Proposed Waste Facility

Traffic Impact Assessment

Torrens Road, Gunnedah, NSW

for

Outline Planning Consultants P/L

On Behalf of Mackellar Equipment Hire P/L

September 2020

Traffic Impact Assessment Details

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APPENDICES

1. INTRODUCTION

1.1 General

StreetWise Road Safety and Traffic Services have been engaged by Outline Planning Consultants Pty Ltd, on behalf of Mackellar Equipment Hire Pty Ltd, to prepare a Traffic Impact Assessment report for a proposed Waste Facility at Torrens Road, Gunnedah. The raw waste material will be transported to Mackellar Equipment Hire's existing Torrens Road depot to be weighed, sorted and processed at the proposed facility. Any recoverable materials will be separated and stored onsite for re-use, while the remaining waste will be processed and transported for use as clean fill or other purposes.

1.2 Description of Project

The proponent, Mackellar Equipment Hire, seeks development consent for the establishment of a waste facility (the Project) on land comprising part Lots 1 and 2 in Deposited Plan 1226992 on industrial zoned land at No.16 Torrens Road Gunnedah, in the Gunnedah LGA (the Project Site).

The site is currently utilised as an office & depot for Mackellar Equipment Hire, MacKellar Excavations (MEX) & Gunnedah Quarry Products (GQP). The MacKellar Group is a local company involved in civil construction for mining, rail and road infrastructure, as well as quarrying and equipment hire. The company operates a blue metal quarry, and produces construction aggregates including railway ballast, road base and gabion rock. Mackellar has been involved in a wide range of related projects including works for local coal mines, remediation works for ARTC at various locations, supplier of trucks for carting of spoil for the M5 WestConnex project, as well as the rehabilitation of redundant effluent tanks (for Gunnedah Leather Processors).

It is planned to construct a Waste Facility (WF) which will complement the activities of the above businesses, given that MacKellar already has crushing and processing equipment, including screens, as well as other mobile plant and equipment capable of being used in a waste facility.

2. SITE LOCATION

The Project Site comprises Lots 1 and 2 DP 1226992 at No.16 Torrens Road, Gunnedah, having a combined area of approximately 2.7ha. The site is zoned IN1 General Industrial. Access to the Project Site is directly from Torrens Road, with side access to an industrial subdivision road, Allgayer Drive. Torrens Road then connects with the Gunnedah CBD via Quia Road and thence to Kamilaroi Highway. All roads are bitumen sealed. The site is flat and well suited to use for industrial purposes. The site is cleared and partly developed for industrial purposes.

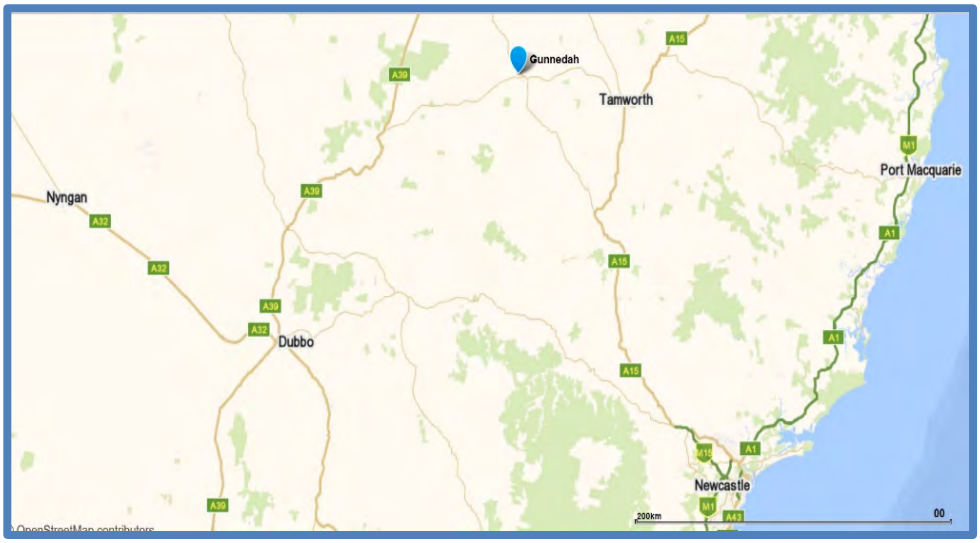


Figure 1 – Locality Plan

3. SEARS REQUIREMENTS

The proposed development sort Environmental Assessment Requirements (EARs) for the proposed Resource Recovery and Waste Transfer Facility at 16 Torrens Road, Gunnedah, NSW. Based on the information provided, the Environment Protection Authority (EPA) expects the proposed activity to be a Scheduled Activity and will require an Environment Protection Licence (EPL). The following traffic related SEARS requirements have been addressed in this report, including comments by Transport for New South Wales (previously RMS). The table indicates the section of this report which addresses the SEARs requirements.

EPA (Reg 2000) requirements	Section	Page No.
Details of all traffic types and volumes likely to be generated during construction and operation, including a description of haul routes.	11	23
An assessment of the predicted impacts of this traffic on road safety and the capacity of the road network, including consideration of cumulative traffic impacts at key intersections using SIDRA or similar traffic model.	13	31
Detailed plans of the proposed layout of the internal road network, pedestrian network and parking on site in accordance with the relevant Australian Standards.	Appendix A	37
Plans of any proposed road upgrades, infrastructure works or new roads required for the development.	NA	
Plans demonstrating how all vehicles associated with construction and operation awaiting loading, unloading or servicing can be accommodated on the site to avoid queuing in the street network.	Appendix A	37
Details of the largest vehicle anticipated to access and move within the site, including swept path analysis	Appendix A	37
Swept path diagrams depicting vehicles entering, exiting and manoeuvring throughout the site.	Fig 11.5	30
RMS requirements	**Section**	**Page No.**
A map of the road network surrounding the site, identifying the site access arrangements, nearby accesses, intersections and any transport related facilities.	Fig 3.1	8
A map of the proposed haulage route/s identifying all public roads proposed to obtain access from the classified (State) road/s to the development site.	6.4	14
Total impact of existing and proposed development on the road network with consideration for a 10-year horizon.	Existing 8.2 Future 11	19 21
Identify Annual Average Daily Traffic (AADT) volumes with percentage heavy vehicles along the haulage route/s and	Sect. 6	12

diagrammatically demonstrate AM and PM peak hour movements at key intersections.		
Background traffic data from published sources and/or recent survey data. The source of data and any assumptions are to be clearly explained and justified, including the growth rate applied to the future horizon.	Fig 6.1	12
The volume and distribution of existing and proposed trips to be generated by the construction and operational phases of the development at key intersections and the accesses. This should identify the maximum daily and hourly demands generated by the development, particularly where they coincide with the network peak hour.	Sect 11	21
The type and frequency of design vehicles accessing the development site.	Sect 11	21
Details of the road geometry and alignment along the identified haulage route/s, including existing formations, crossings, intersection treatments and any identified hazards.	Sect 4	7
Available sight distances at intersections along the proposed haulage routes, including intersections and accesses, and any constraint to achieving the required sight distance for the posted speed limit.	Sect 8	15
An assessment of turn treatment warrants in accordance with the Austroads Guide to Traffic Management Part 6 and Austroads Guide to Road Design Part 4A for the identified intersections and accesses to identify the existence or need for the minimum basic turn treatments and addressing the need for any warranted higher order treatments.	Sect 8	15
Swept path analysis demonstrating the largest design vehicle entering, manoeuvring and leaving the development, and moving in each direction through intersections along the proposed haulage route/s.	Sect 8	15
Capacity analysis (using SIDRA or other relevant application), to identify an acceptable Level of Service (LOS) at intersections with the classified (State) road/s, and where relevant, analysis of any other intersections along the proposed transport route/s.	Sect 8	15
A review of crash data along the identified transport route/s for the most recent 5-year reporting period and an assessment of road safety along the proposed transport route/s considering the safe systems principles adopted under Future Transport 2056.	4.4	11
Strategic (2D) design drawings of all proposed road works and the site access demonstrating scope, estimated cost and constructability of works required to mitigate the impacts of the development on road safety, traffic efficiency and the integrity of transport infrastructure.	NA	
A site plan demonstrating site access, internal manoeuvring, servicing and parking areas consistent with the relevant parts of AS2890 and Council requirements. The site plan should accommodate the swept paths of relevant design vehicles servicing the existing and proposed operation of the site.	11.9	27
Details of measures to address impact on public transport services and active transport modes, such as, public and school bus services, walking and cycling.	13	29
Details of any measures proposed to ameliorate the impacts of road traffic noise and dust generated along the proposed haulage route/s.	NA	

Details of any Traffic Management Plan (TMP) proposed to address the construction and operation of the proposed development. The TMP may include temporary measures such a Traffic Control Plan (TCP) prepared and implemented by suitably qualified persons in accordance with the current Traffic Control at Work Sites Manual.	NA	
Preparation, review and/or update of Driver Code of Conduct	14	34
Where road safety concerns are identified at a specific location along the proposed haulage routes, TfNSW suggests that the TIA be supported by a targeted Road Safety Audit undertaken by suitably qualified persons in accordance with the Austroads Guidelines'.	13.3	32

The full letter from TfNSW (dated 20 July 2020) is attached in Appendix B

4. EXISTING ROAD NETWORK

4.1 Local Road Network

The proposed development site is located approximately 3kms west of the Gunnedah CBD. The site is located within a relatively new industrial precinct, adjacent to the railway line. The site is accessed from Torrens Road, which intersects with Quia Road, which connects the industrial area with the Kamilaroi Highway to the north, and the Oxley Highway to the south.

Figure 4.1: Local road network

The following roads make up the road network around the existing Mackellar depot, and site of the proposed Waste Facility, in Torrens Road, Gunnedah.

4.1.1 Oxley Highway

The Oxley Highway is 653kms long and passes through Gunnedah, Tamworth, Walcha and Wauchope. The highway is designated Classified Route B56, and in the vicinity of the proposed development site, is approximately 7m wide, with 3.5m wide lanes in either direction, and a variable width shoulder and grassed tabledrain on both sides. The posted speedzone of the Oxley Highway, in the vicinity of the proposed development, is 80kmh. Further west, the speedzone increases to 100kmh. It should be noted that the proposed Waste Facility does not have direct access to the Oxley Highway, and is accessed via Ross Road and Farrar Road.

Figure 4.2: Oxley Highway, looking east at speedzone change

4.1.2 Kamilaroi Highway

The Kamilaroi Highway is a 605-kilometre state highway located in the north-western region of New South Wales, Australia. The highway connects the Mitchell Highway at Bourke with the New England Highway in the south at Willow Tree.

In the vicinity of the Gunnedah Industrial area, the Kamilaroi Highway is approximately 9m wide, with a single (3.5m) lane in either direction and sealed shoulders.

Figure 4.3: Kamilaroi Highway, looking east towards the Gunnedah township

4.1.3 Torrens Road

Torrens Road is an industrial standard rural road which provides access to a new industrial precinct approximately 3 kms west of Gunnedah. Between the proposed development site and Quia Road, Torrens Road is 7m wide (2 x 3.5m) with variable width shoulders.

Figure 4.4: Torrens Road, looking east towards Quia Road from the MEX depot.

4.1.4 Ross Road

Ross Road is located west of the Gunnedah township and runs adjacent to the railway line. Ross Road is a 3km long rural road which connects Quia Road with the Oxley Highway. The roadway is generally 8m wide, with unsealed shoulders at the western end. At the eastern end, Ross Road passes through an older industrial area, where the road widens and kerb & gutter is provided.

It is expected that waste transported from locations south and east of Gunnedah will utilise the Oxley Highway, then turn off onto Ross Road, then Quia Road and Torrens Road to access the MEX depot site in the Allgayer Drive industrial precinct.

Ross Road connects with the Oxley Highway and provides access to an existing industrial precinct, it is assumed that the roadway is suitable to cater for heavy vehicles. However, it is not proposed to utilise the Ross Road route to haul waste to and from the future Waste Facility.

4.1.5 Allgayer Drive

Allgayer Drive is an industrial standard road which provides access through the northern end of the new industrial precinct approximately 3 kms west of Gunnedah. Allgayer Drive is 13m wide (2 x 3.5m) with kerb & gutter both sides.

Figure 4.5: Looking east at Allgayer Drive from the MEX depot.

