



# TRANSPORT AND TRAFFIC PLANNING ASSOCIATES

A division of Monvale Pty Ltd ACN 060 653 125  
ABN 44 060 653 125

19 August 2013  
Ref: 09234

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Dear Matthew

**Proposed Bulky Goods Development (Pretty Girl Site)  
728 – 750 Princes Highway, Tempe  
Assessment of Proposed Deferred  
Commencement Condition No. 1**

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I prepared the Traffic Impact Assessment for the subject development and I have extensive experience in assessment of landuse traffic generation characteristics. I undertook the survey and assessment studies for 6 landuses for the former Road and Traffic Authority and the resulting criteria is incorporated in the current RMS Guide to Traffic Generating Development.

I have considered the recently published RMS Technical Direction 2013-04 and have presented a number of critiques to RMS in relation to this document (see Appended). The response from RMS has been that:

- The “averaged” results provided in the TDT should only be taken as a guide
- Assessment of a specific circumstance should be undertaken adopting the characteristics of a most comparable development

**Transportation, Traffic and Design Consultants**

The most relevant criticism I have of the RMS TDT methodology is that it averages uses with extremes of magnitude and differing usage characteristics and examples of this are:

#### Industrial Estates

Erskine Park 326.9 ha averaged with Helensburg 0.6 ha

#### Hardware

Bunnings 14,000m<sup>2</sup> averaged with Mitre 10 1,600m<sup>2</sup>

In relation to the assessment undertaken by RMS for Bulky Goods use the gross floor area of the chosen sites ranges from some 600m<sup>2</sup> to 14,850m<sup>2</sup> (Table 2-3 of Study) and the site peak traffic generation ranges from 26 vtp/h to 232 vtp/h. It is apparent that:

- None of the sites incorporated in the RMS Study have any resemblance to the size and 'make up' of the proposed Tempe development
- The site peak traffic generation of the largest site occurred at 7.30pm on a Thursday and 2.30pm on a Saturday

Apart from the Auburn Harvey Norman site the other sites ranged from 600m<sup>2</sup> to 6,029m<sup>2</sup> with an average of some 2,700m<sup>2</sup> and all the sites were single tenancies. The proposed development however is for some 19,600m<sup>2</sup> with multiple tenancies and the preeminent implications are that:

- Traffic generation (vtp/h/100m<sup>2</sup>) decreases as the floorspace increases
- Traffic generation decreases as a result of dual/multiple patronage (ie visitation to various tenancies)

It is an indisputable fact that:

- The RMS 'averaging' does not provide appropriate criteria for assessment of the proposed development
- The Bulky Goods sites in the RMS Study are not comparable to the proposed development

In the extreme, the 600m<sup>2</sup> Retravisio site at Springwood (not in the Metropolitan Area anyway) with a total of 13 parking spaces presents no resemblance or comparison whatsoever with the proposed development and the traffic generation outcome (which is likely to reflect no bonifide parking and traffic movements) seriously skews the

averaged results. If the 2 Metropolitan sites (albeit single occupant) are averaged without the Springwood site the results for “Site Peak” generation would be:

Weekday PM	1.49vtph/100m <sup>2</sup> (not 2.44)
Weekend	2.54vtph/100m <sup>2</sup> (not 3.75)

Similarly the results for the “Network Peak” generation would be:

Weekday PM	1.01vtph/100m <sup>2</sup> ( * )
Weekend	1.95vtph/100m <sup>2</sup> (not 2.24)

\* *Springwood site not open*

The rates for the network peak adopted in the TTPA study reflect the above results as follows:

Weekday PM	1.0vtph/100m <sup>2</sup>
Weekend	2.0vtph/100m <sup>2</sup>

These details are identified on the extracts from the RMS report attached and the relevance in relation to “site peak” traffic conditions is reflected in the volumes on the Princes Highway at the respective times as follows:

		Total Highway Flows *
Network Peak	Thursday 5-6pm	5,014
Site Peak	Thursday 7-8pm	2,507 (-2,507vph)
Network Peak	Saturday 12-1pm	3,911
Site Peak	Saturday 2-3pm	3,566 (- 345vph)

\* *Data from RMS Count Station on Princes Highway and Cooks River*

The sites peak for Bulky Goods use can therefore be reasonably accepted as being some 0.5vtph per 100m<sup>2</sup> more than that of the network peak. Therefore the additional generation (ie over the network peak) of 19,600m<sup>2</sup> is only 98vtph when there is between 345 and 2,507 less vehicle movements on the highway at these times. It is quite clear therefore that the network peak circumstances is the “worst case” in terms of capacity/performance and there is no requirement to undertake a more detailed assessment of the site peak circumstances.

