the northern side of the building;
- a weighbridge entry gatehouse building located about 130 metres east of the main site processing building;
- a general staff car parking area for approximately 150 cars located outside the entry gatehouse building with connecting footpaths to the main site building;
- an additional 'executive' and site visitor car parking area located inside the entry gatehouse controlled area;
- a secure fence surrounding all areas of the site including the access road which connects to and from the Mitchell Highway;
- the minimum internal site road widths within the main developed part of the site will be to Australian standards to accommodate the turning paths of large trucks including road trains;
- the main access road width will generally be a minimum of 6.5 metres on the straight sections between the Mitchell Highway intersection and the main site gatehouse and car parking areas; and
- sealed and gravel hard stand road surfaces will be provided for the internal site access roads and loading dock manoeuvring areas.

3.2 Traffic generation

The following site traffic generating activities and movements by different vehicle types will occur. A summary of all the site generated daily traffic movements is provided in Table 3.1:

- Deliveries of livestock– the largest type of vehicles (eg road trains) will generally be used for the transport of livestock to the site as these deliveries will all generally occur from the rural areas of North Western NSW where road trains are permitted to operate.
- Deliveries of consumables – these movements will generally occur by semi trailers, carrying loads of specialised products from the manufacturing regions of NSW.

- Dispatch of meat products to customers – these movements will generally occur by either B Double or semi trailer type vehicles which will deliver the products in a single journey to the major capital cities for export, ie, Sydney, Melbourne and Brisbane.
- Dispatch of waste products and garbage from the site and maintenance vehicle trips – These movements will generally occur to and from sites in the nearby local area surrounding the townships of Bourke and North Bourke and will generally use rigid trucks of various sizes.
- Staff and trades visitor vehicle movements – from the existing Bourke locality workforce travel patterns, this traffic will be cars and other light vehicles and will primarily travel (approximately 80%) to and from the local Bourke and North Bourke townships, with relatively small proportions (no more than 5% in any each direction) travelling to and from the east or north of Bourke (via Enngonia or Collierina) or to and from the south or west of Bourke via other routes which travel through the urban areas of Bourke and North Bourke.

Table 3.1 Indicative additional daily traffic volumes generated by the Project

Activity	Type of Vehicle	Daily traffic (vehicles)	Daily traffic (vehicle movements)
Delivery of livestock	Road trains	5	10
Delivery of consumables	Semi trailers	1	2
Dispatch of meat products	Semi trailers or B Doubles	3	6
Removal of waste products	Rigid truck	3	6
Removal of general garbage	Rigid truck	1	2
Maintenance vehicles	Rigid truck	1	2
Sub total heavy vehicles	All trucks	14	28
Staff	Car or other light vehicle	130	260
Trades visitors	Car or other light vehicle	2	4
Sub total light vehicles	All light vehicles	132	264
Total all vehicles	All vehicles	146	292

The project workforce generated daily traffic movements will be approximately 130 daily vehicles (260 daily vehicle trips) for 200 staff. This represents an average vehicle occupancy of 1.54 persons per car. This would be normal for rural workforce travel in a rural locality such as Bourke.

All the project workforce car travel movements will normally occur within a one hour period at the beginning and end of each working day, ie between the periods 6.00 am to 7.00 am in the morning and 3.00 pm to 4.00 pm each afternoon typically.

The site livestock truck arrivals would mainly arrive during daytime periods, but the site product dispatch and other truck movements could occur at any time over a 24 hour period. The future site morning and afternoon peak hourly truck traffic movements are estimated as one tenth of the total daily truck traffic movements, which would be approximately 3 truck movements per hour on an average day.

Overall, 30% of the future site truck traffic movements, for the combined livestock deliveries and other project delivery and waste transport traffic would be travelling to and from the north via the Mitchell Highway and the remaining 70% would travel to and from the south via Bourke to a range of other regional NSW and capital city destinations.

The overall distribution of the future site generated daily car and truck traffic movements travelling within the locality of Bourke and surrounding areas is shown in Figure 3.1

3.3 Construction traffic

The daily site construction traffic movements will be less than the site generated daily traffic movements during operations and do not therefore require detailed assessment.

However, a construction stage traffic management plan would be required for the management of the site access (including any access requirements for oversize vehicles) during the project construction stage. This would be prepared subsequently to and as a condition of the project approval.

3.4 Design of internal site roads and car parking

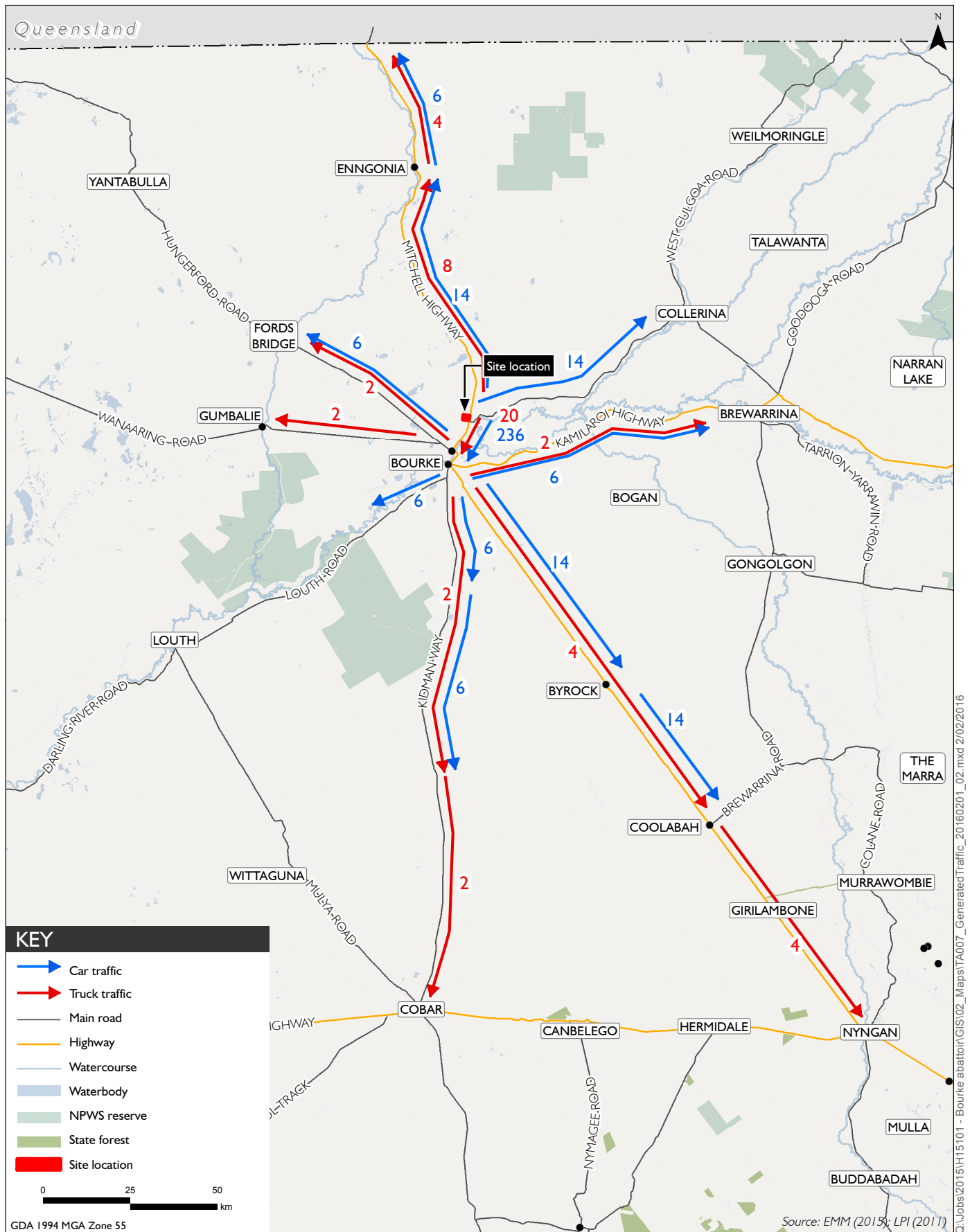
Parking for the project construction and operations workforces will be provided in two sealed car parking areas which will have appropriate dimensions to accommodate the required number and size of the vehicles using each car park. Approximately 150 car parking spaces will be provided in the main site employee car park, with a further 10 car parking spaces provided in a separate car park for management and site visitors.