4.2 Quia Road

Quia Road is a sealed rural road which connects Goolhi Road to the Gunnedah township, via the intersection with Blackjack Road roundabout. The length is approximately 16.2km. The road has a 6-

7m wide bitumen seal on an 8-9m wide gravel formation. The speed limit is generally 100kph, reducing to 80kph near the Gunnedah town limits.

The road is generally flat, with large radius bends and minimal grades. Pavement and surface condition is generally good.

Figure 4.6: Quia Rd – just east of Goolhi Rd intersection

Quia Road is generally 2 lanes in either direction with sealed or gravelled shoulders. The lane widths are generally 3 - 3.5m wide. The road surface is sealed and is generally in good condition. The roadway has previously been approved as a haul road for local quarries to allow laden semi-trailers and truck & dogs to deliver to sites south & east of Gunnedah via the Oxley Highway.

Council records (2018) indicate average daily volumes on Quia Road are less than 300 vehicles per day. This equates to approximately 30 in a peak hour or (say) 20 in a single direction.

While the posted speed limit on Quai Road is generally 100kmh, many of the curves are signposted with advisory speeds. Signage is also provided to warn drivers of upcoming intersections, road alignment and occasional floodways. Guardfence has also been provided at a number of water courses.

4.3 Black Jack Road

Black Jack Road is located approximately 4 kms west of Gunnedah, and links Quia Road with the Oxley Highway. The section of Blackjack Road involved with the haul road is approximately 2kms long. The road is sealed, with 2 lanes in either direction with sealed or gravelled shoulders. The road varies in width but is generally 6.5 – 7m wide. The intersection with Quia Road is a relatively new roundabout, while the intersection with the Oxley Highway includes widening and auxiliary turn lanes.

Figure 4.7: Black Jack Rd – looking south from Quia Rd intersection

Black Jack Road is generally 2 lanes in either direction with sealed or gravelled shoulders. The lane widths are generally 3 - 3.5m wide. The road surface is sealed and is generally in good condition. The roadway has previously been approved as a haul road for local quarries to allow laden semi-trailers and truck & dogs to deliver to sites South & east of Gunnedah via the Oxley Highway. The posted speed limit on Black Jack Road is generally 100kmh. Black Jack Road is also an authorised B-double route.

StreetWise do not have any traffic volumes for Black Jack Road. However, it is assumed the daily volumes would be less than the adjacent Oxley Highway and similar to Quia Road. For the purposes of this report, daily volumes on Black Jack Road are assumed to be around 300 vehicles per day, or 30 during peak hours (approx. 20 vph in a single direction).

4.4 Crash Data

The RMS website indicates 20 crashes have been recorded in the area west of Gunnedah, that is likely to be utilised by vehicles hauling waste material to and from the proposed WMF at Torrens Road. The RMS data includes the following information:

- 1 fatal crash, 6 serious crashes & 13 crashes with non/minor injuries
- More than 50% of crashes involved loss of control/running off road
- 4 crashes involved collisions with animals
- Only 4 crashes involved collisions with other vehicles
- 5 crashes occurred on the Kamilaroi Hwy & 10 on the Oxley Hwy

The crashes appear to be widespread across the subject area, with no particular location recording multiple incidents.

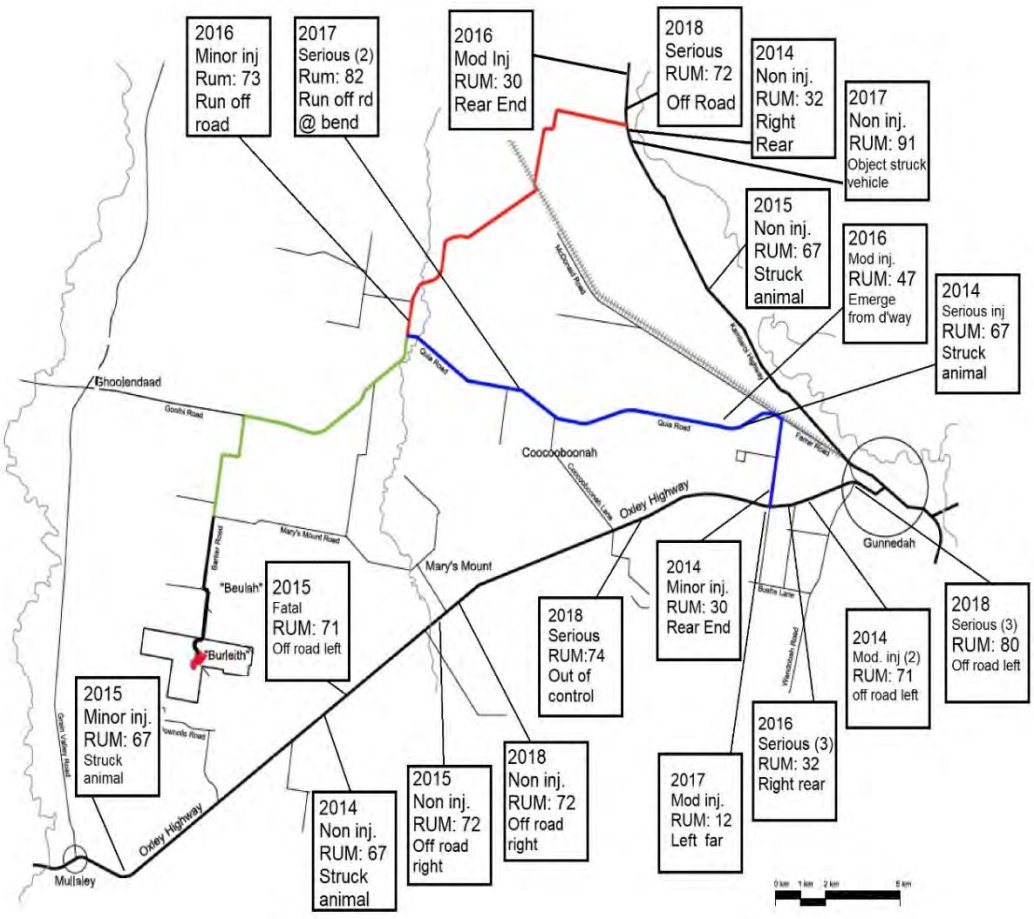


Figure 4.8: Location and description of crashes west of Gunnedah 2014 - 2019

5. EXISTING TRAFFIC GENERATION

The applicant currently operates a depot on the subject site which supports MacKellar Equipment Hire, MacKellar Excavations (MEX) & Gunnedah Quarry Products (GQP). The company is privately owned and involved in earthmoving & quarrying activities. The existing depot includes 7 staff, and a fleet of 8 truck & dog trailers and semi-trailers, which leave the site in the morning and return in the afternoon. On a normal day, the following movements can be expected:

Office staff commute	7 trips between 7am - 9am
	7 trips between 3pm - 5pm
Truck driver commute	8 trips between 6am - 7am
	8 trips between 3pm - 6pm
Truck & dog out	8 trips around 7am
Truck & dog in	8 trips around 5pm
Staff movements (lunch, errands etc)	say 2 per hour between 9am – 3pm (2 in & 2 out)
Deliveries	say 4 per day (4 in & 4 out)

Therefore, the following movements generated by the existing MacKellar activities can be expected during the morning and afternoon peak hours:

	AM Peak 7:45 - 8:45pm		PM Peak 2:45 - 3:45pm	
Type of movement	*In*	*Out*	*In*	*Out*
Office staff commute	4	1	1	3
Truck driver commute	0	0	0	2
Truck & dog trip	0	2	2	0
Other staff trips	1	1	1	1
Deliveries	1	1	1	1
Total	***6***	***5***	***5***	***7***

Figure 4.1: Existing peak hour movements in & out of MEX depot (Torrens Rd)

6. TRAFFIC VOLUMES

6.1 Existing Traffic Volumes

6.1.1 Oxley Highway

StreetWise obtained historical traffic data for various sites on the Oxley Highway and Kamilaroi Highway, from the RMS website. Based on this data, the expected annual growth on the Oxley Highway is around 1% p.a.

Site No	Road	Location	1998	2004	2007	2009	2011	2015	2017	2018
92302	Oxley Hwy	520m E of Wyuna St				604				
92055	Oxley Hwy	590m W of Black Stump Way					620			
92646	Oxley Hwy	Overhead Railway Bridge	7267	5069	5931		6250			
6167	Oxley Hwy	1.5km E of Wilkinson St						3365	3606	3683
92294	Kamilaroi	North of Emerald Hill Road	2244	1966	1595					
92046	Oxley Hwy	Carroll			2520					
92052	Oxley Hwy	20km W of Gunnedah					1052			

Figure 6.1: Average Daily Traffic Volumes from RMS Counters website

6.1.2 Council Tube Counters

The following data was supplied by Gunnedah Shire Council, following a check of haul roads in the Gunnedah area. A summary of the data is shown in Table 3.1 below:

Road	*Location*	*Yr*	*AADT*	*Pk Hr*	*85% speed*	*% HV*
Quia	East of Goolhi Rd	2018	266	38	92	14
Goolhi	South of Quia Rd	17/18	252	64	99	21
Barker	Sth of Marys Mount Rd	17/18	85	39	86	72

Figure 6.2: Average Daily Traffic Volumes on existing haul route

As can be seen from the above results, the traffic volumes on the rural roads around the township of Gunnedah are relatively low.

7. ROAD CAPACITY

7.1 Road Capacities

AustRoads guidelines (see below) indicate that a single lane can cater for up to 900 vehicles per hour, while still maintaining an efficient flow of traffic. Given the volumes on the existing approved haul roads are relatively low (less than 250 vehicles a day in one direction), the Austroads table indicates the surrounding roads have adequate capacity to cater for existing volumes and any future increases due to additional traffic generated by the Waste Facility.

Type of lane	One-way mid-block capacity (pc/hr)
Median or inner lane	
• Divided road	1000
• Undivided road	900
Middle lane (of a 3-lane carriageway)	
• Divided road	900
• Undivided road	1000
Kerb lane	
• Adjacent to parking lane	900
• Occasional parked vehicles	600
• Clearway conditions	900

Source: Table 5.1 of Austroads Guide to Traffic Management Part 3

Figure 6.1: Austroads Lane Capacity

Additionally, the graph below (from '*Austroads Traffic Management - Part 3 – Traffic Studies & Analysis')* shows the capacity of a single lane based on posted speeds and traffic volumes. Given the speedzones of the Oxley Highway generally vary between 80 – 100kmh, an hourly volume of less than 500 vehicles in any one direction will operate at a Level of Service (LoS) of 'A'

A Level of Service of 'A' is a condition of free flow in which individual drivers are virtually unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and to manoeuvre within the traffic stream is extremely high, and the general level of comfort and convenience provided is excellent.

As can be seen from Figure 6.2 below, the roads to be utilised to haul waste to and from the Torrens Road site all currently operate at a Level of Service of 'A'.

