MEMO

ARCADIS Design & Consultancy for natural and built assets

Date	29/07/2020
To	Sean Fishwick (Arcadis)
From	Peter Tamsett (Arcadis)
Copy to	Justin Moss (Arcadis)
Subject	Kings Park Expansion SSD EIS - Pavement Assessment

INTRODUCTION

Sell and Parker (the Applicant) currently own and operate a resource recovery facility (RRF) at 23-43 and 45 Tattersall Road, Kings Park (the Proposal site) (Figure 1). The RRF currently operates under approval SSD 5041 and three associated modifications (MODs 1- 3) (the Original Approval).

The Applicant is seeking approval to increase the throughput limit of the RRF from 350,000 to 600,000 tonnes per annum (tpa) (the Proposal). Approval for the Proposal is sought as State Significant Development (SSD) under Part 4, Division 4.7 of the *Environmental Planning and Assessment 1979* (EP&A Act).

The purpose of this memo is to document the potential impacts on the road pavement lifespan of Tattersall Road, Kings Park resulting from the Proposal.

This pavement lifespan assessment for Tattersall Road was based on the following methodology:

- Estimation of the current pavement traffic loading of Tattersall Road
- Estimation of the additional pavement traffic loading of Tattersall Road resulting from the proposed throughput limit increase from 350,000 to 600,000 tonnes per year
- Estimation of the effect on the lifespan of the current pavement of Tattersall Road resulting from the proposed increase throughput limit.

The following documents and information were referenced to carry out the pavement assessment:

- Draft report from The Transport Planning Partnership titled - *45/23-43 Tattersall Road, Kings Park Traffic Impact Assessment* - dated 24 April 2020
- Austroads Guide to Pavement Technology Part 2: Pavement Structural Design (2017)
- Spreadsheet - *Kings Park Expansion_June 2019 weighbridge data.xlsx*- which contains gross and tare weights for trucks entering and leaving the metal waste facility
- Spreadsheet - *1376 - Tattersall Rd - West of Romsford Rd.xlsx* - which contains a classification count of vehicles using Tattersall Road over a 7 day period from 25 February to 3 March 2020.

CURRENT TRAFFIC LOADING

Traffic loadings for pavement design are based solely on heavy vehicles traditionally called trucks which have a gross mass greater than 3 tonnes.

Traffic loadings are derived from the volume and type of heavy vehicles and an estimation of the range of pavement loadings from the various axle groups of these vehicles.

Traffic loadings are traditionally measured in terms of an Equivalent Standard Axle (ESA).

Data on the volume and type of heavy vehicles was contained in the referenced spreadsheet in the form of a vehicle classification count. The location of this two-way vehicle count on Tattersall Road was east of the Proposal site and west of Romford Road. An analysis of this data produced the following information:

- Percentage of heavy vehicles: 15%
- Estimated annual average daily traffic (AADT): 4,692 vehicles
- Average number of axle groups per heavy vehicle: 2.24 HVAG/HV.

Heavy Vehicle Axle Group Proportions for traffic counts on Tattersall Road are shown in Table 1.

Table 1 Heavy Vehicle Axle Group Proportions for traffic counts on Tattersall Road

Axle Group Type	Single Axle Single Tyre (SAST)	Single Axle Dual Tyre (SADT)	Tandem Axle Single Tyre (TAST)	Tandem Axle Dual Tyre (TADT)	Tri-axle Dual Tyre (TRDT)	Quad-axle Dual Tyre (QADT)
Proportion	0.3882	0.2522	0.0578	0.2046	0.0972	0.0000

An estimation of the range of pavement loadings from the various axle groups can be based on presumptive values derived from either Austroads guides, RMS guides, or weigh in motion data in the form of a traffic loading distribution (TLD). A TLD is also required in the pavement thickness design process for pavements containing thick (>40 mm) asphalt layers.

As weighbridge data was available from the metal recycling facility, it was adopted as the basis for the derivation of the required TLD. This was based on the assumption that the heavy vehicle types and loadings accessing the metal recycling facility were similar to other general heavy vehicle traffic using Tattersall Road.

Based on the gross mass of a vehicle in the weighbridge data, the vehicle was designated with a standard Austroads heavy vehicle class as show in Table 2.