Sealed car parking areas within the site will be designed to appropriate dimensions determined by the Australian Standard AS 2890:1 for an industrial site use and the internal site roads which are used for heavy vehicle access will be designed in accordance with the Australian Standards.

3.5 Other transport

Use of general public bus services for the project workforce travel is unlikely as there are currently no public bus or coach services which operate via the Mitchell Highway, north of Bourke.

Shuttle buses may be used on occasions to transport a proportion of the project staff to and from work at the site.



4 Impact assessment

4.1 Traffic volumes increases on major roads

Livestock are proposed to be transported directly to the abattoir site near Bourke from a wide regional area of North Western NSW, potentially using either of the following transport routes:

- The Kamilaroi Highway, to and from the east, towards Brewarrina and Walgett;
- The Kidman Way, to and from the south, towards Cobar;
- The Mitchell Highway, to and from the north, from the Queensland border direction;
- The Mitchell Highway, to and from the south east, from the Nyngan direction;
- MR 404 Hungerford Road, to and from the north west; and
- MR 405 Wanaaring Road, to and from the west.

The future meat products produced at the facility would primarily be transported to the major capital cities of the eastern states of Australia, generally using the following transport routes:

- The Mitchell Highway, to and from the north, for products transported to Brisbane;
- The Mitchell Highway, to and from the south east, for products transported to Sydney; and
- The Kidman Way, to and from the south, for products transported to Melbourne.

Current daily traffic volumes on the major roads in the locality, for the year 2015, have been estimated from the RTA/RMS daily traffic volume surveys which are summarised in Section 2.3, by the application of a typical NSW rural locality traffic growth rate of +1.0% for annual background traffic growth (linear growth).

For the surveyed base daily traffic volume using the Mitchell Highway in the locality of the site in 2011 which was 293 vehicles per day, this volume would have increased by +4% approximately in 2015, which would give approximately 305 daily vehicles of which approximately 88 daily vehicles (29%) would be trucks or other heavy vehicles.

For the daily traffic volumes on the other roads which were last surveyed in 2005, a +10% traffic growth factor would be applicable to give current year 2015 daily traffic volumes. For Collierina Road, which was last surveyed in 1992, a +23% traffic growth factor would be applicable.

The comparison of the current year (projected 2015) daily traffic volumes on each of the major roads in the Bourke region of North Western NSW, with the future project generated daily traffic volumes for each route, from Figure 3.1, is summarised in Table 4.1.

Table 4.1 Comparison of the current year 2015 and future project traffic volumes

Traffic generation route	Projected base daily traffic volume (year 2015)	Peak daily traffic from the proposal, cars + (trucks)	Percentage traffic increase
Mitchell Highway at Queensland border	187	6+(4)	5%
Mitchell Highway immediately north of the project area	305	14+(8)	7%
Mitchell Highway immediately south of the project area	305	250+(20)	88%
Mitchell Highway, North Bourke, north of MR 404	650	236+(20)	39%
Mitchell Highway, North Bourke, south of MR 404	1,337	184+(12)	15%
Mitchell Highway, Bourke, north of Anson Street	2,211	144+(8)	7%
Mitchell Highway, 8 km south of Bourke	274	14+(4)	7%
Mitchell Highway, 8 km north of Nyngan	340	0+(4)	1%
Kamilaroi Highway, 6 km east of Bourke	371	6+(2)	2%
Kidman Way, at Priory Tank	173	6+(2)	5%
MR 404 Hungerford Road, west of Mitchell Highway	583	12+(4)	3%
MR 404 Hungerford Road, west of MR 405	75	6+(2)	11%
MR 405 Wanaaring Road, west of MR 404	288	6+(2)	3%
Collerina Road, east of Mitchell Highway	30	14+(0)	46%

The results in Table 4.1 show that the highest daily traffic volume increases from the proposal will be on the roads in the immediate vicinity of the site, where there will be approximately +88% and +46% daily traffic increases in the year 2015 base daily traffic volumes using the Mitchell Highway and Collerina Road.

North of the site, at locations on the Mitchell Highway, between the site and the Queensland border, the proportional daily traffic increases would generally be much lower than this, between +5% to +7%.

At other locations on the Mitchell Highway, south of the project area, there will be progressively lower future project daily traffic increases, which are estimated as approximately +39% in the North Bourke area, north of the junction with Hungerford Road, +15% south of North Bourke at the Darling River Bridge, +7% on the main street section through Bourke, north of Anson Street and generally +7% or less on sections of the Mitchell Highway and other transport routes south of Bourke.

The proportional daily traffic increases from the future site traffic will primarily only be noticeable on the sections of the Mitchell Highway between the site and the main township of Bourke, where there are generally low prevailing traffic volumes using the route currently in comparison to other major rural highways in NSW. Although noticeable, these traffic increases will generally have only minimal future effects on the actual traffic operations, level of service or traffic safety for the future local and regional traffic using the Mitchell Highway route.

During the project construction stages there may be significant proportions of additional heavy vehicle trips using the Mitchell Highway in the locality during the peak stages of the project construction. However the effects of these heavy vehicle trips will generally not be noticeable on the Mitchell Highway due to the relatively high proportion (29%) of heavy vehicles in existing traffic using the road.

4.2 Predicted project related livestock transport through Bourke and North Bourke

The traffic implications for the project have also been considered in terms of the potential project related livestock movements through the urban areas of Bourke and North Bourke. These livestock transport movements have been summarised for the existing situation in Section 2.4 and Figure 2.2, where it has been identified that although there are approximately 800,000 head of livestock in total each year transported through the town, due to the double movements of livestock on some transport routes into depots and then out to market, it is estimated that 910,000 head are transported per year through North Bourke and approximately 780,000 per year through the main town of Bourke.

In the future the annual livestock transport movements through the townships of Bourke and North Bourke is expected to be more straightforward with limited double movements and approximately 27% (400,000 out of a potential annual total of 1,500,000 head) being transported directly to the project site from the north, without travelling through the urban areas of either Bourke or North Bourke. It is anticipated that there will however be an increase in movements of livestock from the east and south through Bourke and North Bourke to the abattoir, resulting in a minimal net change in movements as described below, and illustrated in Figure 4.1.

- Through Bourke, there would be a negligible increase in the average annual livestock transport movements from around 780,000 currently (2.60 daily loaded road train movements) to up to 800,000 with the proposal (2.67 daily loaded road train movements), which is an increase of 0.07 loaded road train movements per day on average.
- Through North Bourke, there would also be a minor increase in the average annual livestock transport movements from around 910,000 currently (3.03 daily loaded road train movements) to approximately 1,100,000 with the proposal (3.67 daily loaded road train movements), which is an increase of 0.60 loaded road train movements per day on average.