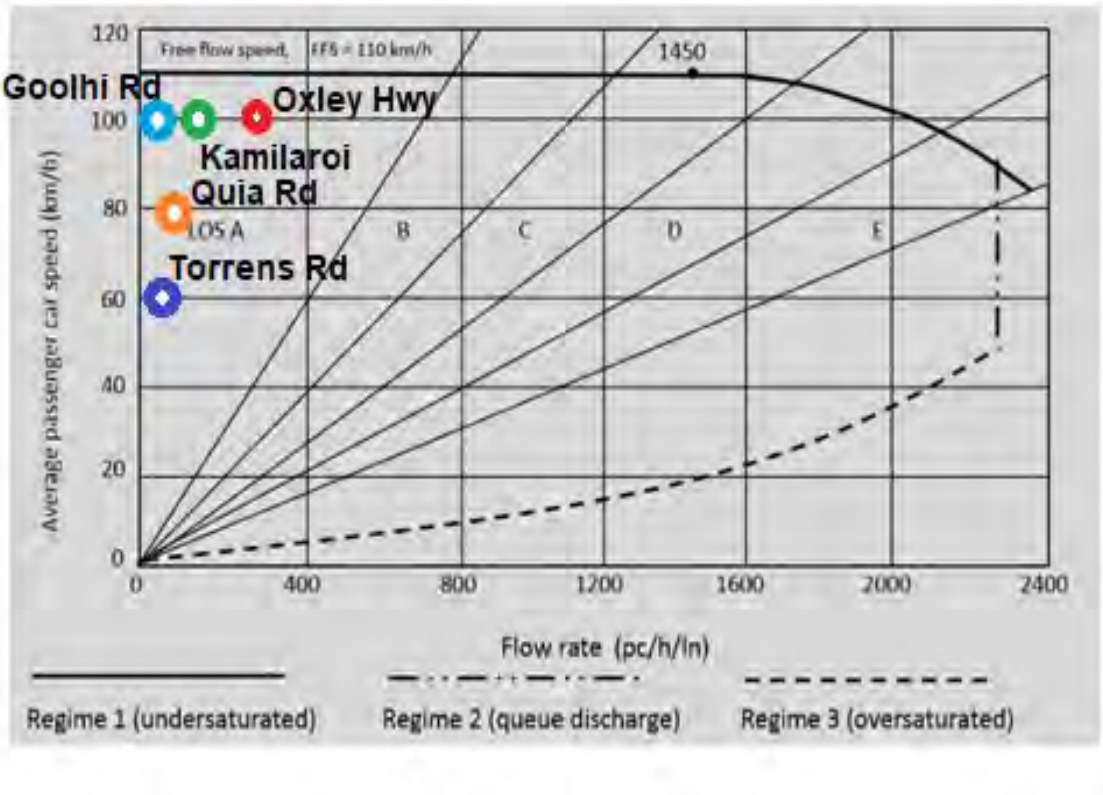


Figure 6.2: Existing Level of Service – Gunnedah Roads (Austroads Service Flow Rates)

		Volumes			Hourly
Road Name	***Speed (kmh)***	*Daily*	*Peak Hr*	*Single Lane*	**capacity***
Oxley Highway	100	4000	400	250	1600
Kamilaroi Hwy	100	2500	250	150	1600
Goolhi Road	100	300	31	20	1600
Quia Road	100	300	30	20	1600
Black Jack Road	100	300	30	20	1600
Torrens Road	60	200	20	15	900

Figure 6.3: Existing Rural Road Volumes vs Austroads Service Flow Rates

- One lane capacity taken from Figure 6.2 above, based on existing speedzone

As can be seen from Figure 6.3 above, there is adequate capacity on each of the local rural roads to easily cater for the current traffic volumes, including heavy vehicle movements. All of the subject roads currently operate at a Level of Service of 'A'.

7.2 Approved B-Double Routes

The local rural roads include a number of B-Double routes approved by the RMS. These routes have been assessed and approved for use by multi-trailer heavy vehicles, and include the Oxley Highway, Kamilaroi Highway, the northern section of Black Jack Road and the eastern section of Quia Road (near the Gunnedah industrial area).

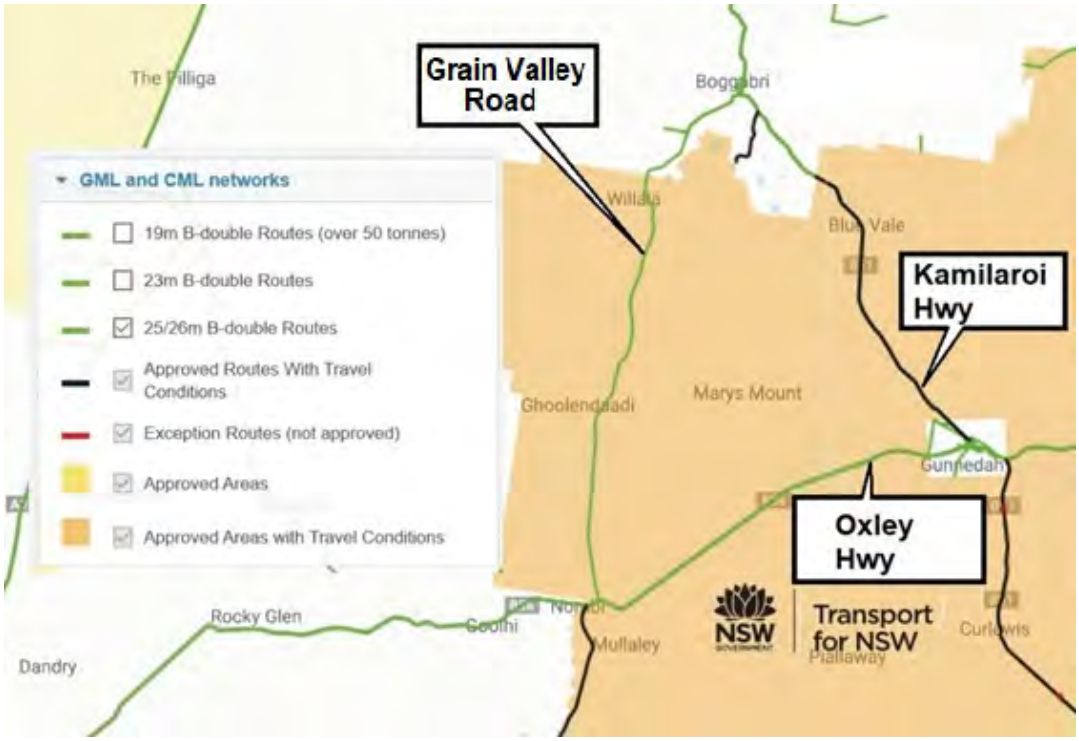


Figure 6.4: B-double Routes – Gunnedah Region

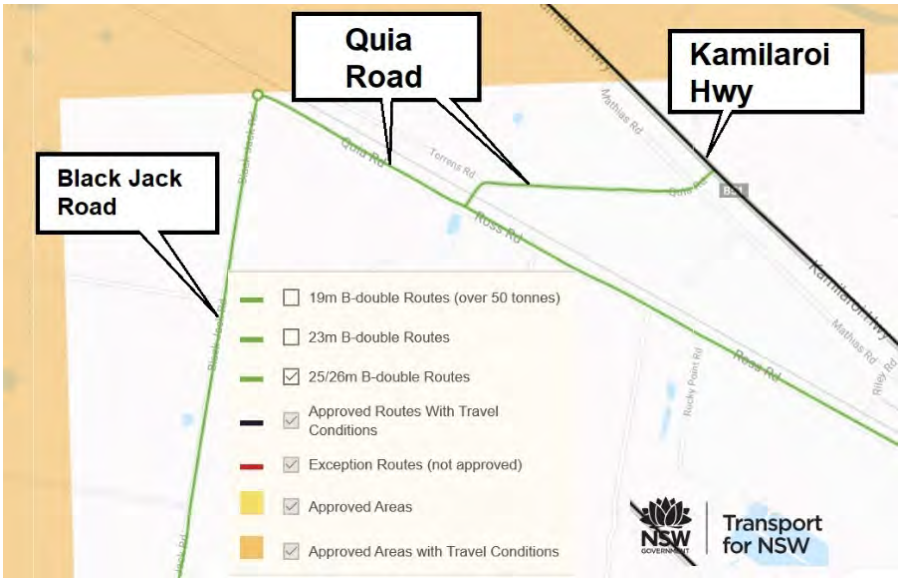


Figure 6.5: B-double Routes – Gunnedah Township

8. INTERSECTION CAPACITY

In most situations roadway capacity is normally controlled by the intersection capacities within the road network. In this case there are a number of existing intersections through the local rural road network, and therefore potentially impacted by the proposal, including:

- Barker Road & Goolhi Road
- Goolhi Road & Quia Road
- Quia Road & Black Jack Road
- Black Jack Road & Oxley Highway
- Goolhi Road & Kamilaroi Highway

These layouts are all suitable for the turn movements of heavy vehicles, with a number of the intersections approved for use by B-Double vehicles.

8.1.1 Intersection of Quia Road & Kamilaroi Hwy

The intersection of Kamilaroi Highway and Quia Road is a channelised T-intersection layout, with a dedicated right turn lane from Kamilaroi Hwy into Quia Road. There is no turn/acceleration to assist vehicles turning right out of Quia Road.

Figure 8.1: Quia Road, looking north towards the intersection with Kamilaroi Hwy

As can be seen from Figure 8.2 below, the existing intersection also includes:

- A 75m dedicated right turn bay to cater for heavy vehicles turning into Quia Road, and to allow through vehicles to pass turning vehicles safely
- Large radii curves to cater for heavy vehicle turn movements
- The intersection is currently controlled by Give Way signs in Quia Road.
- Speedzone on both roads is 80kmh.
- Sight distance in both directions is good.

Figure 8.2: Aerial view of the Kamilaroi Hwy & Quia Road intersection

Assessment of existing intersection:

StreetWise did not undertake a manual traffic count at this intersection. However, a desktop assessment was undertaken utilising traffic volumes provided by Gunnedah Shire Council and RMS, as well as data collected by StreetWise at the intersection of Quia Road and Torrens Road. The RMS website did not indicate any record of crashes at this location in recent years.

Kamilaroi Highway:

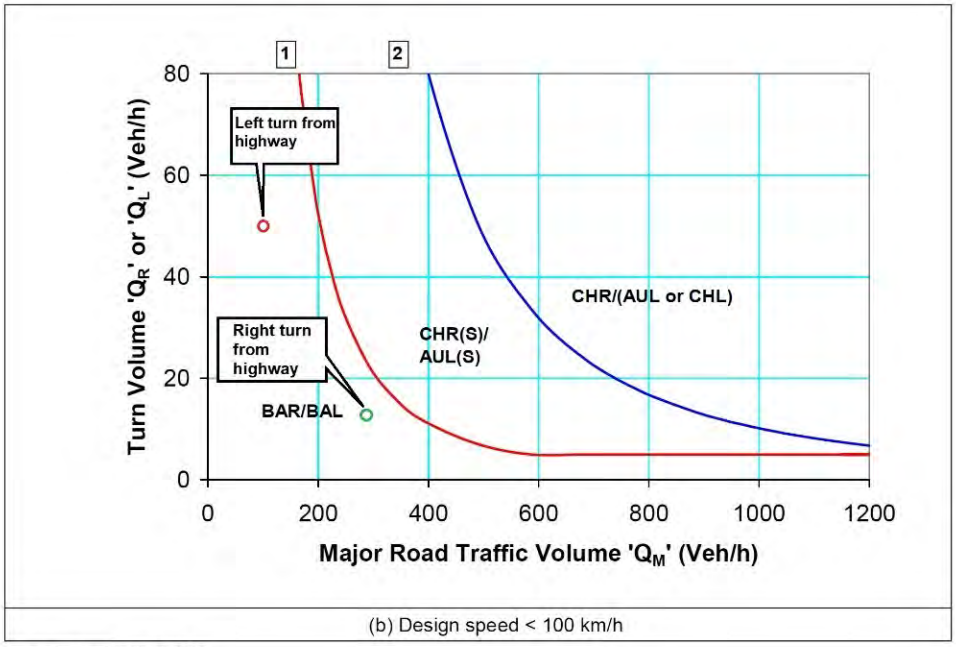
Estimated daily volumes 2500 vehicles per day = 250 peak hour = 150/hr single lane

Quia Road:

Estimated daily volumes 600 vehicles per day = 60 peak hour = 50/hr single lane

It is assumed that the majority of vehicles turning into Quia Road will be heading to and from the Gunnedah CBD, with only a small percentage turning west onto the Kamilaroi Highway (10% adopted).

Based on the assumptions above, the following diagram is an approximation of the current movements through the Kamilaroi Hwy & Quia Road intersection. As can be seen from the Figure 8.3 below, the estimated turn volumes, when plotted on the Austroads Warrant, indicate a BASIC intersection is required. It should be noted that the current intersection has been upgraded to provide a channelised intersection.



Source: Arndt and Troutbeck (2006).

Figure 8.3: AustRoads warrant - Kamilaroi Hwy & Quia Road intersection

8.1.2 Intersection of Quia Road & Ross Road

The existing intersection of Quia Road and Ross Road is a BASIC T-intersection suitable for heavy vehicle movements. The intersection has been widened to provide a left turn into for eastbound vehicles. The kerb returns also have large radii kerb returns suitable for heavy vehicle turn movements. The westbound lane includes a sealed shoulder to allow safe passing of any vehicle queuing to turn right from Ross Road into Quia Road. This intersection is included approved B-double routes, as well as part of approved haul routes for local quarries.