It is also noted that RMS/Sydney Regional Development Committee response did not raise this issue and accepted the Traffic Assessment provided with the Development Application.

There are numerous existing Bulky Goods developments in the Metropolitan Area which are very comparable to the proposed development. If there is still to be a Deferred Commencement Condition requiring assessment of the "site peak" traffic generation it should be based on:

- Agreement with RMS in relation to a comparable site/s to be surveyed
- RMS being the authority responsible for assessing the analysis, not Council, as intersections on the highway are RMS responsibility

In relation to the electrical kiosks these have been relocated to the western side of the access and the turning path diagrams provided in my letter of 15.2.13 (attached) quite clearly confirm that there is no issue in relation to "potential" vehicle conflict.

Yours faithfully



Ross Nettle  
Director  
Transport and Traffic Planning Associates

Encl



# Roads and Traffic Authority Trip Generation and Parking Generation Surveys Bulky Goods / Hardware Stores

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## Analysis Report



Table 2-3 Site Details of the Selected Sites – Bulky Goods

Site ID	BC1	BC2	BC3	BC4	BC5	BC6
Name	Freedom/	Harvey Norman	Retravision	Domayne	Bing Lee	Fantastic
Suburb	Balgowlah 2093	Auburn 2144	Springwood 2777	Kotara 2289	Warilla 2528	South Nowra 2541
Region	Sydney	Sydney	Blue Mountain	Newcastle	Southern	Southern
Network Peak Hours						
Year of Network Survey Dates	2005	2007	2005	2004	2007	2009
AM Peak - Weekdays	0800-0900	0800-0900	0800-0900	0800-0900	0800-0900	18/3-24/3
PM Peak - Weekdays	1700-1800	1700-1800	1700-1800	1600-1700	1500-1600	0800-0900
Peak - Weekends	1200-1300	1200-1300	1100-1200	1200-1300	1100-1200	1500-1600
Site Details - Bulky Goods/Hardware						1100-1200
Area Dimension (m <sup>2</sup> )		Approx 9000	1,600			
Gross floor area (m <sup>2</sup> )	4,300	25,384 (including car park)	600	6,029	1,200	1,700
No. of Employee (Total)	29	220	5			9
No. of Employee (at one time)	10	100	5	50	20	9
Year Constructed	Unknown	2001	<79	78	2008	0
Accessibility Score	80-139	<79				
Opening Hours						
Mon-Fri	0900-1800	0900-1730	0900-1730	0900-1730	0900-1730	0900-1730
Sat	0900-1700	0900-1730	0900-1600	0900-1700	0900-1700	0900-1700
Sun	1000-1700	0900-1730	1000-1600	1000-1700	1000-1700	1000-1700
Parking Spaces						
Customers	43	338	13	151	51	30
Disabled	0	12	0	2	4	4
Staff	3	0	0	0	33	9
Loading Bay	4		1	1	4	2
Total	50	350	14	154	92	45
Survey Results						
Date of Survey - Weekdays	19/03/09 (Thurs)	12/03/09 (Thurs)	12/03/09 (Thurs)	12/03/09 (Thurs)	19/03/09 (Thurs)	26/03/09 (Thurs)
Weather	Sunny	Sunny	Sunny	Sunny/Cloudy	Sunny/Cloudy	Sunny
Date of Survey - Weekend	21/03/09 (Sat)	14/03/09 (Sat)	14/03/09 (Sat)	14/03/09 (Sat)	21/03/09 (Sat)	28/03/09 (Sat)
Weather	Sunny/Shower	Sunny	Sunny	Sunny/Cloudy	Sunny/Cloudy	Sunny