Table 2 Austroads heavy vehicle class designations

Weighbridge Gross Vehicle Mass (GVM)		Austroads Heavy Vehicle Class	Vehicle Type
From	Up to		
3 tonne	15 tonne	3	2 axle rigid
15 tonne	22.5 tonne	4	3 axle rigid
22.5 tonne	42.5 tonne	9	Semitrailer
42.5 tonne	62.5 tonne	10	B-Double

The gross mass of each vehicle in the weighbridge data was distributed across each axle group of the designated Austroads vehicle class. The ESA of each vehicle was then able to be calculated as well as the number and type of heavy vehicle axle groups (HVAG).

From the supplied weighbridge data, the following average values were derived for 2,310 heavy vehicles entering and leaving the metal recycling facility during June 2019:

- Average number of axle groups per heavy vehicle: 2.62 HVAG/HV
- Average ESA per heavy vehicle: 2.0

Heavy Vehicle Axle Group Proportions for weighbridge data are shown in Table 3.

Table 3 Estimated Heavy Vehicle Axle Group Proportions for weighbridge data

Axle Group Type	Single Axle Single Tyre (SAST)	Single Axle Dual Tyre (SADT)	Tandem Axle Single Tyre (TAST)	Tandem Axle Dual Tyre (TADT)	Tri-axle Dual Tyre (TRDT)	Quad-axle Dual Tyre (QADT)
Proportion	0.38	0.10	0.00	0.28	0.24	0.0000

In addition, a traffic load distribution was derived from the weighbridge data which was labelled as Kings Park TLD Combined Mass TLD. The average ESA per HVAG using this TLD was 0.56.

A standard traffic load distribution is also available from RMS and is titled 2018 Urban Presumptive TLD. This is for major urban roads and was considered for comparison purposes only. The average ESA per HVAG using this TLD was 1.04.

Advice was received from The Transport Planning Partnership that the annual traffic growth rate is currently estimated at 1% per annum.

A 20 year pavement traffic loading was estimated based on the current traffic volumes measured by the traffic count west of Romford Road and the two TLD described above. A 20 year period was adopted as this is a typical design life for the type of pavement existing in Tattersall Road. RMS standard software based on Austroads 2017 was used to calculate pavement traffic loadings. The 20 year (from 2020) estimated pavement design traffic loadings are shown in Table 4.

Table 4 20 year estimated pavement design traffic loadings

TLD Used	Pavement Design Traffic Loading (ESA)
Kings Park Combined (Gross + Tare) Mass TLD	3.58E+06
RMS 2018 Urban Presumptive TLD	6.56E+06

Based on the average ESA per heavy vehicle and the fact that the RMS TLD is more appropriate for major urban roads, the Kings Park TLD was adopted and the current 20 year estimate of traffic loading as 3.58E+06 ESA. Please note that this estimated traffic loading does not include any additional traffic loading from the proposed increase in throughput at the Proposal site.

ADDITIONAL TRAFFIC LOADING

This portion of the memo considers the additional traffic loadings on Tattersall Road resulting from the proposed metal waste production increase from 350,000 to 600,000 tonnes per year. This will increase heavy vehicle movements in Tattersall Road by 55,154 heavy vehicles per year.

Based on Figures 2.4 and 2.5 of the draft report from The Transport Planning Partnership, it is estimated that the additional traffic movements will be proportioned as shown in Table 5.

Table 5 Traffic distribution on Tattersall Road

Portion of Tattersall Road	Percentage of Total Movements
Eastbound to the east of the facility	12.5%
Westbound to the east of the facility	16.7%
Westbound to the west of the facility	37.5%
Eastbound to the west of the facility	33.3%

The greatest effect on the traffic loadings is the westbound direction to the west of the facility which will have 37.5% of the estimated additional total heavy vehicle movements.

The estimated additional 37.5% of heavy vehicles on the pavement for the westbound direction, west of the facility equates to a daily average of 54 additional heavy vehicles.

The estimated additional traffic loading for the westbound direction in Tattersall Road to the west of the facility is 6.09E+05 ESA over a 20 year period. This would represent a 17% increase in the 20 year traffic loading compared to no expansion of the metal recycling facility.

REDUCTION IN PAVEMENT LIFESPAN

No details are currently available for the material profile and age of the existing pavement. An application has been made to Blacktown City Council for this information, however a reply was not received in time for incorporation into this assessment.

The estimated 17% increase in traffic loadings would result in a 20 year pavement lifespan being reduced by approximately 3 years. This is on the basis that the existing pavement has a current remaining life of 20 years without the additional traffic loading from the expansion of the existing metal recycling facility.