Figure 8.3: Intersection of Quia Road and Ross Road

8.1.3 Intersection of Kamilaroi Highway & Matthias Road

Mattias Road is a short section of rural road that connects the industrial precinct and Allgayer Drive to the Kamilaroi Highway. The intersection includes large radii to cater for heavy vehicle turn movements and shoulder widening on the eastbound side to allow eastbound vehicles to pass any vehicle waiting to turn right.

It is not proposed that any heavy vehicle movements generated by the future waste facility will utilise this intersection.

Figure 8.4: Kamilaroi Hwy, looking west from intersection with Mathias Road

8.1.4 Intersection of Quia Road & Torrens Road

The existing intersection of Quia Road and Torrens Road is a T-intersection that provides entry to the Allgayer Drive industrial precinct. StreetWise conducted an on-site manual traffic count at the intersection of Quia Road and Torrens Road during the afternoon period (Wednesday 4 December 2019) and the following morning (Thursday 5 December). The results of the traffic count are tabulated below, in Figure 8.5 and 8.6

		Quia Road Movements								Torrens Road Turn Movements									
		1			2					3		4		5		6			
Time		Quia Rd - towards Goolhi			Quia Rd - towards Gunnedah			15 min totals	60 min totals	Left into Torrens Rd		Right into Torrens Rd		Left out of Torrens Rd		Right out of Torrens Rd		15 Min Total	60 min Total
		Light	HV	Total	Light	HV	Total	Quia Rd Total		LV	HV	LV	HV	LV	HV	LV	HV		
2:45 PM	3:00 PM	7	3	10	3	5	8	18		1	0	1	0	1	1	0	0	4	
3:00 PM	3:15 PM	7	3	10	2	1	3	13		1	0	0	0	0	0	1	0	2	
3:15 AM	3:30 AM	6	1	7	6	0	6	13		0	0	2	0	0	0	0	0	2	
3:30 AM	3:45 AM	10	2	12	5	3	8	20	64	1	0	1	0	0	0	0	0	2	10	74
3:45 AM	4:00 PM	3	1	4	8	1	9	13	59	0	0	1	0	0	0	1	0	2	8	67
4:00 PM	4:15 PM	5	1	6	7	1	8	14	60	0	0	1	0	0	0	0	0	1	7	67
4:15 PM	4:30 AM	4	2	6	1	0	1	7	54	0	0	2	0	0	0	2	0	4	9	63
4:30 PM	4:45 PM	3	3	6	2	0	2	8	42	0	0	1	0	0	0	1	0	2	9	51
4:45 PM	5:00 PM																		
	Total	31	16	41	34	11	45	106		3	0	9	0	1	1	5	0		

Figure 8.5: Observed PM Traffic Volumes – Wednesday 4-12-19

		Quia Road Movements								Turn Movements									
		1			2					3		4		5		6			
Time		Quia Rd - towards Goolhi			Quia Rd - towards Gunnedah					Left Into Torrens Rd		Right Into Torrens Rd		Left out of Torrens Rd		Right out of Torrens Rd		15 Min Total	
		Light	HV	Total	Light	HV	Total	Quia Rd Total		LV	HV	LV	HV	LV	HV	LV	HV		
2:45 PM	3:00 PM	7	3	10	3	5	8	18		1	0	1	0	1	1	0	0	4	
3:00 PM	3:15 PM	7	3	10	2	1	3	13		1	0	0	0	0	0	1	0	2	
3:15 AM	3:30 AM	6	1	7	6	0	6	13		0	0	2	0	0	0	0	0	2	
3:30 AM	3:45 AM	10	2	12	5	3	8	20	64	1	0	1	0	0	0	0	0	2	10 74
3:45 AM	4:00 PM	3	1	4	8	1	9	13	59	0	0	1	0	0	0	1	0	2	8 67
4:00 PM	4:15 PM	5	1	6	7	1	8	14	60	0	0	1	0	0	0	0	0	1	7 67
4:15 PM	4:30 AM	4	2	6	1	0	1	7	54	0	0	2	0	0	0	2	0	4	9 63
4:30 PM	4:45 PM	3	3	6	2	0	2	8	42	0	0	1	0	0	0	1	0	2	9 51
4:45 PM	5:00 PM																		
	Total	31	16	41	34	11	45	106		3	0	9	0	1	1	5	0		

Figure 8.6: Observed AM Traffic Volumes – Thursday 5-12-19

The StreetWise traffic count results indicate a peak hour of 74 vehicles in PM peak periods, and 81 in the morning peak. These numbers are relatively low and the results also indicate:

- AM peak hour is between 7:45 – 8:45am
- PM peak hour is between 2:45 – 3:45pm
- over 32% of total movements counted were heavy vehicles
- approx. 26% of movements through the intersection turned in or out of Torrens Road

It should be noted that the subject industrial area west of Gunnedah is relatively new, with only a small number of lots occupied. It is assumed the intersection of Torrens Road and Quia Road was designed to cater for the traffic to be generated by the ultimate industrial development. Similarly, it is assumed the road accessing the industrial development were constructed to a standard suitable for the completed and fully occupied development.

8.2 Intersection – Peak hour volumes

The results of the existing AM and PM peak hour traffic counts are listed below.

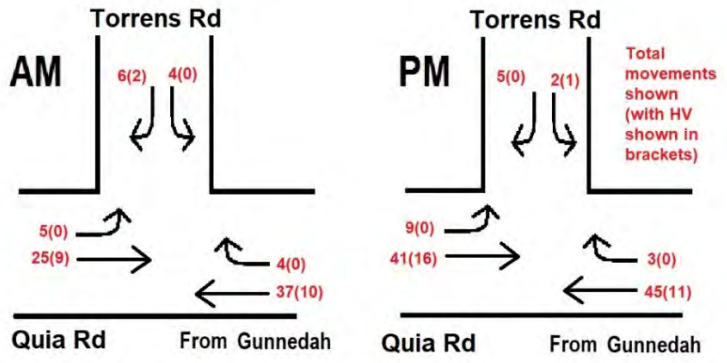


Figure 8.7: Existing AM and PM peak hour volumes at Quia Rd & Torrens Rd intersection

The RMS AustRoads Guidelines ('Traffic Management: Part 6 – Interchanges, Intersections and Crossovers') includes warrants to determine intersections types. Figure 7.7 below shows the AustRoads warrant for T-intersections in low speedzones, such as the Gunnedah industrial precinct. The warrant also includes the current traffic volumes and turn movements into Torrens Road from Quia Road (from Figure 7.6 above).

As can be seen from the warrant below, the existing BAR/BAL intersection layout is suitable for the current traffic volumes, which are relatively low. There is adequate capacity within the existing layout to cater for the future traffic generated by the full development of the Torrens Road industrial precinct, including the proposed Waste Facility at the Mackellar depot.

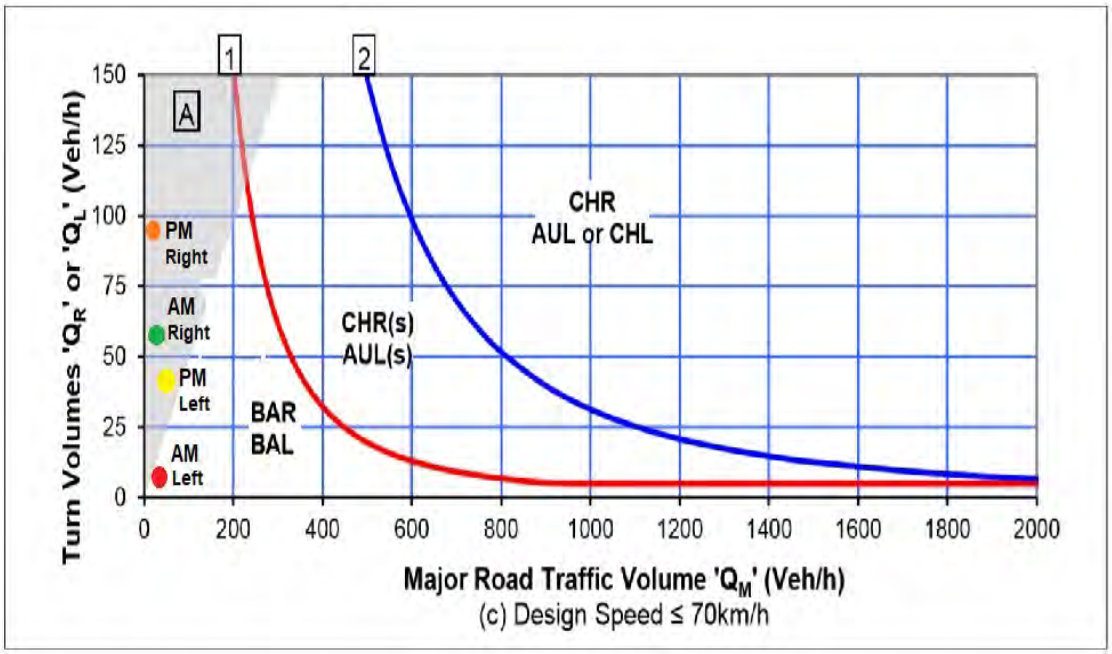


Figure 8.8: AustRoads Warrant showing turn volumes at Quia Rd & Torrens Rd intersection

9. ALTERNATE TRANSPORT MODES

There is limited public transport (bus) service to the area that is within convenient walking distance to the site. A school bus service also runs along Quia Road.

There are no constructed footpaths in the vicinity of the Torrens Road industrial area, and other facilities for pedestrians are non-existent. Pedestrians walking along the local road network would be required to use the unformed verges or utilise the road shoulder where necessary.

Similarly, there are no designated on or off-road cycle ways in the area therefore cyclists using the road network would either need to use the formed road shoulders or share the traffic lanes where necessary.

In regard to the haulage of waste & recycleable material to and from the site, there are currently no alternative transport methods available.

10. DEVELOPMENT PROPOSAL

Development consent is sought for a waste facility, including resource recovery and waste transfer facility ("waste facility") handling up to 250,000 tonnes per annum of waste for separating and sorting, processing or treating, temporary storage, or transfer or sale of recovered resources ("the Project").

The proponent proposes to establish and operate a resource recovery facility and waste transfer station to process waste, including excavated natural materials' contaminated soils, construction and demolition waste, commercial and industrial waste, asbestos and lithium batteries. Additionally, ancillary works include construction of internal roads, a weighbridge, storage bays and associated infrastructure.

The resource recovery processes that would occur on the site are described below according to the waste type. On average, 905 tonnes per day of waste would be delivered to the Torrens Road Gunnedah site in a range of vehicles including 0.5-tonne domestic trailer loads, 8-tonne rigid trucks and 30 tonnes + heavy articulated trucks. Trucks are inspected and weighed on arrival (and departure, with the difference in weight being the waste payload). The trucks are then directed to

unload in the covered unloading area where waste will be sorted, processed and prepared for transfer to the processing shed for further processing.

- **Excavated material that meets CT1 thresholds**

  This material would be mechanically sorted and shredded by front-end loader in the unloading shed prior to either crushing and/or screening in the processing shed. Then it would be mechanically screened by the trommel in the processing shed and blended for re-use, followed by transfer to the on-site storage bins. Any contaminated residue would be removed for landfilling at a licensed facility.

- **Contaminated soils (ASS and PASS)**

  Acid sulfate soils (ASS) would be blended with lime on site, verified such that it is capable of reverting to GSW and ultimately disposed to landfill (unless an Exemption is granted), in accordance with the EPA's neutralising techniques outlined in the *ASS Manual* and *Waste classification guidelines: Part 4: Acid Sulfate soils* requirements. Following neutralisation, the waste must be chemically assessed to determine whether there are any other contaminants that may affect how the waste is classified for disposal. Any landfill will be informed that the actual ASS has been treated in accordance with the neutralising techniques outlined in the ASS Manual and that the waste has also been classified in accordance with Part 1 of the *Waste Classification Guidelines*. Potential acid sulfate soils (PAAS) will be treated in accordance with the same EPA requirements. Potential ASS must be kept wet at all times during excavation and subsequent handling, transport and storage, until they can be disposed of safely.

- **Construction and Demolition (C&D) waste**

  This material would be mechanically sorted and shredded by front-end loader in the unloading shed prior to either crushing and/or screening in the processing shed in accordance with the NSW EPA Minimum Standards for Managing Construction and Demolition Waste in NSW (October 2016). The resultant material would be separated into various components and stockpiled for either resale as a recycled product with material not suited to recycling removed to a licensed facility. Waste including concrete, bricks and tiles would be crushed on a campaign basis before being mechanically screened and stockpiled in the storage bins as aggregate, sand and road base for sale.