In terms of the average daily loaded road train movements, the net effects of the project livestock transport movements would be relatively minor through the township of North Bourke (where there would be 0.60 additional daily loaded road train movements on average) and virtually insignificant through the main township of Bourke (where there would be 0.07 additional daily loaded road train movements on average).

It is noted that in determining the above impacts, the maximum anticipated project related livestock movements of up to 800,000 through Bourke has been assumed. However, as noted in Figure 4.1, project related movements are anticipated to be between 700,000 and 800,000, depending on market demand. 800,000 livestock movements have been assumed in this assessment to present the worst case scenario, resulting in a negligible increase in truck movements through Bourke. If the lower limit of 700,000 were to occur, truck movements through Bourke would decrease on a daily basis by around 0.3 to 2.3 road trains per day. Again, this would represent an imperceptible change.

4.3 Traffic impacts at Intersections

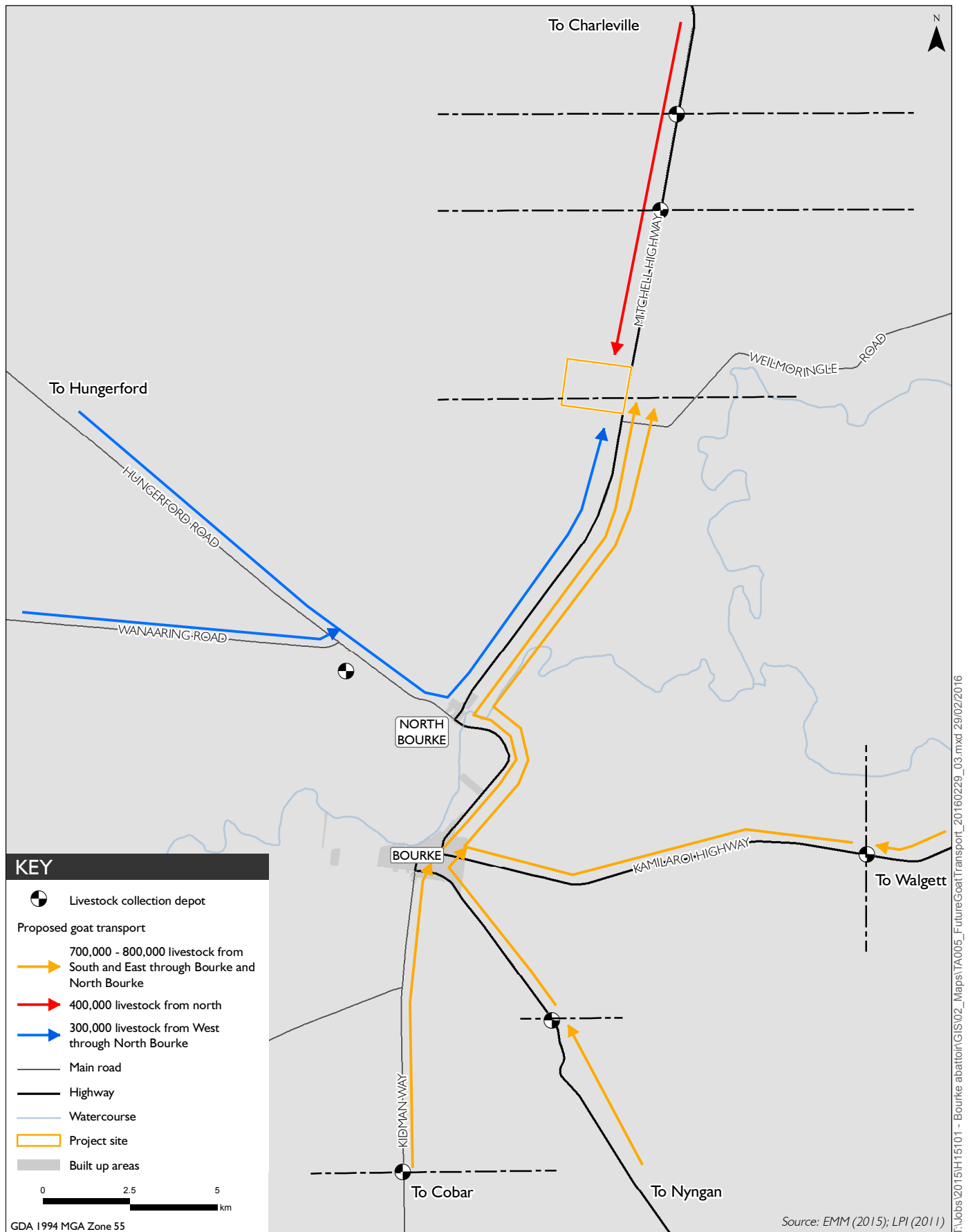
Rural intersection operations are assessed from the combination of the peak hourly through and turning traffic volumes which are occurring at each intersection. This determines the need for additional intersection turning lanes.

These volumes should comply with the relevant Austroads Warrant Charts for rural intersection design which provide separate design charts for roads with either 100 km/hr or higher travel speeds or travel speeds are lower than 100 km/hr. The current Austroads Warrant Charts are included in Appendix C.

The maximum travel speed on the Mitchell Highway in this locality is 110 km/hr. For this design speed, as long as the peak hourly through traffic volumes remain below approximately 120 vehicle movements (two-way total) on the major road, no additional left or right turn traffic lanes are needed and the basic rural Type BAL and Type BAR intersection designs are appropriate. These designs which can in some cases provide extensive sealed shoulder widening, are shown in Appendix C.

As the existing Mitchell Highway through traffic volumes are significantly below 120 vehicle movements per hour at any time of day in this locality, the site access intersection design for the project would generally be acceptable with sealed shoulder widening to accommodate left and right turning traffic movements by the appropriate design vehicle (which is a road train in this locality) without the requirement for formal additional right or left turning traffic lanes.