### 3.3.2 Bulky Goods

Table 3-4 Traffic Results Summary – Bulky Goods

	Sydney Metropolitan Area			Non-Metropolitan Area		
Site ID	BG1	BG2	BG3	BG4	BG5	BG6
Gross floor area (m2)	4,300	14,849	600	6,029	1,200	1,700
<b>Weekdays</b>						
<b>Person-based Trips</b>						
- Site Peak Hour	104	531	42	159	94	61
Trips/ 100m <sup>2</sup> GFA	2.42	3.58	7.00	2.64	7.83	3.59
- Vehicle Network AM Peak	Network AM peak is outside of opening hours					
Trips/ 100m <sup>2</sup> GFA						
- Vehicle Network PM Peak	57	301	Outside of opening hrs	104	55	45
Trips/ 100m <sup>2</sup> GFA	1.33	2.03		1.72	4.58	2.65
Daily Total Person Trips	683	3,169	218	1,315	599	330
Trips/ 100m <sup>2</sup> GFA	15.88	21.34	36.33	21.81	49.92	19.41
<b>Vehicle-based Trips</b>						
- Site Peak Hour	61	232	26	118	57	35
Trips/ 100m <sup>2</sup> GFA	1.42	1.56	4.33	1.96	4.75	2.06
- Network AM Peak	Network AM peak is outside of opening hours					
Trips/ 100m <sup>2</sup> GFA						
- Network PM Peak	35	180	Outside of opening hrs	70	27	19
Trips/ 100m <sup>2</sup> GFA	0.81	1.21		1.16	2.25	1.12
Daily Total LV Trips	437	1743	133	898	319	170
Trips/ 100m <sup>2</sup> GFA	10.16	11.74	22.17	14.89	26.58	10.00
Daily Total HV Trips	9	0	18	12	28	4
Trips/ 100m <sup>2</sup> GFA	0.21	0.00	3.00	0.20	2.33	0.24
Daily Total Vehicle Trips	446	1,743	151	910	347	174
Trips/ 100m <sup>2</sup> GFA	10.37	11.74	25.17	15.09	28.92	11.60
% HV	2.0%	0.0%	11.9%	1.3%	8.1%	2.3%
Peak Parking Accumulation	28	133	19	41	24	7
Peak Parking/ 100m <sup>2</sup> GFA	0.65	0.90	3.17	0.68	2.00	0.41
<b>Weekend</b>						
<b>Person-based Trips</b>						
- Site Peak Hour	199	1,075	71	377	170	95
Trips/ 100m <sup>2</sup> GFA	4.63	7.24	11.83	6.25	14.17	5.59
- Vehicle Network Peak	164	731	26	302	100	53
Trips/ 100m <sup>2</sup> GFA	3.81	4.92	4.33	5.01	8.33	3.12
Daily Total Person Trips	1,079	5,851	220	1,950	850	407
Trips/ 100m <sup>2</sup> GFA	25.09	39.40	36.67	32.34	70.83	23.94
<b>Vehicle-based Trips</b>						
- Site Peak Hour	96	425	37	205	68	47
Trips/ 100m <sup>2</sup> GFA	2.23	2.86	6.17	3.40	5.67	2.76
- Network Peak	73	327	17	170	48	23
Trips/ 100m <sup>2</sup> GFA	1.70	2.20	2.83	2.82	4.00	1.35
Daily Total LV Trips	491	2510	119	1102	404	178
Trips/ 100m <sup>2</sup> GFA	11.42	16.90	19.83	18.28	33.67	10.47
Daily Total HV Trips	0	0	2	2	6	2
Trips/ 100m <sup>2</sup> GFA	0.00	0.00	0.33	0.03	0.50	0.12
Daily Total Vehicle Trips	491	2,510	121	1,104	410	180
Trips/ 100m <sup>2</sup> GFA	11.42	16.90	20.17	18.31	34.17	10.59
% HV	0.0%	0.0%	1.7%	0.2%	1.5%	1.1%
Peak Parking Accumulation	39	243	13	51	27	6
Peak Parking/ 100m <sup>2</sup> GFA	0.91	1.64	2.17	0.85	2.25	0.35