- **Commercial and Industrial (C&I) waste** The waste would be mechanically sorted and shredded by front-end loader in the unloading shed prior to either crushing and/or screening in the processing shed. The resultant material would be separated into its various components and stockpiled for either resale as a recycled product with material not suited to recycling removed for landfilling at a licensed facility. Bricks, concrete and tiles would be crushed on a campaign basis before being mechanically screened and stockpiled as aggregate, sand and road base for sale.

- **Asbestos and lithium batteries** These materials will be suitably stored in a stand-alone restricted waste storage facility. It is estimated that no more than about 33-38 tonnes of asbestos waste and about 0.5 tonne of lithium batteries will be stored on site at any one time.

The mix of waste discussed above is an estimate only, and ultimately dependent on a range of factors including prevailing market conditions, access to the waste streams described above, prevailing government policies, and the like. No other types of hazardous or special waste will be accepted at the site. No garden (green) waste, household waste or timber/wood waste, tyres, liquid waste, chemical waste or putrescible waste will be accepted by the proposed waste facility.

The recycled materials able to be produced including but not limited to soils and mulched material suitable for landscaping or rehabilitation and civil construction applications, aggregates, road-base, drainage material, dry paper/cardboard and metals. The aim of the recycling process will be to

produce end recycled products that meet EPA resource recovered orders while recovering a range of materials that may otherwise be disposed to landfill.

All of the materials brought onto the site are taken from the site as products or as rejects for disposal at a licensed landfill. The recycled materials able to be produced include soils suitable for landscaping or rehabilitation purposes, and road-base. The aim of the recycling process will be to produce end recycled products that meet recycled material specifications while recovering a range of materials that may otherwise be disposed to landfill.

No materials are land-filled or otherwise disposed anywhere within the site. With the exception of asbestos waste all other waste destined to landfill will be directed to a licensed landfill. Material would be transported to the site by MEX or contractors and the general public. Prior to processing, delivered material would be inspected and unwanted items such as fuel, oil and other motor fluid from motor vehicles would be removed.

The proposed waste facility can utilise other existing facilities already owned and used by Mackellar Group, including but not limited to diesel fuel tanks, heavy vehicles used to transport waste and recycled material to and from the site, office and staff amenities, parking, and stormwater detention, as well as crushing and screening plant - the latter from MacKellar's existing quarry operations. Processing would be undertaken with the above equipment.

The aim of the recycling process will be to produce end recycled products that meet recycled material specifications while recovering a range of materials that may otherwise be disposed to landfill. All of the materials brought onto the site are taken from the site as products or as rejects for disposal at a licensed landfill.

11. FUTURE TRAFFIC GENERATION

11.1 Existing MEX Depot Generated Volumes

See Section 4 above.

11.2 Heavy Vehicle Movements

As discussed in Section 9 above, the proposed Waste Facility will process up to 250,000 tonnes of waste material per year. After processing, which includes weighing, separating and sorting, it is expected that around 250,000 tonnes of the waste material will be transported away from the site after processing.

Waste will be delivered to site by a variety of heavy vehicles including 0.5-tonne domestic trailer loads, 8-tonne rigid trucks and 30 tonnes+ heavy articulated trucks. However, for the purposes of this assessment, it is assumed that the majority of the waste material will be hauled to & from the future Waste Facility by heavy articulated vehicles. While haulage by smaller vehicles will increase the number of future trips to & from the Torrens Road site, this assessment considers that the increase in heavy articulated vehicles will have more impact on the local road network, particularly in regard to their greater size, weight, turnpaths, braking and acceleration requirements.

Vehicles will access the site from the Oxley Highway, Kamilaroi Highway Quia Road and Torrens Road, all of these routes being suitable for heavy vehicles. Trucks are not expected to remain on the site for any extended period of time as the trucks would be processed as they come in. Therefore, minimal parking area for trucks would be required onsite.

It is expected that laden vehicles can enter the site, be unloaded and exit in approximately 14 minutes. Similarly, it is estimated an empty vehicle will be filled and off-site within 14 minutes as well. To achieve the average 12 laden truck-loads an hour to and from the future Waste Facility, at least 2 trucks need to be onsite at any one time, either being loaded or unloaded (i.e. 60 minutes / 10 minutes loading x 2 trucks = 12 laden trips).

Task	Maximum time to complete task
Delivery	
1. Incoming vehicles will enter the site and be weighed and inspected at the weighbridge. Any loads suspected to contain material that cannot be accepted by the site will be rejected and directed to the exit weighbridge.	2 minutes
2. Vehicles will travel to the tipping areas and be unloaded and inspected. A docket will be issued. If unacceptable waste is identified, they will be re-loaded and directed to the exit weighbridges.	10 minutes
3. Outgoing vehicles will be weighed and invoiced at the weighbridges and leave the site.	2 minutes
Total time on site:	***14 minutes***
Dispatching	
1. Incoming empty vehicles will enter the site and will be weighed at the weighbridge.	2 minutes
2. Vehicles will travel to the stockpile area and be loaded from stockpiles as required, receive a docket and travel to the weighbridge.	10 minutes
3. Outgoing vehicles will be weighed and invoiced if necessary at the weighbridge and leave the site.	2 minutes
Total time on site:	***14 minutes***

Figure 11.1: Estimated turn-around time for loading & unloading heavy vehicles at Waste Facility

As discussed above, the proposed Waste Transfer Station will process 250,000 tonnes of raw waste per year. While it is expected that single unit trucks and trailers towed by light vehicles are expected to haul waste to the site, we have adopted heavy vehicles only for the purposes of this assessment. Therefore, to haul the unprocessed waste to the waste facility site would require:

- 6579 laden trips per year using truck & dog trailers (38 tonne capacity), or 126 trips per week
- 4717 laden trips per year using B-double semi-trailers (53 tonne), or 90 trips per week.

Given that the proposed haulage of waste material to the waste facility will be undertaken by a combination of the 2 heavy vehicle types discussed above, the number of laden trips per week will therefore be between 92 – 126. For the purposes of this assessment, 110 laden trips a week will be adopted. This equates to 20 laden trips per day (using a 5.5 day working week).

The waste facility will then generate around 250,000 tonnes of clean fill material per year. To transport this volume of material away from the Torrens Road site will require:

- 6579 laden trips per year using truck & dog trailers (38 tonne capacity), or 126 trips per week
- 4718 laden trips per year using B-double semi-trailers (53 tonne), or 90 trips per week.

For the purposes of this assessment, 110 laden trips a week will be adopted. This equates to 20 laden trips per day (using a 5.5 day working week).

Scenarios:

The operators of the waste facility plan to utilise the haulage trucks as efficiently as possible, to reduce the total number of heavy vehicle trips required and also reduce haulage costs for the company. The operators plan to reduce the overall number of heavy vehicle movements by utilising incoming trucks hauling un-processed waste to the waste facility to deliver processed waste to customers i.e. both inward & outward heavy vehicle movements will be laden.

As discussed above, an average of 20 heavy vehicle trips a day would be entering the waste facility, with another 20 laden vehicles exiting the site to deliver to customers around Gunnedah and further afield.

The following scenarios indicate the estimated reduction in heavy vehicle movements due to good scheduling and better use of empty haulage vehicles. It should be noted that an average of 110 laden trips a week will be required to haul unprocessed waste to the future waste facility, or 20 laden trips per day.

0%

If the operators were to ignore the potential to re-use haulage vehicles, and every trip to import unprocessed waste and export processed waste were considered as separate trips, then the following would apply:

Haul raw waste to waste facility: 110 laden trips per week (or a total of 220 movements). This equates to 20 laden trips in per day & 20 empty trips out (i.e 40 total trips).

Haul processed waste from waste facility: 110 laden trips per week (or a total of 220 movements). This equates to 20 empty trip in & 20 laden trips per day (i.e 40 total trips).

Total movements: **220** laden trips (440 return) a week or **40** (80) per day or average of **4** (8) per hr.

40%

If the waste facility operators are able to utilise 40% of the vehicles hauling unprocessed waste to the waste facility to then re-load and deliver processed waste to customers, the total number of trips would be reduced, as shown below:

Haul raw waste to waste facility: 110 laden trips per week (or a total of 220 movements). This equates to 20 laden trips per hour (or 40 return trips).

Utilise 40% of return trips to deliver processed waste = 44 trips per week (or 8 trips per day)

Additional haulage of processed waste from waste facility: 110 – 44 laden trips per week = 66 laden trips (or 132 return trips).

Total movements: **176** laden trips (352 return) per week or **32** (64) per day or **3.2** (6.4) per hr

60%

If the waste facility operators are able to utilise 60% of the vehicles hauling unprocessed waste to the waste facility to then re-load and deliver processed waste to customers, the total number of trips would be reduced, as shown below:

Haul raw waste to waste facility: 110 laden trips per week (or a total of 220 movements). This equates to 20 laden trips per hour (or 40 return trips).

Utilise 60% of return trips to deliver processed waste = 66 trips per week (or 12 trips per day)

Additional haulage of processed waste from waste facility: 110 – 66 laden trips per week = 44 laden trips (or 88 return trips).

Total movements: **154** laden trips (308 return) per week or **28** (56) per day or **2.8** (6) per hr

Adopted volumes

For the purposes of this assessment, the worst case will be adopted (the 0% scenario), where all heavy vehicles trips to and from the future Waste Facility will be separate trips i.e. all heavy vehicle trips will be laden one way and empty the other. This will result in 20 laden trucks into the waste facility (to transport raw waste) and leaving empty. Another 20 empty trucks will enter the site at a later time, and exit laden with processed waste each day.

This results in an average 40 laden trips or a total of 80 heavy vehicle movements per full working day, or an average total of 8 trips per hour. For the purposes of this assessment, we will adopt a peak hour volume 50% above the average hourly rate i.e. **12** trips (**6** laden and **6** empty).

11.3 Staff Movements

The Waste Facility will require approximately 8 staff to operate at full operation with an additional 3 administrative staff operating from the main office. This does not include the maintenance and repair workforce currently operating within the existing Mackellar Group workshop currently operating from the project site. There are no contractors expected to work onsite except for service suppliers and possible additional maintenance and repair workers.

The extra staff commuting to & from work will generate around 10 vehicle movements in the morning (around 7am) and again in the afternoon (5pm), in addition to a small number of trips during working hours. As can be seen from Section 7.1.4 above, the majority of future staff movements will be outside the current AM & PM peak periods.

11.4 General Public

The Waste Facility will be open to the general public and businesses to deposit recyclable waste materials such as glass, cardboard, metals, batteries etc. For the purposes of this assessment, it is estimated that 10 – 20 light vehicles a day will enter & exit the site to drop off waste materials during working hours (7am – 5pm). This equates to around 1 – 2 vehicles an hour or (say) an average 3 movements (in & out) per hour.

11.5 Future Waste Facility Traffic Volumes

The proposed Waste Facility will normally operate and accept waste deliveries between 7.00 am and 5.00 pm Monday to Friday, with reduced hours on Saturdays. The operation of heavy machinery is only able to occur between 7.00am - 5.00pm Monday to Friday. No waste facility operations are to be undertaken on Sundays or public holidays.

Based on the discussions above, the following additional vehicle movements are estimated to be generated by the proposed Waste Facility. The volumes shown below are total movements i.e. in & out, laden & empty

Type	Daily	Peak Hour
Heavy Vehicle	80#	12
Staff	20	4
Public	30	6
Total	***130***	***22***

Worst case

Figure 11.2: Estimated total movements to be generated by proposed Waste Facility

11.6 Future MEX Depot Generated Volumes (including proposed waste facility)

Figure 11.3 below shows the estimated number of vehicle movements to be generated by the existing Mackellar Depot and future Waste Facility once completed and fully operational. Figure 11.4 below compares the current peak hour movements in and out of the MEX site with the estimated future movements. As can be seen from the tables below, the proposed waste facility will generate approximately 28 additional movements during the morning peak hour, including 12 heavy vehicle movements. The afternoon peak hour will see 32 additional movements generated, with 12 of those being heavy vehicles. It should be noted, as discussed above, that the estimated volumes shown below are the worst case, with future movement numbers likely being reduced by utilising empty haulage vehicles, as discussed above.