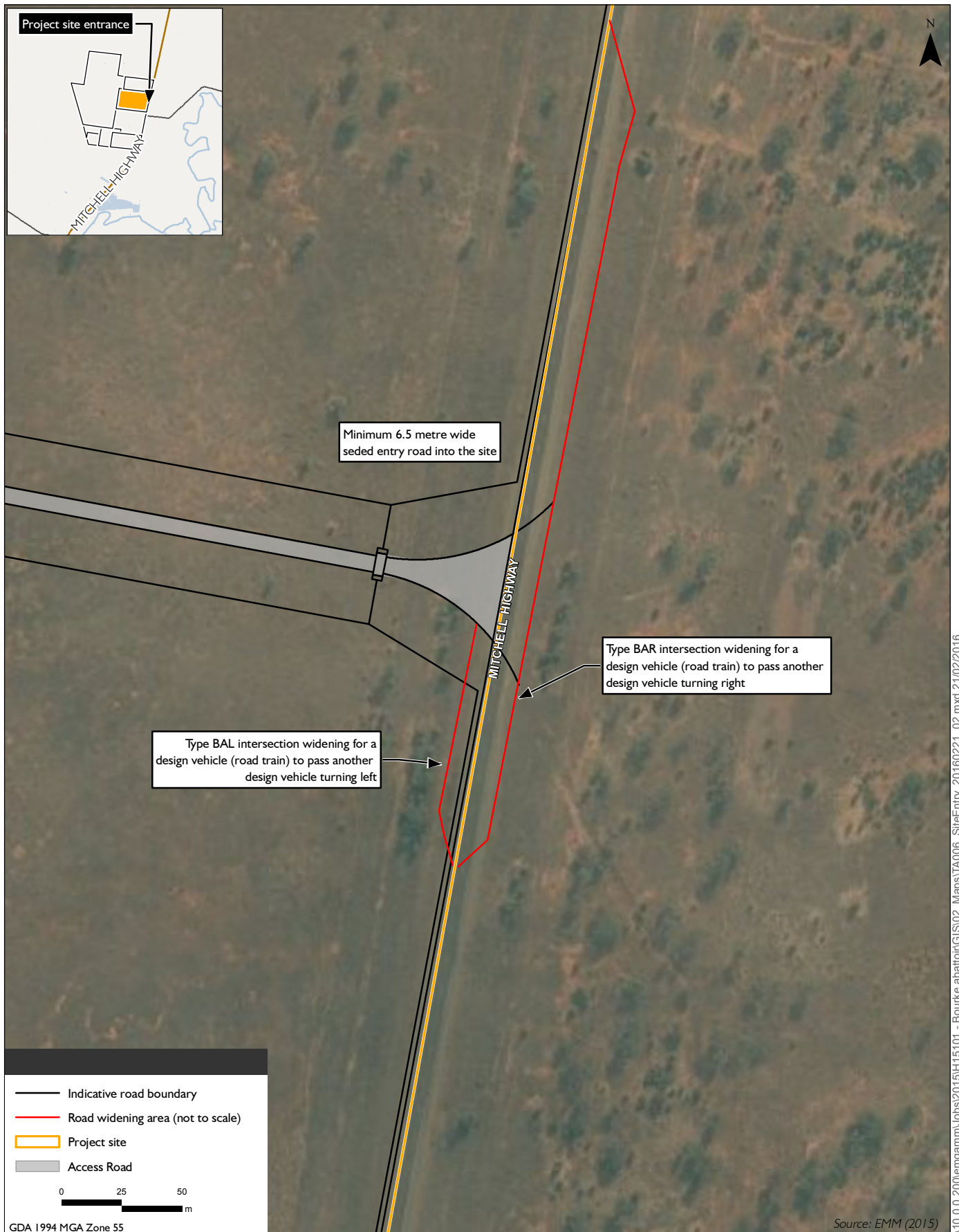
A schematic design plan of the future site access intersection design showing the approximate future extent of sealed shoulder intersection widening to accommodate left and right turning traffic movements at the intersection, by the appropriate design vehicle (a road train), is provided in Figure 4.2.



Indicative predicted livestock movements

Bourke Small Stock Abattoir
Traffic Assessment

Figure 4.1



Project site entrance conceptual design

Bourke Small Stock Abattoir
Traffic Assessment

Figure 4.2

5 Summary and conclusions

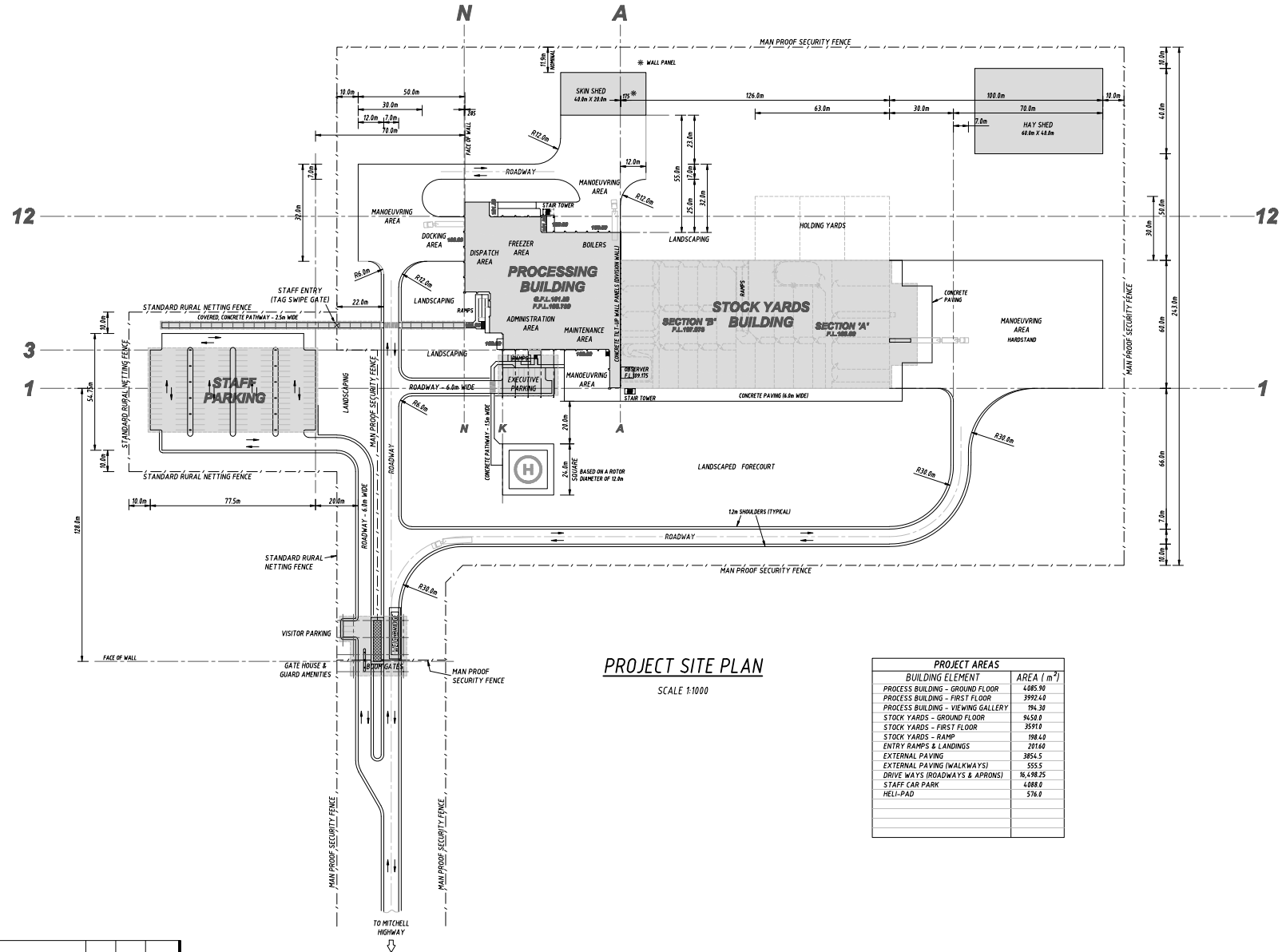
The local and regional traffic impacts from the proposed Bourke small stock abattoir project have been assessed and the key findings are as follows:

- Access from the Mitchell Highway to the project site will be via a new site access intersection which is to be constructed on the Mitchell Highway, approximately 14 km north of Bourke (700 m north of the intersection with Collerina Road).
- The existing daily traffic volume using the Mitchell Highway in this locality in 2011 was 293 vehicles per day with peak hourly traffic volumes of 32 vehicles or less. This provides a high level of service with free flowing traffic conditions currently on the Mitchell Highway in the locality. The prevailing traffic volumes on the Mitchell Highway increase as the route travels towards Bourke, increasing to over 1,200 vehicles per day at the Darling River Bridge and over 2,000 vehicles per day through the main centre of the Bourke township.
- The background traffic growth conditions for the Mitchell Highway and other routes in the Bourke region are considered to be moderate with projected future base year 2015 daily traffic volume for the route estimated at all locations by assuming a +1% annual traffic growth rate (linear growth) from the most recent available RTA or RMS traffic survey data at all locations.
- Additional traffic to be generated by the project has not been specifically assessed during project construction, as it is considered that both the light and heavy vehicle traffic movements which will be generated during the project construction will be significantly lower than during subsequent project operations. A construction traffic management plan would be required for the management of the site access (including any access requirements for oversize vehicles) during the project construction stage. This would be prepared subsequently to and as a condition of the project approval.
- Additional traffic generated by the project operations will be a maximum of +264 light vehicle trips daily and +28 heavy vehicle movements daily (+292 additional daily vehicle trips in total). The site light vehicle (car) traffic will primarily (approximately 80%) be travelling to and from the townships of Bourke and North Bourke and will primarily be travelling via the Mitchell Highway to and from the south of the site. The project related heavy vehicle traffic will include a more significant proportion of heavy vehicle traffic movements (approximately 30%) travelling to and from the north, but will also primarily (70%) be travelling via the Mitchell Highway to and from the south of the site, before being distributed onto a number of other routes (via the Kamilaroi Highway, Kidman Way, Hungerford Road and Wanaaring Road) in addition to via the Mitchell Highway, after travelling through the Bourke and/or North Bourke urban areas.
- The future distribution of the site generated truck traffic onto a large number of other routes, which are all generally state highways or classified main roads, after travelling through Bourke or North Bourke, will generally minimise the potential future project related traffic increases on any specific route. A detailed comparison of the existing and future livestock transport movements by road trains through Bourke and North Bourke has also been undertaken. As there are already significant annual livestock transport movements (indicatively 800,000 per annum) through both these urban areas currently, the future additional project related livestock transport movements will not generally be significant. There will be an additional 0.60 daily loaded road train movements on average through North Bourke and an additional 0.07 daily loaded road train movements on average through Bourke as a result of the changed livestock transport movements through these areas with the project.

- The predicted additional daily traffic usage on the Mitchell Highway and other transport routes from the project will be approximately +88% and +46% daily traffic increases in the year 2015 base daily traffic volumes using the Mitchell Highway and Collierina Road. On the Mitchell Highway to the south, there will be progressively lower project daily traffic increases further away from the site, which are estimated as approximately +39% in the North Bourke area, north of the junction with Hungerford Road, +15% south of North Bourke at the Darling River Bridge and +7% on the main street section of the Mitchell Highway, travelling through Bourke.
- The proportional daily traffic increases from the future site traffic will primarily only be noticeable on the sections of the Mitchell Highway between the site and the main township of Bourke, where there are generally low prevailing traffic volumes using the route currently in comparison to other major rural highways in NSW. Although noticeable, these traffic increases will generally have only minimal future effects on the actual traffic operations, level of service or traffic safety for the future local and regional traffic using the Mitchell Highway route.
- Rural intersection operations are assessed from the combination of the peak hourly through and turning traffic volumes which are occurring at each intersection. This determines the need for additional intersection turning lanes. As the existing Mitchell Highway through traffic volumes are significantly below 120 vehicle movements per hour at any time of day in this locality, the future site access intersection design would generally be acceptable with sealed shoulder widening (Type BAL and Type Bar) to accommodate left and right turning traffic movements by the appropriate design vehicle which is a road train in this locality.
- There is excellent intersection visibility in both directions along the Mitchell Highway at the proposed site access road intersection location. The minimum future intersection sight distances to the north and the south of the site access road would be at least 1 km due to the generally straight and level alignment of the Mitchell Highway in this locality.
- Internal site roads and car parking will be provided to serve the site vehicular access and car parking requirements for both light and heavy vehicle traffic. Sealed car parking areas within the site will be designed to appropriate dimensions determined by Australian Standards for an industrial site use and the internal site roads which are used for heavy vehicle access will also be designed in accordance with the Australian Standards.
- Normal public transport services in the area are very limited and will generally not be used for access to the project work sites. Shuttle buses would probably be used on occasions to transport a proportion of the project staff to and from work at the site, although there are no specific details available for this at the current time.
- Access for pedestrians and cyclists to the project site from the surrounding areas is considered unlikely due to the separation distances from the nearest residential areas.

Appendix A

Site Plans



PROJECT SITE PLAN

SCALE 1:1000

PROJECT AREAS	
BUILDING ELEMENT	AREA (m ²)
PROCESS BUILDING - GROUND FLOOR	4085.90
PROCESS BUILDING - FIRST FLOOR	3992.40
PROCESS BUILDING - VIEWING GALLERY	194.30
STOCK YARDS - GROUND FLOOR	9458.0
STOCK YARDS - FIRST FLOOR	3591.0
STOCK YARDS - RAMP	198.40
ENTRY RAMPS & LANDINGS	201.60
EXTERNAL PAVING	3854.5
EXTERNAL PAVING (WALKWAYS)	555.5
DRIVEWAYS (ROADWAYS & APRONS)	16,498.25
STAFF CAR PARK	4088.0
HELL-PAD	576.0

No	Revision Description	Drawn	Approved	Date
I	GATEHOUSE REVISED	LGH	-	07.01.16
H	SITE REVISED (EXEC. PARKING & WALKWAY SHELTER)	LGH	-	10.12.15
G	SITE REVISED (ENTRY ROAD & HELL-PAD)	LGH	-	10.12.15
F	SITE REVISED (STAFF PARKING)	LGH	-	14.12.15
E	SITE REVISED (STAFF PARKING)	LGH	-	11.12.15
D	SITE REVISED	LGH	-	10.12.15
C	ENTRY ROAD & STAFF PARKING	LGH	-	07.12.15
B	ENTRY ROAD & STAFF PARKING	LGH	-	04.12.15
A	ISSUED FOR APPROVAL	LGH	-	28.11.15

SARAN
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Project
PROPOSED ABATTIOR
MITCHELL HIGHWAY, BOURKE N.S.W.
Title
PROJECT SITE PLAN

0 10 20 30 40 50m
SCALE 1:1000 AT ORIGINAL SIZE

FOR APPROVAL

Client CAPRA DEVELOPMENTS PTY LTD			
Drawn	LGH	Designed	Approved
Scale	AS SHOWN	Date	NOV, 2015
Drawing No.	32686-DA.03		Rev: 1
			Original Size A1

Appendix B

Traffic Surveys

Austrroads94

Austrroads94 replaced NAASRA in Australia in 1994. It is an improved system using information from the spacings of the first three axles, the total number of axles and the number of axle groups. There are 13 classes.

Level 1	Level 2		Level 3	Austroads Classification			
Length	Axles and Groups		Vehicle Type				
Type	Axles	Groups	Description	Class		Parameters	Dominant Vehicle
Short up to 5.5m	Light Vehicles						
	2	1 or 2	Short Sedan, Wagon, 4WD, Utility, Light Van, Bicycle, Motorcycle, etc.	SV	1	$d(1) \leq 3.2\text{m}$ and axles = 2	
Medium 5.5m to 14.5m	3, 4 or 5	3	Short - Towing Trailer, Caravan, Boat, etc.	SVT	2	groups = 3, $d(1) \geq 2.1\text{m}$, $d(1) \leq 3.2\text{m}$, $d(2) \geq 2.1\text{m}$ and axles = 3,4,5	
	Heavy Vehicles						
	2	2	Two Axle Truck or Bus	TB2	3	$d(1) > 3.2\text{m}$ and axles = 2	
	3	2	Three Axle Truck or Bus	TB3	4	axles = 3 and groups = 2	
	> 3	2	Four Axle Truck	T4	5	axles > 3 and groups = 2	
Long 11.5m to 19.0m	3	3	Three Axle Articulated Three axle articulated vehicle or Rigid vehicle and trailer	ART3	6	$d(1) > 3.2\text{m}$, axles = 3 and groups = 3	
	4	> 2	Four Axle Articulated Four axle articulated vehicle or Rigid vehicle and trailer	ART4	7	$d(2) < 2.1\text{m}$ or $d(1) < 2.1\text{m}$ or $d(1) > 3.2\text{m}$ axles = 4 and groups > 2	
	5	> 2	Five Axle Articulated Five axle articulated vehicle or Rigid vehicle and trailer	ART5	8	$d(2) < 2.1\text{m}$ or $d(1) < 2.1\text{m}$ or $d(1) > 3.2\text{m}$ axles = 5 and groups > 2	
	≥ 6	> 2	Six Axle Articulated Six (or more) axle articulated vehicle or Rigid vehicle and trailer	ART6	9	axles = 6 and groups > 2 or axles > 6 and groups = 3	
Medium Combination 17.5m to 36.5m	> 6	4	B Double B Double or Heavy truck and trailer	BD	10	groups = 4 and axles > 6	
	> 6	5 or 6	Double Road Train Double road train or Heavy truck and two trailers	DRT	11	groups = 5 or 6 and axles > 6	
Long Combination Over 33.0m	> 6	> 6	Triple Road Train Triple road train or Heavy truck with three trailers	TRT	12	groups > 6 and axles > 6	
Ungrouped Classes							
			Unclassifiable Vehicle		13		
			Unclassifiable Axle Event		0		