Table 3-5 Trips Rate Summary – Bulky Goods

Trips/ 100m <sup>2</sup> GFA	Sydney Metropolitan Area BG1 to BG3			Non-Metropolitan Area BG4 to BG6			All Survey Sites BG1 to BG6			Avg Non-metro / Metro %
	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	
<b>Weekdays</b>										
<b>Person-based Trips</b>										
- Site Peak Hour	2.42	7.00	4.33	2.64	7.83	4.69	2.42	7.83	4.51	108.2%
- Vehicle Network AM Peak	Network AM peak is outside of opening hours									
- Vehicle Network PM Peak	1.33	2.03	1.68	1.72	4.58	2.99	1.33	4.58	2.46	178.1%
Daily Total Person Trips	15.88	36.33	24.52	19.41	49.92	30.38	15.88	49.92	27.45	123.9%
<b>Vehicle-based Trips</b>										
- Site Peak Hour	1.42	4.33	2.44	1.96	4.75	2.92	1.42	4.75	2.68	119.8%
- Network AM Peak	Network AM peak is outside of opening hours									
- Network PM Peak	0.81	1.21	1.01	1.12	2.25	1.51	0.81	2.25	1.31	149.0%
Daily Total LV Trips	10.16	22.17	14.69	10.00	26.58	17.16	10.00	26.58	15.92	116.8%
Daily Total HV Trips	0.00	3.00	1.07	0.20	2.33	0.92	0.00	3.00	1.00	86.2%
Daily Total Vehicle Trips	10.37	25.17	15.76	10.24	28.92	18.08	10.24	28.92	16.92	114.7%
Peak Parking Accumulation	0.65	3.17	1.57	0.41	2.00	1.03	0.41	3.17	1.30	65.6%
<b>Weekend</b>										
<b>Person-based Trips</b>										
- Site Peak Hour	4.63	11.83	7.90	5.59	14.17	8.67	4.63	14.17	8.28	109.7%
- Vehicle Network Peak	3.81	4.92	4.36	3.12	8.33	5.49	3.12	8.33	4.92	125.9%
Daily Total Person Trips	25.09	39.40	33.72	23.94	70.83	42.37	23.94	70.83	38.05	125.7%
<b>Vehicle-based Trips</b>										
- Site Peak Hour	2.23	6.17	3.75	2.76	5.67	3.94	2.23	6.17	3.85	105.1%
- Vehicle Network Peak	1.70	2.83	2.24	1.35	4.00	2.72	1.35	4.00	2.48	121.4%
Daily Total LV Trips	11.42	19.83	16.05	10.47	33.67	20.81	10.47	33.67	18.43	129.6%
Daily Total HV Trips	0.00	0.33	0.11	0.03	0.50	0.22	0.00	0.50	0.16	195.2%
Daily Total Vehicle Trips	11.42	20.17	16.16	10.59	34.17	21.02	10.59	34.17	18.59	130.1%
Peak Parking Accumulation	0.91	2.17	1.57	0.35	2.25	1.15	0.35	2.25	1.36	73.2%
<b>Weekend / Weekdays %</b>										
<b>Person-based Trips</b>										
- Site Peak Hour	191.3%	242.9%	259.9%	180.7%	181.8%	183.8%	235.2%	181.8%	199.9%	
Daily Total Person Trips	158.0%	108.4%	137.5%	123.3%	141.9%	139.5%	150.7%	141.9%	138.6%	
<b>Vehicle-based Trips</b>										
- Site Peak Hour	157.4%	142.3%	154.0%	141.3%	119.3%	135.0%	157.4%	129.8%	143.6%	
Daily Total LV Trips	112.4%	89.5%	109.3%	104.7%	126.6%	121.2%	104.7%	126.6%	115.7%	
Daily Total HV Trips	0.0%	11.1%	10.4%	16.7%	21.4%	23.5%	0.0%	16.7%	16.5%	
Daily Total Vehicle Trips	110.1%	80.1%	102.6%	103.4%	118.2%	116.3%	103.4%	118.2%	109.9%	
Peak Parking Accumulation	139.3%	68.4%	99.9%	85.7%	112.5%	111.5%	85.7%	71.1%	104.5%	

\* LV – Light vehicles, HV – Heavy vehicles

\* The units of parking accumulation are Peak parked cars / 100m<sup>2</sup> GFA.