	AM Peak 7:45 - 8:45pm		PM Peak 2:45 - 3:45pm	
Type of movement	*In*	*Out*	*In*	*Out*
MEX - Office staff commute	8	4	4	8
MEX - Truck driver commute	0	0	0	2
MEX - Truck & dog trip	**0**	**2**	**2**	**0**
MEX - Other staff trips	3	3	3	3
MEX - Service & deliveries	1	1	1	1
WF - waste haulage	**6**	**6**	**6**	**6**
WF - staff commute	3	1	1	3
WF - other staff trips	2	2	2	2
WF - general public trips	3	3	3	3
WF - service & deliveries	1	1	1	1
Total	***27***	***23***	***23***	***29***

Figure 11.3: Estimated future peak hour movements in & out of MEX depot (Torrens Rd) and Waste Facility.

	AM Peak 7:45 - 8:45pm		PM Peak 2:45 - 3:45pm	
Period	*In*	*Out*	*In*	*Out*
Existing	12(0)	10(2)	10(2)	14(0)
Future	27(6)	23(8)	23(6)	29(6)
Change	+15(6)	+13(6)	+13(4)	+15(6)

Figure 11.4: Estimated increase in MEX depot generated movements (HV in brackets) due to proposed Waste Facility. Note that the volumes shown above are a 'worst case' scenario.

11.7 Distribution of movements

As can be seen from Section 11.4 above, the proposed Waste Facility at the Torrens Road site will generate an additional 32 vehicle movements during peak hours, with approximately 12 of those movements being heavy vehicles.

It is expected that the majority of those vehicle movements will utilise Torrens Road, and pass through the existing intersection with Quia Road. No heavy vehicle movements are proposed to and from Ross Road, while the following assumptions have been adopted to prepare the movement diagram below (Figure 11.4):

- The majority of light vehicle commuter movements will originate from the Gunnedah CBD.
- Delivery and service vehicle movements will originate from both the Gunnedah CBD and the Oxley Hwy Industrial precinct (say 50% south and 50% north)
- Public vehicles dropping off recoverable waste to the waste facility will be evenly split between the CBD (south) and the industrial & rural areas (north)
- All heavy vehicle movements will pass through the Quia Road intersection
- Approximately 50% of heavy vehicle movements will travel to & from Kamilaroi Hwy (south). The remainder will utilise the Oxley Highway (north).
- The peak traffic generation by the proposed Waste Facility is unlikely to correspond with the peak times of the surrounding road network. However, the following diagrams assume the worst case – i.e. the max traffic generation from the future WF occurs during local peak hrs.

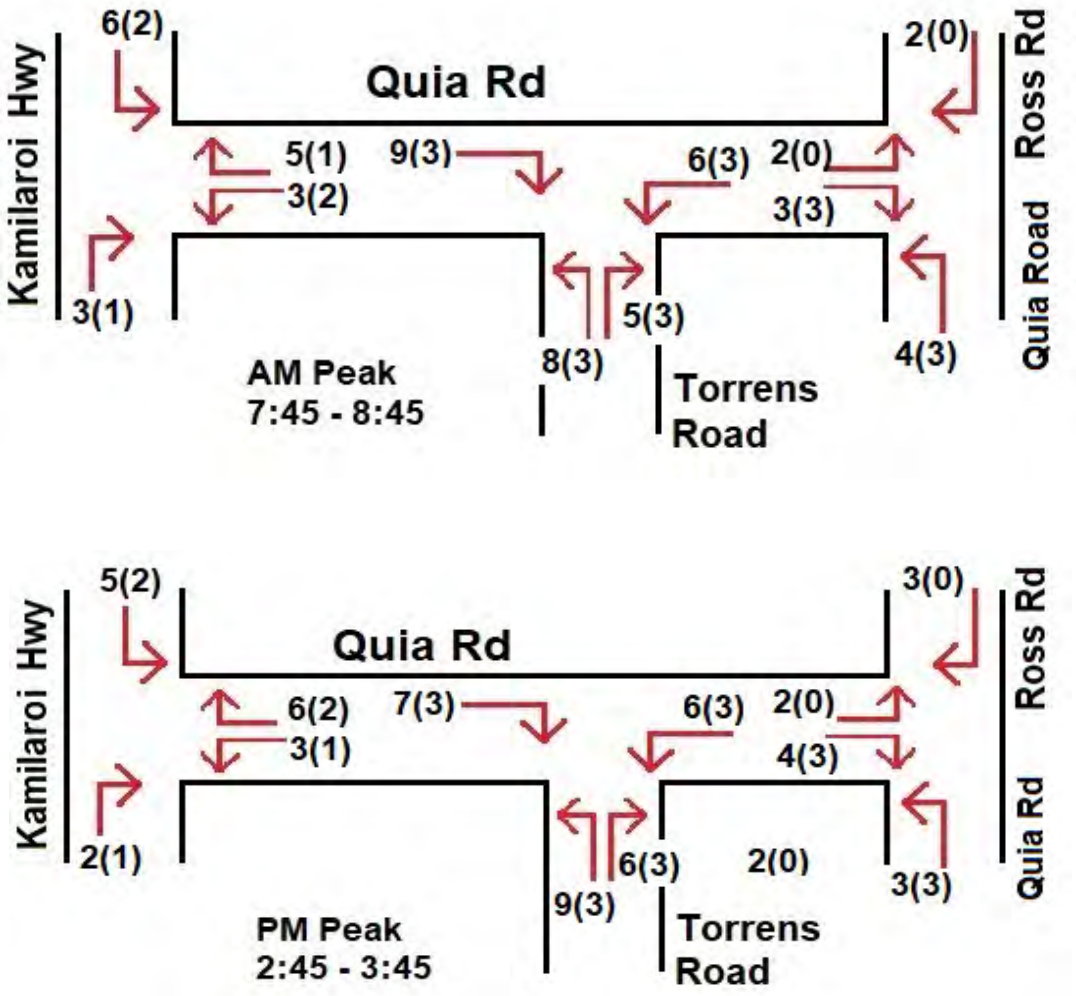


Figure 11.4: Estimated distribution of traffic to be generated by proposed Waste Facility during AM & PM peak hours (heavy vehicles in brackets)

As can be seen from the diagrams above, the additional traffic to be generated by the future Waste Facility will result in a 'worst case' of 28 additional turn movements through the Quia Road & Torrens Road intersection, including a maximum 3 additional heavy vehicle movements at any turn.

The development will result in approximately 1-2 additional heavy vehicle movement for each turn at the Kamilaroi Highway intersection, with a similar impact on the Quia Road & Ross Road intersection. It should be noted that the above diagrams are a 'worst case', with the peak movements generated by the future waste facility unlikely to conflict with the existing peak hour volumes within the local road network i.e. staff commute trips generated by the waste facility are likely to be outside the existing network peak hours shown in Figure 11.4 above. Also, the traffic volumes shown in the diagrams above have been estimated using the maximum number of heavy vehicle trips (i.e. the 0% scenario from Section 11.2 above – no utilisation of empty haulage vehicles).

11.8 Impacts on intersection of Kamilaroi Highway & Quia Road

As can be seen from Section 11.6 above, the proposed Waste Facility at the Torrens Road site will generate an additional 28 vehicle movements during peak hours, with approximately 12 of those movements being heavy vehicles. It is expected that the majority of light vehicles generated by the waste facility will travel between the site and Gunnedah township, via Kamilaroi Highway and Quia Road, while a 50:50 split has been adopted for heavy vehicles entering & exiting Torrens Road via Quia Road.

As can be seen from Figure 11.4, a maximum of 17 additional vehicles per hour will pass through the existing intersection of the Kamilaroi Highway and Quia Road during peak times, with 6 of those being heavy vehicles. As discussed previously, the estimated increase in traffic volumes is a 'worst case' scenario, and is likely to be significantly less i.e. the staff commuter trips are likely to be outside the local network peak hours, and the utilisation of empty haulage vehicles to transport processed waste (Section 11.2) will reduce the number of heavy vehicle movements.

However, the minor increase in turn movements through the existing intersection of the Kamilaroi Highway and Quia Road due to the proposed waste facility will not significantly change the Austroads intersection warrant (Figure 8.2), with the existing traffic volumes only requiring a BASIC T-intersection. Given that the existing layout is currently a higher standard layout i.e. a line-marked, channelised intersection featuring dedicated right-turn lane into Quia Road, it is recommended that the current intersection layout has the capacity to cater for the minor increase in traffic volumes.

The waste facility will generate approximately 6 heavy vehicle movements through the existing intersection of the Kamilaroi Highway and Quia Road, at peak times, with only 1 - 2 additional movements an hour expected to turn left from Quia Road onto the Kamilaroi Highway at peak times. Given that existing volumes on the highway are around 250 vehicles an hour, and a maximum 150 vehicles an hour in a single direction, we can expect an average gap of at least 24 seconds between vehicles at peak times. This is adequate to safely allow laden, heavy vehicles to turn left within the existing 80kmh speedzone and accelerate with minimal conflicts with westbound traffic. It is not considered that the minor increase in heavy vehicle turn movements would trigger the need for a dedicated left turn treatment.

11.9 MEX depot access

Existing access to the Mackellar Equipment Hire depot at 16 Torrens Road is via 2 exiting industrial standard driveways with adequate width to cater for 2 heavy vehicles. Access is currently gained via Torrens Road or a side access onto Allgayer Drive (see Figure 10.5 below). Existing driveway dimensions and construction are suitable to cater for the volume, size and turn movements of existing heavy vehicles entering and exiting the MEX site. It is proposed re-arrange the site access, with the following layout:

- Heavy vehicles in & out of the site to utilise the existing Torrens Road driveway. This will direct all truck movements across the weighbridges to ensure all trucks are weighed as they enter and exit the Waste Facility.
- Light vehicles will access the site and proposed carparking area via the existing driveway off Allgayer Drive. This will improve site safety by separating light and heavy vehicle movements.
- A second driveway in Allgayer Drive (to the south of the proposed light vehicle access) will be designated solely for emergency vehicle access.

Torrens Road and Allgayer Drive are industrial standard roads, constructed to cater for the surrounding industrial precinct. The roadways are wide, and designed to cater for heavy vehicles and heavy vehicle turn movements.

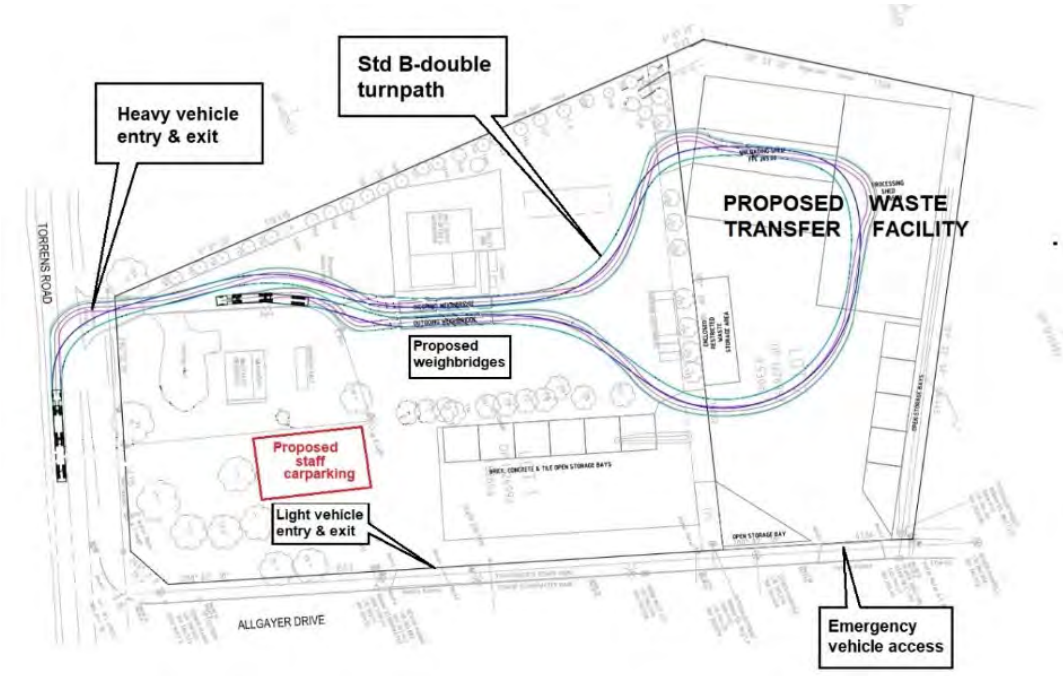


Figure 11.5: Future MEX depot layout showing location of waste facility, access locations, carparking and turn movements of articulated vehicles through the site.