Group: Axle group, where adjacent axles are less than 2.1m apart

Groups: Number of axle groups

Axles: Number of axles (maximum axle spacing of 10.0m)

d(1): Distance between first and second axle

d(2): Distance between second and third axle

HW7 Mitchell Highway – 12km north of MR404, north Bourke Weekly Vehicle Counts (Virtual Week)

Datasets:

Site: [96.182] hw7 mitchell hwy 12km north of mr404 both direction
Direction: 7 - North bound A>B, South bound B>A. Lane: 0
Survey Duration: 8:45 Tuesday, 12 July 2011 => 7:41 Thursday, 4 August 2011
Algorithm: Factory default
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 8:45 Tuesday, 12 July 2011 => 7:41 Thursday, 4 August 2011
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Speed range: 10 - 200 km/h.
Direction: North, South (bound)
Separation: All - (Headway)
Scheme: Vehicle classification (AustRoads94)
Units: Metric (meter, kilometer, m/s, km/h, kg, tonne)
In profile: Vehicles = 6749 / 6761 (99.82%)

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Averages 1 - 5	1 - 7
Hour									
0000-0100	1.0	1.7	1.0	2.5	0.3	1.7	3.0	1.4	1.6
0100-0200	1.0	1.3	0.8	1.0	1.7	1.0	1.7	1.1	1.2
0200-0300	1.7	0.3	0.8	0.8	1.3	0.7	1.7	0.9	1.0
0300-0400	0.0	1.7	0.5	1.0	0.0	1.7	1.0	0.6	0.8
0400-0500	0.7	1.3	1.8	1.3	1.7	1.0	0.7	1.4	1.2
0500-0600	4.3	1.3	3.3	1.0	1.7	2.3	1.0	2.3	2.1
0600-0700	4.0	4.3	3.8	5.5	4.7	1.7	3.3	4.5	4.0
0700-0800	10.3	10.3	11.5	8.3	11.0	12.3	9.3	10.2	10.4
0800-0900	17.3	18.3	22.8	21.7	31.3<	24.3	22.3	22.1	22.4
0900-1000	37.3<	29.8<	30.3<	34.3<	31.0	25.0	30.0	32.2<	31.0<
1000-1100	27.7	28.0	27.0	27.3	30.0	30.0<	25.3	27.9	27.9
1100-1200	25.0	24.5	22.0	24.3	28.3	26.7	37.0<	24.6	26.5
1200-1300	26.0	23.0	23.8	28.3<	27.3	25.0	33.3<	25.4<	26.4<
1300-1400	27.0<	24.5<	24.0	23.0	28.0	25.7	24.3	25.2	25.1
1400-1500	18.0	23.8	23.8	24.0	24.3	24.7	21.3	22.9	22.9
1500-1600	17.0	23.3	24.0<	25.0	28.7<	27.0<	22.7	23.6	23.9
1600-1700	19.7	18.8	17.3	24.7	17.7	21.0	15.3	19.4	19.1
1700-1800	9.0	15.0	11.0	17.3	14.0	14.3	11.0	13.2	13.1
1800-1900	8.3	7.5	10.3	7.3	13.3	11.7	8.7	9.3	9.5
1900-2000	3.7	6.0	7.5	6.7	7.0	5.3	8.7	6.2	6.4
2000-2100	6.3	5.8	5.0	5.3	6.3	9.3	4.7	5.7	6.0
2100-2200	4.3	3.0	5.0	6.0	5.0	6.0	3.0	4.6	4.6
2200-2300	2.0	2.3	3.5	5.0	4.0	4.7	2.3	3.3	3.3
2300-2400	2.0	2.3	2.8	2.7	2.3	3.0	5.7	2.4	2.9
Totals									
0700-1900	242.7	246.6	247.5	265.6	285.0	267.7	260.7	256.1	258.2
0600-2200	261.0	265.7	268.8	289.1	308.0	290.0	280.3	277.1	279.2
0600-0000	265.0	270.2	275.0	296.8	314.3	297.7	288.3	282.8	285.5
0000-0000	273.7	277.8	283.0	304.3	321.0	306.0	297.3	290.5	293.4
AM Peak	0900	0900	0900	0900	0800	1000	1100		
	37.3	29.8	30.3	34.3	31.3	30.0	37.0		
PM Peak	1300	1300	1500	1200	1500	1500	1200		
	27.0	24.5	24.0	28.3	28.7	27.0	33.3		

	class 1	2	3	4	5	6	7	8	9	10	11	12	
mon	122	98	26	1	2	3	8	0	14	10	22	2	
tues	123	99	26	4	0	1	1	2	12	4	24	2	
wed	111	65	13	3	0	2	2	3	14	9	23	8	
thur	126	67	25	0	0	3	5	0	19	13	28	3	
fri	147	91	18	4	0	4	2	1	14	9	21	4	
sat	110	91	19	6	0	3	6	1	11	11	27	13	
sun	118	89	17	2	0	3	5	3	10	10	28	6	
													total
entire week	122	86	21	3	0	3	4	1	13	9	25	5	293
	41.8%	29.2%	7.0%	1.0%	0.1%	0.9%	1.4%	0.5%	4.6%	3.2%	8.4%	1.9%	100.0%
weekdays	126	84	22	2	0	3	4	1	15	9	24	4	293
	43.0%	28.7%	7.4%	0.8%	0.1%	0.9%	1.2%	0.4%	5.0%	3.1%	8.1%	1.3%	100.0%
weekend	114	90	18	4	0	3	6	2	11	11	28	10	295
	38.7%	30.6%	6.1%	1.4%	0.0%	1.0%	1.9%	0.7%	3.6%	3.6%	9.3%	3.2%	100.0%

ADT factor	1	1	1.1	1.6	2	1.6	2.1	2.6	2.3	3.3	4	5.7	
entire week													
ADT	122	86	23	5	1	4	9	4	31	31	99	31	444