The bottom section of this table expresses the weekend traffic characteristics as a percentage of the weekday traffic characteristics and the last column expresses the non metropolitan traffic characteristics as a percentage of the metropolitan traffic characteristics.

A review of the data reveals a number of observations

- The surveys were undertaken on a range of GFA from 600 to 14,849 square metres.
- The weekday site peak hour trip generation rate varied from 4.42 to 4.75 vehicle trips per 100 sq m GFA with an average of 2.68 trips.
- The weekday daily trip rate varied from 10.24 to 28.92 vehicle trips per 100 sq m GFA with an average of 16.92 trips.



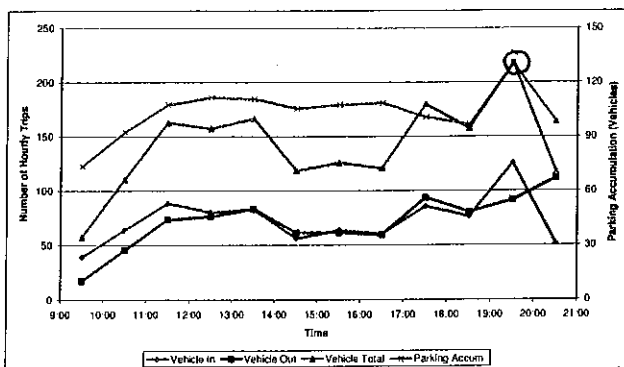


Figure 3-41 BG2 – Survey Results (Thursday) – Vehicle Trips

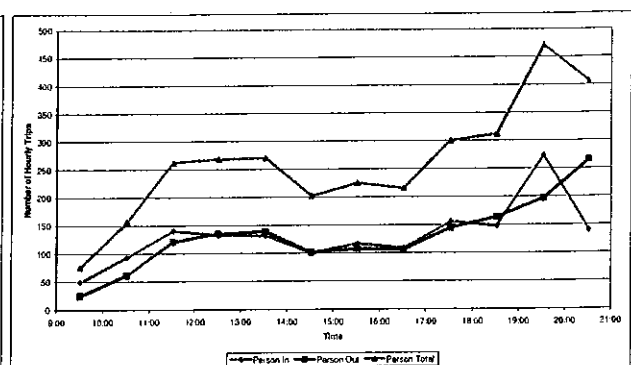


Figure 3-42 BG2 – Survey Results (Thursday) – Person Trips

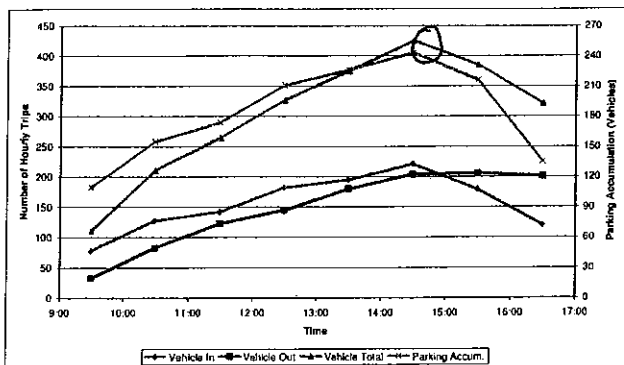


Figure 3-43 BG2 - Survey Results (Saturday) - Vehicle Trips

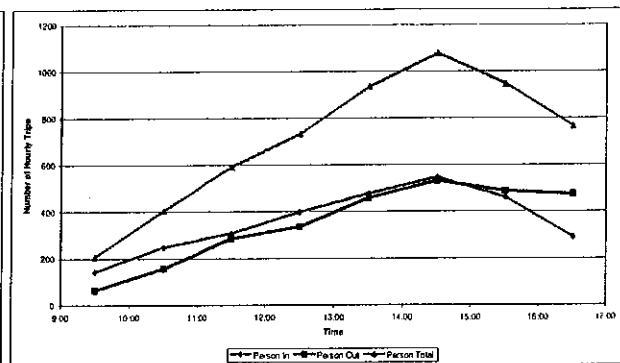
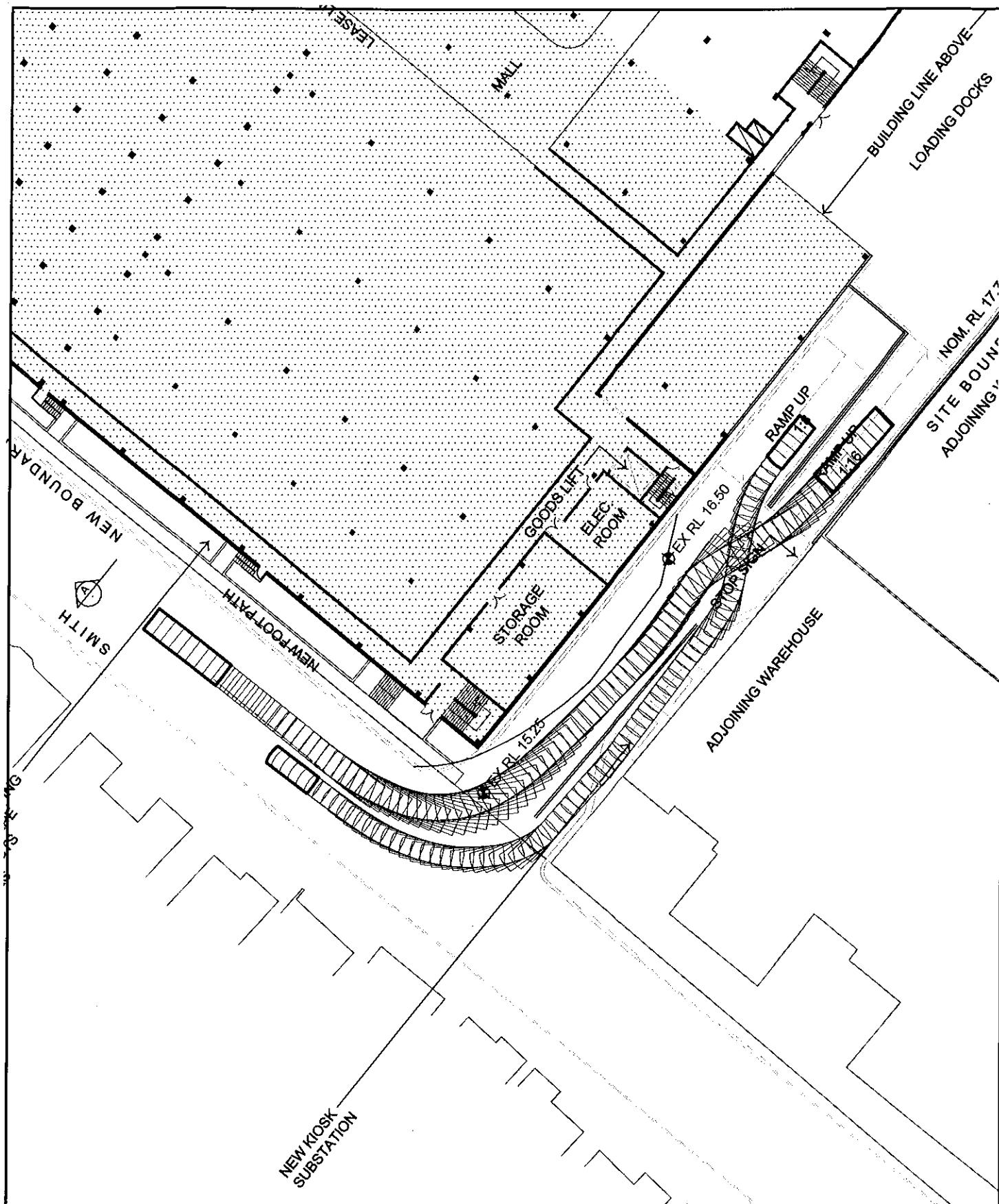