Figure 11.6: Existing MEX depot layout showing access locations (L) and existing driveway off Allgayer Drive (R)

There is currently adequate all-weather surface area within the site for parking and manoeuvring of a number of heavy vehicles, including semi-trailers and truck & dogs. Adequate light vehicle parking is also available for staff, with room for further expansion, if required.

The adjacent roads within the industrial area also have sufficient width and pavement design to allow heavy vehicles to turn in and out of the MEX site.

11.10 Construction Traffic

The proposal to develop a Waste Facility will require construction of buildings, roadways and material storage on the site, as well as provision of plant and equipment. Construction on the site is likely to take a number of months and will regular generate heavy vehicle movements to transport building and construction materials, plant & equipment, as well as construction vehicles (cranes, concrete agitators etc). Construction workers will also commute regularly to the site.

The construction of the proposed Waste Facility will take a number of months and generate variable number of vehicle movements over a number of stages. A Traffic Management Plan (TMP) is to be

prepared and is to be implemented for all vehicle and pedestrian movements around the proposed works, in accordance with NSW RMS (2018) Traffic Control at Work Sites Manual.

Construction access to all stages of the proposed works is expected to be from Allgayer Drive.

Different sized trucks will be used during construction, although it is expected that most trucks can be rigid types for the delivery of construction material (e.g. concrete agitator trucks). Special traffic control measures would be prepared in the instance where oversize precast materials or plant is to be transported to the project site.

All loading and unloading of excavation and construction machinery, excavation and building materials is to occur within the site boundaries or stockpiled along the road reserve fronting the site boundary. All loading and unloading operations are to comply with relevant WorkCover and other statutory regulations.

The local road network will satisfactorily cater for the size and volumes of the vehicles generated by the required construction work. It is recommended a Construction Traffic Management Plan is prepared to indicate construction access to the site, vehicle movement plans, construction parking areas, materials storage areas etc. Council's road systems will be maintained during the construction works period. Any damage to Council's infrastructure within the road reserve by construction operations will be repaired and/or reinstated.

12. OTHER DEVELOPMENTS

The current Mackellar Depot is located within an industrial precinct to the west of the Gunnedah township. The site is part of a recent development of 12 large industrial lots, with approximately half the lots currently containing industrial buildings housing a variety of businesses and activities. It is assumed the remainder of the lots will eventually be developed.

Advice from Council indicates future industrial developments may also be approved on Torrens Road. However, given the wide variety of activities which can be undertaken within an industrial zoning, it is difficult to determine future traffic generation volumes.

The existing traffic volumes in Torrens Road and Allgayer Drive are relatively low, with adequate width and capacity within the sealed roadways to cater for existing traffic volumes. Given the industrial precinct is relatively recent, it is assumed the roads and intersections were designed to cater for future traffic generated by the current and any future industrial developments.

13. TRAFFIC IMPACTS OF DEVELOPMENT

The main traffic impacts of the proposed Waste Facility lie in the areas of traffic efficiency, amenity, road safety, road pavements and alternate transport modes. Within these areas the main issues usually relate to the levels of service (LoS) experienced on the road network particularly at intersections, the impacts of road noise and dust, the geometric standards of the haulage routes, the construction standard of the haulage routes and the availability and accessibility to alternate transport modes.

13.1 Traffic Efficiency

From the assessment of existing traffic volumes as well as road and intersection capacity, it can be seen that the local road network around the site is currently operating at the highest levels of efficiency. The combination of low traffic volumes and a good standard of road construction mean that motorists on the local road network experience a high level of service with little or no delays. This occurs currently with the current Torrens Road activities, and is likely to continue with the relatively low number of additional vehicle movements to be generated by the Waste Facility.

Similarly, in regard to the intersections on the approved haul routes and existing B-double routes, with only a small increase due to the waste facility-generated traffic, the layouts all meet (or exceed) the required AustRoads guidelines and currently operate with uninterrupted flow conditions. The proposed Waste Facility will increase the daily volumes by a maximum of 162 vehicles through the Torrens Rd/Quia Rd intersection or 22 vehicles during peak hours, including 12 heavy vehicle movements. The additional volumes through the other intersections will be less, as traffic disperses through the local road network. Also, the WF operators plan to minimise the number of haulage movements by utilising empty haulage vehicles, further reducing the estimated number of future movements.

It is therefore concluded the relatively low number of additional heavy vehicle movements to be generated by the Waste Facility will not significantly impact on the efficiency or operation of the local road network and no nexus would exist for any additional road upgrading works.

13.2 Amenity

Amenity issues for adjoining residents in regard to the traffic generated by a development usually relate to traffic noise and dust generation. In regard to dust generation, the proposed haulage routes are sealed for the full length, which results in minimal dust generation from the haulage traffic, provided all loads are covered as required by law in NSW (and in the proposed requirements of the future waste facility).

In terms of road noise, the operation of large haulage trucks can generate significant noise particularly when travelling empty. Similarly, the internal operations of the waste facility can also generate noise issues for any adjoining residents. It should be noted that the proposed waste facility is located in an industrial area, with minimal residences close to the site or adjacent to the proposed haul roads. Also, traffic volumes on the local road network are less than 300 vpd for local roads.

13.3 Road Safety

In terms of road safety, the main issues that need to be considered are type of traffic, road geometry and intersection safety. Any increase in traffic volumes increases the risk of traffic accidents and thus impacts on the standard of road geometry required for the road. The road geometry impacts on the safe travelling speed in a number of ways including horizontal alignment, vertical alignment and lane widths. Intersections represent the major traffic conflict points on a road network and thus are a location of increased accident risk.

In terms of development traffic, the main impact for this proposal is not so much the peak volume of traffic to be generated by the waste facility, but the type of traffic generated. Specifically, the waste facility will generate a high proportion of heavy vehicles particularly rigid truck and trailer combinations. The road geometry and construction standard therefore needs to be appropriate for this type of traffic.

Existing pavement construction standards have been discussed previously in this report, and it is been found that the haulage routes to the Torrens Road site is generally sealed with a minimum road width of 7.0 metres. Traffic volumes on the local road network are all less than 300 vpd and thus with a minimum sealed width of 7 metres would satisfy the design requirements for road widths contained within the Austroads Guide to Road Design (2009). It should also be noted that all of the local routes associated with the approved haul routes currently operate at a Level of Service of 'A' – "*a condition of free flow in which individual drivers are virtually unaffected by the presence of others in the traffic stream."*

Assessment of the existing road alignment both horizontal and vertical is a much more difficult task without the need to carry out extensive survey works. By visual assessment however it is considered that the road alignment within Goohli Road, Quia Road, Black Jack Road and Barkers Road are all suitable for the speed zoning currently regulated. Torrens Road is a relatively new road constructed

to provide access to a new industrial development. It is assumed the industrial standard road, in association with the intersection with Quia Road, were constructed to cater for the weight and turnpaths of articulated and heavy vehicles.

It is the area of intersection safety that is of most relevance for this proposal. Intersection safety is generally dependant on the amount of traffic passing through and turning at the intersection as well as the availability of sight distance and intersection geometry. In this case the main intersections on the haulage route are:

- Barkers Road & Goolhi Road
- Goohli Road & Quia Road
- Kamilaroi Highway & Goohli Road
- Quia Road & Black Jack Road
- Oxley Highway & Black Jack Road
- Quia Road & Torrens Road
- Quia Road & Kamilaroi Hwy

These intersections are discussed in Section 7 above, but by observation the layouts all have suitable road geometry and the available sight distance exceeds Austroads requirements (as specified in Guide to Road Design Part 4A: Unsignalised and Signalised Intersections). The safe intersection sight distance for an 80 km/h speed zone is listed as 181m while SISD for a 100kmh speedzone is 248m.

The revised SEARS requirements (11/08/20) recommends that '*where road safety concerns are identified at a specific location along the proposed haulage routes, TfNSW suggests that the TIA be supported by a targeted Road Safety Audit undertaken by suitably qualified persons in accordance with the Austroads Guidelines'*. The site inspection of the proposed haul routes and intersections within the vicinity of the proposed Waste Facility where undertaken by Andy Davis (StreetWise), who is an accredited Level 3 Road Safety Auditor (#RSA-02-0678). At the time of inspection, no significant road safety concerns were noted at the adjacent intersections, or proposed haul routes within the west Gunnedah area.

It should also be noted that the current haul routes have previously been approved by Gunnedah Shire Council, while Goohli Road, Kamilaroi Highway, Oxley Highway and parts of Black Jack Road and Quia Road are approved by the RMS for use by 25m B-Double vehicles.

In summary, it is concluded that the local road network potentially impacted by the proposal is suitably safe for use by future Waste Facility-generated traffic.

13.4 Pavement Condition

The proposed haulage routes appear to be constructed of a suitable pavement for use by heavy vehicles given the existing condition of the road network and its current use by heavy vehicles. A visual assessment of the road pavement along the proposed haul routes indicated that there were no major failures or areas of deterioration.

It is therefore considered that the road pavements on the highways or other proposed haulage routes to & from the proposed Waste Facility (Torrens Road) via the existing arterial road network are all satisfactory.

The proposed use of B-double haulage vehicles is likely to minimise damage to the surrounding road network when compared to truck & dog combinations.

Reliance on larger trucks means that there is likely to be much less pavement damage than if smaller truck loads were employed. Wear and tear on a road pavement is measured by the impact of the Equivalent Standard Axles (ESAs) on that road from heavy truck traffic. This is then considered in terms of the volume of material carried and type of truck used to transport that load.

Research shows that larger haulage vehicles carrying larger loads cause significantly less road pavement damage than smaller haulage vehicles carrying smaller payloads, measured in terms of ESAs per tonne of load. For example, a 43 tonne B-double produces 224 ESAs per 1,000 tonnes of load, and:

- Up to 58% less ESAs per 1,000 tonnes than a 2-axle rigid truck (payload up to 7.6 tonnes).
- Up to 35% less ESAs than a 3-axle rigid truck (payload up to 13.69 tonnes).
- Up to 74% less ESAs than a semi-trailer carrying between 24 to 27 tonne payloads. (Source: Australian Trucking Association "Truck Impact Chart Technical Advisory Procedure" Developed by the ATA Industry Technical Council 2.2 edition – March 2018.

Larger heavy vehicles carrying larger loads (like that proposed), will result in demonstrably less impacts on the road pavement than that of smaller truck loads. While there have been improvements in the carrying capacity of haulage trucks over the past 5 – 10 years, there have also been significant improvements resulting in quieter trucks, with upgraded braking and safety systems.

Similarly, the transporting of waste material to the proposed Waste Facility by contract vehicles is likely to be undertaken by local contractors using standard truck & dogs, or B-double trucks – similar to those owned by the MacKellar Group or regularly used for a variety of material haulage.

13.5 Alternative Transport Modes

As previously discussed in this report accessibility to alternate transport modes for the existing MEX depot site is considered poor. No specific bicycle or pedestrian infrastructure is provided to the site and the public transport service to the site is also minimal. The proposal will not increase demand for alternate transport modes therefore it is considered that no new alternative transport mode infrastructure will be required by the proposal.