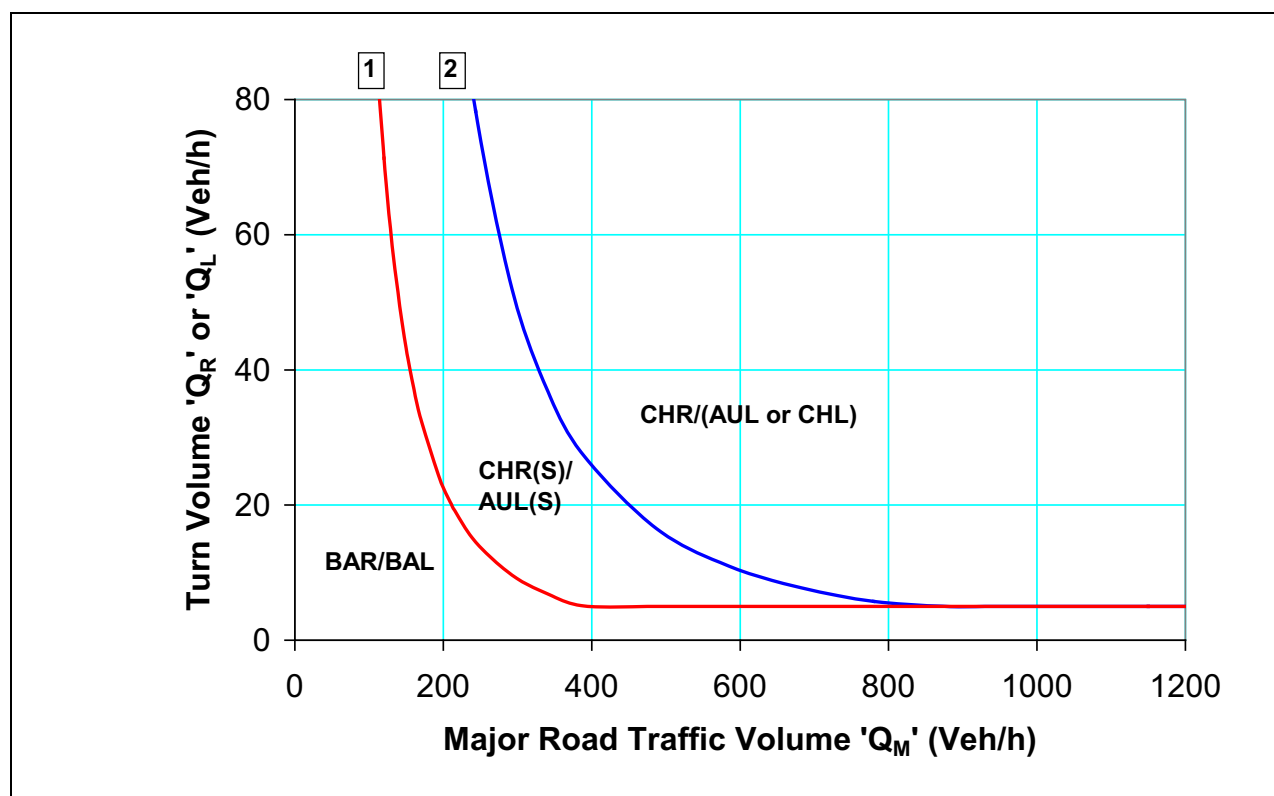
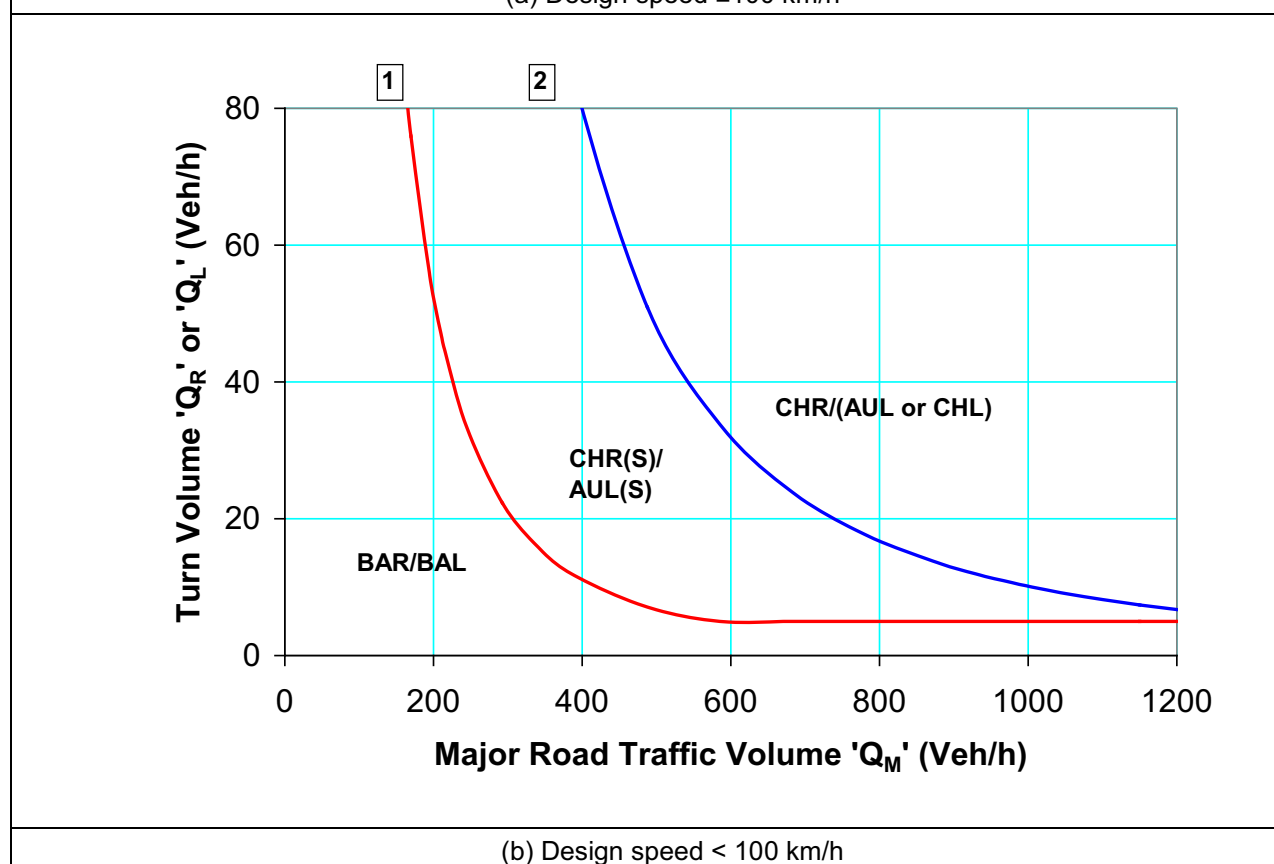
% light / heavy - based on vehicles, not ADTs