14. CONCLUSIONS

This traffic impact assessment for the proposed Waste Facility, located west of Gunnedah township at part Lots 1 and 2 in Deposited Plan 1226992 on industrial zoned land at No.16 Torrens Road Gunnedah, has determined the following:

- The Waste Facility will generate a maximum of 130 vehicle movements a day, or 22 peak hour movements (in & out). The total movements will be made up of staff commuting, service & delivery vehicles, as well as a maximum of 80 heavy vehicle movements per day (or 12 peak hour trips i.e. in & out).
- The number of laden heavy vehicle movements will be reduced by:
    - Utilising existing empty haulage trucks i.e. using haulage vehicles which bring in unprocessed waste to deliver processed waste on the outward trip
    - Utilising more efficient B-double vehicles and reduce truck & dog movements for haulage of waste material
- The roads planned to access the future Waste Facility at Torrens Road have been approved by the RMS for use as B-double routes i.e. Quia Road (east) and Kamilaroi Highway. Other roads in the area have previously been approved for use as quarry haul roads or are industrial standard roads.
- Heavy vehicles movements generated by the future Waste Facility will utilise Quia Road or Kamilaroi Highway to access the site (via Torrens Road). Approximately 12 heavy vehicle movements an hour will pass through the existing intersection of Quia Road and Torrens Road. These movements will split 50:50, resulting in 6 heavy vehicle movements per hour through the existing intersections of:
    - Quia Road & Kamilaroi Highway

  - Quia Road & Ross Road. Note that no heavy vehicle trips are proposed on Ross Road (between Quia Road & Oxley Highway)
- Current peak period traffic volumes on approved haul roads have been measured as:
  - Goolhi Road (near Barkers Rd) – 300vpd
  - Quia Road – 300 vpd
  - Oxley Highway – 3683 vpd
  - Kamilaroi Highway – 2500 vpd
- Heavy vehicle traffic on the local road network around the site was found to be in the order of 20% (Kamilaroi Hwy & Quia Rd).
- The efficiency of the local road network will not be significantly impacted on by the proposal as the peak hourly and peak daily traffic volumes generated by the proposed Waste Facility are relatively low. The local road network has the capacity to cater for the minor increase in waste facility-generated vehicles, and uninterrupted flow conditions will continue to exist on local roads and intersections.
- The local road network servicing the site is in satisfactory condition and is considered suitable in terms of road geometry, speed zoning and pavement construction for use by traffic generated by the Waste Facility. It would be unreasonable for further works in this regard given the total estimated traffic volumes to be generated by the proposed Waste Facility are relatively low, and plans to reduce the number of haulage movements as possible by utilising more efficient haulage vehicles and using empty truck return trips.
- Construction of the Waste Facility will take a number of months and will generate traffic movements. Amelioration measures will be implemented to minimise impacts from construction traffic movements as a result of the proposal.
- Alternative transport modes available to the site are minimal and would not provide any benefit to the proposal. Therefore, no nexus exists for additional infrastructure requirements in regard to alternative transport modes.
- A Driver Code of Conduct will be prepared by the Waste Facility operators at a later date.

15. RECOMMENDATION

Having carried out this traffic impact assessment for the proposed construction and operation of a Waste Facility on the Torrens Road site of the existing Mackellar depot, it is recommended the proposal can be supported.

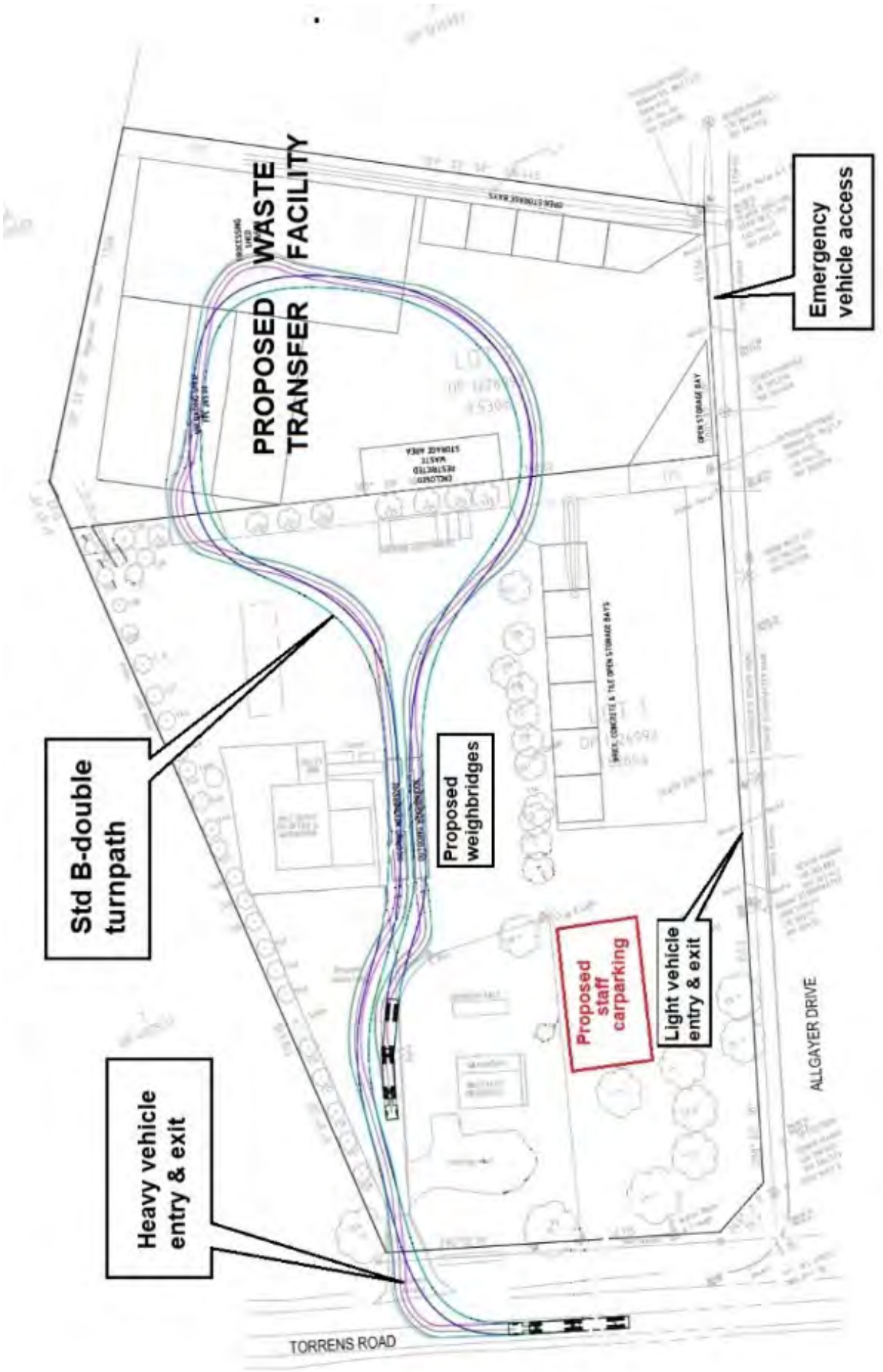
The major roads and intersections in the vicinity of the proposed Waste Facility, and the proposed haulage routes proposed to haul waste to and from the Torrens Road site, are suitable to cater for the relatively low waste facility-generated vehicle movements, including a maximum of 12 heavy vehicle movements per hour.

The existing capacity of all haulage roads and intersections can satisfactorily accommodate the traffic likely to be generated by the proposed waste facility. The minor increase in traffic volumes due to the development will have no significant impacts on the existing Level of Service of all existing intersections in the vicinity of the proposed Waste Facility.

In summary, StreetWise recommend that the proposed Waste Facility, and the associated minor increase in traffic generation, including haulage of waste material, as being a suitable proposal. The relatively low number of proposed daily heavy vehicle trips, staff commuting, and delivery vehicles will not have a significant impact on the efficiency or safety of the local road network.

A J Davis
BTech (Civil Engineering)
Level 3 Road Safety Auditor
Director StreetWise Road Safety & Traffic Services

Appendix A
Proposed WASTE FACILITY Layout Plan


PROPOSED WASTE TRANSFER FACILITY
Emergency vehicle access
Std B-double turnpath
Proposed weighbridges
Proposed staff carparking
Light vehicle entry & exit
Heavy vehicle entry & exit
ALLGAYER DRIVE
TORRENS ROAD

Appendix B
SEARs Requirements – TfNSW Letter

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ATTACHMENT A – Requested Traffic Impact Assessment considerations for SEAR

For context, this attachment must be read with TfNSW letter of 30 July 2020

Traffic Impact Assessment (TIA) be prepared by suitably qualified person/s in accordance with the Austroads Guide to Traffic Management Part 12, the complementary TfNSW Supplement and RTA Guide to Traffic Generating Developments.

The TIA is to identify the impacts of the development and the proposed on-site and off-site measures proposed to mitigate the impacts of the development on any road or rail related infrastructure. The TIA must explain and justify all inputs informing the proposed measures.

The TIA should be tailored to the proposed development and include, but not necessarily be limited to, consideration of the following;

- A map of the road network surrounding the site, identifying the site access arrangements, nearby accesses, intersections and any transport related facilities.
- A map of the proposed haulage route/s identifying all public roads proposed to obtain access from the classified (State) road/s to the development site. This should take into consideration other existing approved haulage routes and any constraints for turning traffic.
- The total impact of existing and proposed development on the road network with consideration for a 10 year horizon. This should include;
  - Identify Annual Average Daily Traffic (AADT) volumes with percentage heavy vehicles along the haulage route/s and diagrammatically demonstrate AM and PM peak hour movements at key intersections.
  - Background traffic data from published sources and/or recent survey data. The source of data and any assumptions are to be clearly explained and justified, including the growth rate applied to the future horizon.
  - The volume and distribution of existing and proposed trips to be generated by the construction and operational phases of the development at key intersections and the accesses. This should identify the maximum daily and hourly demands generated by the development, particularly where they coincide with the network peak hour.
  - The type and frequency of design vehicles accessing the development site.
- Details of the road geometry and alignment along the identified haulage route/s, including existing formations, crossings, intersection treatments and any identified hazards. This should include;
  - Available sight distances at intersections along the proposed haulage routes, including intersections and accesses, and any constraint to achieving the required sight distance for the posted speed limit.
  - An assessment of turn treatment warrants in accordance with the Austroads Guide to Traffic Management Part 6 and Austroads Guide to Road Design Part 4A for the identified intersections and accesses to identify the existence or need for the minimum basic turn treatments and addressing the need for any warranted higher order treatments.

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  - Swept path analysis demonstrating the largest design vehicle entering, manoeuvring and leaving the development, and moving in each direction through intersections along the proposed haulage route/s.

- Capacity analysis (using SIDRA or other relevant application), to identify an acceptable Level of Service (LOS) at intersections with the classified (State) road/s, and where relevant, analysis of any other intersections along the proposed transport route/s.
- A review of crash data along the identified transport route/s for the most recent 5 year reporting period and an assessment of road safety along the proposed transport route/s considering the safe systems principles adopted under Future Transport 2056.
- Strategic (2D) design drawings of all proposed road works and the site access demonstrating scope, estimated cost and constructability of works required to mitigate the impacts of the development on road safety, traffic efficiency and the integrity of transport infrastructure. Works must be appropriately designed for the existing posted speed limit.
- A site plan demonstrating site access, internal manoeuvring, servicing and parking areas consistent with the relevant parts of AS2890 and Council requirements. The site plan should accommodate the swept paths of relevant design vehicles servicing the existing and proposed operation of the site.
- Details of measures to address impact on public transport services and active transport modes, such as, public and school bus services, walking and cycling.
- Details of measures proposed to ameliorate the impacts of road traffic noise and dust generated along the proposed haulage route/s.
- Details of any Traffic Management Plan (TMP) proposed to address the construction and operation of the proposed development. The TMP may include temporary measures such a Traffic Control Plan (TCP) prepared and implemented by suitably qualified persons in accordance with the current *Traffic Control at Work Sites Manual*. It is recommended that any TMP adopt a Driver Code of Conduct, including but not necessarily limited to, the following;
  - A map of the primary haulage route/s highlighting critical locations.
  - An induction process for vehicle operators and regular toolbox meetings.
  - Procedures for travel through residential areas, school zones and/or bus route/s.
  - A complaint resolution and disciplinary procedure.
  - Community consultation measures proposed for peak periods.

Where road safety concerns are identified at a specific location along the proposed haulage routes, TfNSW suggests that the TIA be supported by a targeted Road Safety Audit undertaken by suitably qualified persons in accordance with the Austroads Guidelines.

Any roadwork on classified (State) road/s is to be designed and constructed in accordance with the current Austroads Guidelines, Australian Standards and TfNSW Supplements.

The developer will be required to enter into a Works Authorisation Deed (WAD) with TfNSW for any roadwork deemed necessary on the classified (State) road. The developer will be responsible for all costs associated with the roadwork and administration for the WAD. It is recommended that developers familiarise themselves with the requirements of the WAD process. Further information can be obtained from the TfNSW website.

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