% light 71.0%

% heavy 29.0%

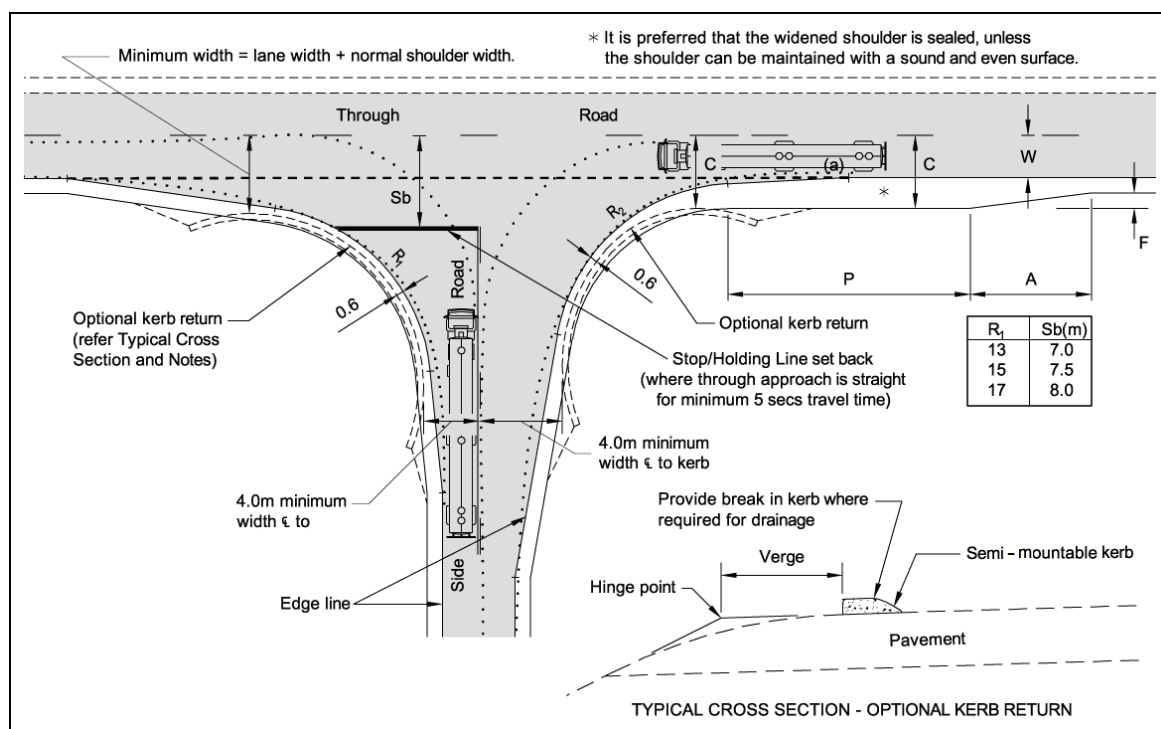
Appendix C

Design standards for intersection turning lanes


 (a) Design speed ≥ 100 km/h

 (b) Design speed < 100 km/h

Source: Arndt and Troutbeck (2006).

Figure 4.9: Warrants for turn treatments on the major road at unsignalised intersections



Notes:

1. R₁ and R₂ are determined by the swept path of the design vehicle.
2. The dimensions of the treatment are defined thus:
 - W = Nominal through lane width (m) (including widening for curves).
 - C = On straights – 6.0 m minimum.
On curves – 6.0 m plus curve widening (based on widening for the design turning vehicle plus widening for the design through vehicle).
 - A =
$$\frac{0.5VF}{3.6}$$
 - V = Design speed of major road approach (km/h).
 - F = Formation/carriageway widening (m).
 - P = Minimum length of parallel widened shoulder (Table 8.1).

Source: QDMR (2006).

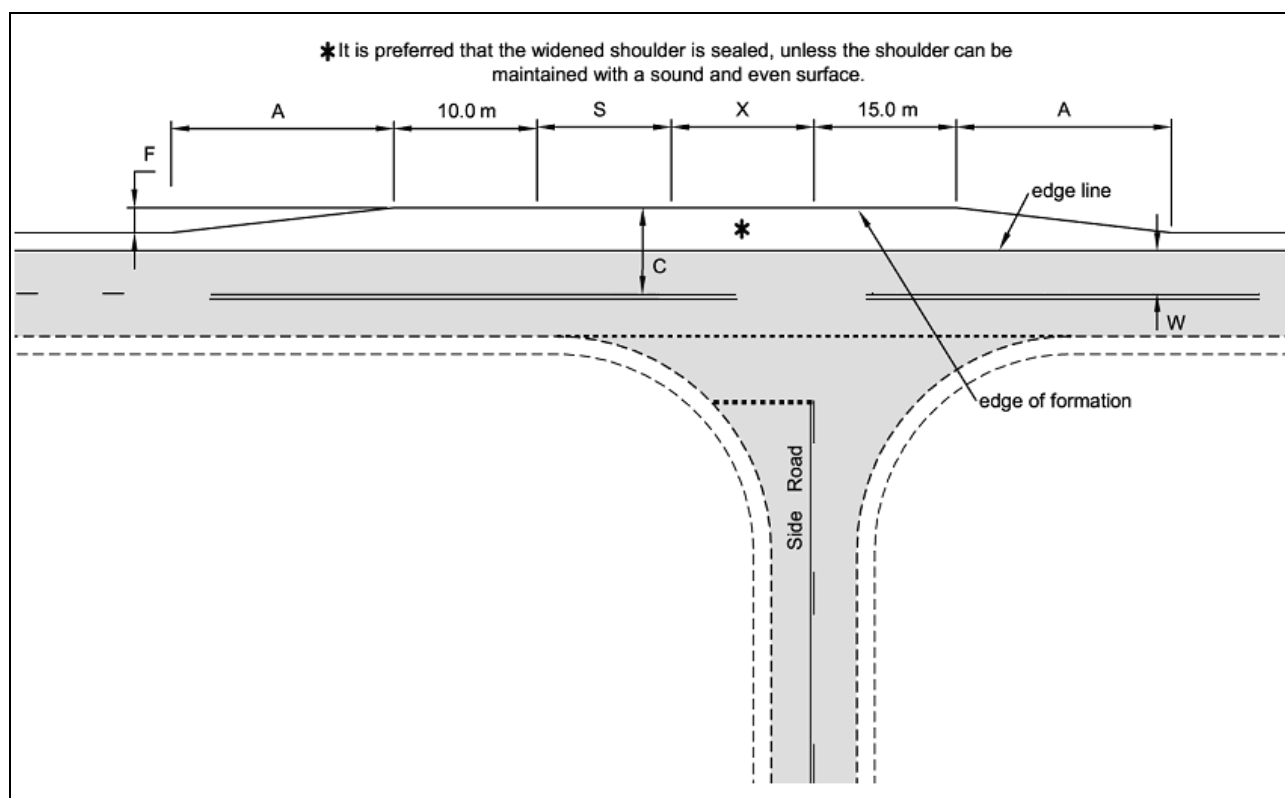
Figure 8.2: Rural basic left-turn treatment (BAL)

Table 8.1: Minimum length of widened parallel shoulder

Design speed of major road approach (km/h)	Minimum length of parallel widened shoulder P (m)
50	0
60	5
70	10
80	15
90	20
100	25
110	35
120	45

Note: Adjust the length for grade using the 'correction to grade' factor in Table 5.3

Source: QDMR (2006).



Notes:

1. This treatment applies to the right turn from a major road to a minor road.

2. The dimensions of the treatment are defined thus:

W = Nominal through lane width (m) (including widening for curves). Width to be continuous through the intersection.

C = On straights – 6.5 m minimum

7.0 m minimum for Type 1 & Type 2 road trains

On curves – widths as above + curve widening (based on widening for the design turning vehicle plus widening for the design through vehicle).

$$A = \frac{0.5VF}{3.6}$$

Increase length A on tighter curves (e.g. those with a side friction demand greater than the maximum desirable). Where the design through vehicle is larger than or equal to a 19 m semi-trailer the minimum speed used to calculate A is 80 km/h.

V = Design speed of major road approach (km/h).

F = Formation/carriageway widening (m).

S = Storage length to cater for one design turning vehicle (m) (minimum length 12.5 m).

X = Distance based on design vehicle turning path, typically 10–15 m.

Source: QDMR (2006).

Figure 7.5: Basic right (BAR) turn treatment on a two-lane rural road

7.5.2 Rural Channelised T-junction – Short Lane Type CHR(S)

The CHR(S) turn treatment shown in Figure 7.6 is a more desirable treatment than the BAR treatment because it provides greater protection for vehicles waiting to turn right from the centre of the road. This treatment is suitable where there are low to moderate through and turning volumes. For higher volume sites, a full-length CHR turn treatment (Figure 7.7) is preferred.



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