Figure 3-44 BG2 - Survey Results (Saturday) - Person Trips



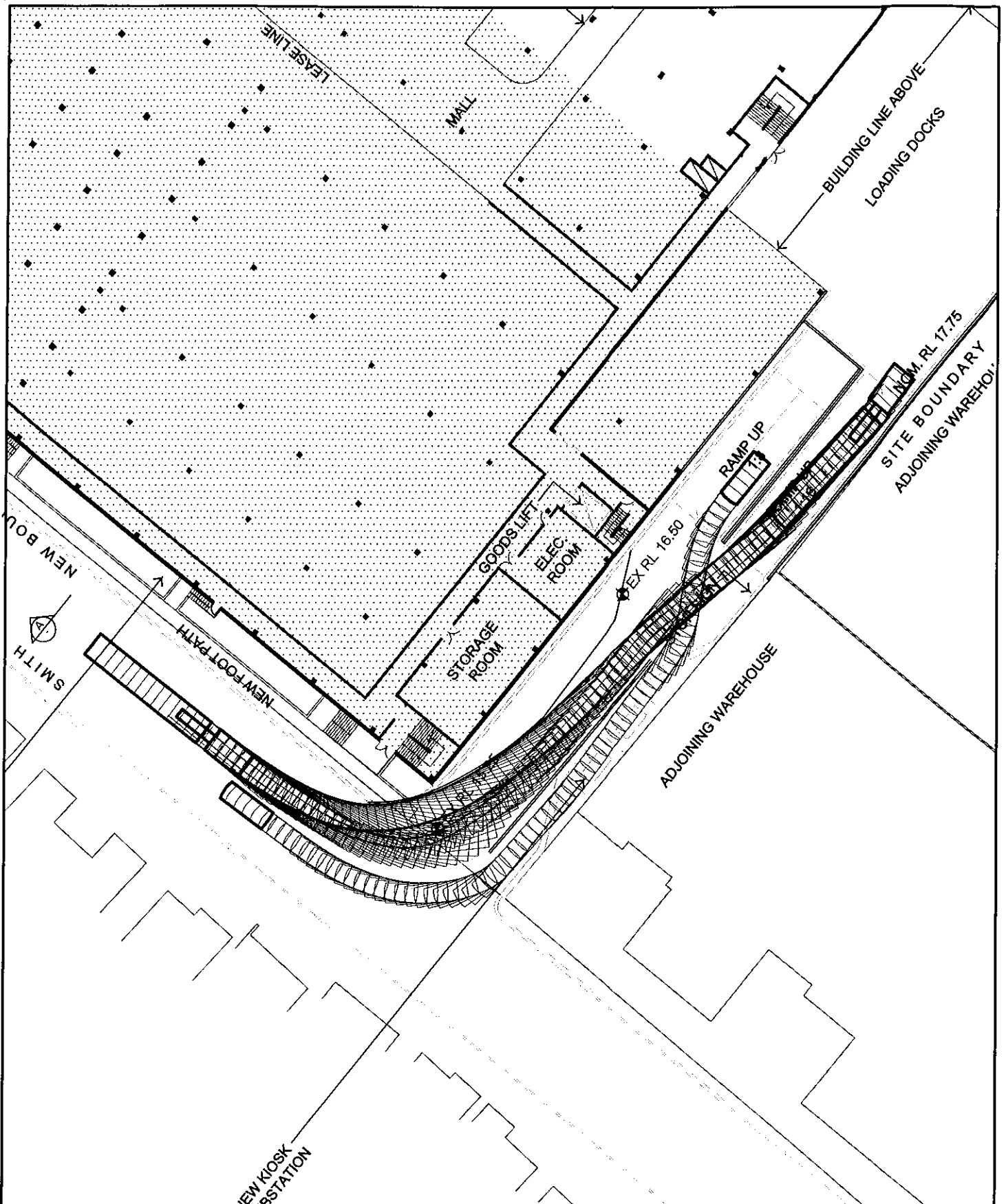
## LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V9.21 in conjunction with AutoCAD 2012. The vehicle used is based upon vehicle data provided by Austroads and incorporates a reasonable degree of tolerance. However, it is not possible to account for all vehicle types/characteristics and/or driver ability.



**SWEPT PATH ANALYSIS  
OF AN 8.8m RIGID VEHICLE  
AND A 99th PERCENTILE  
VEHICLE**

**SP 1**



## LEGEND

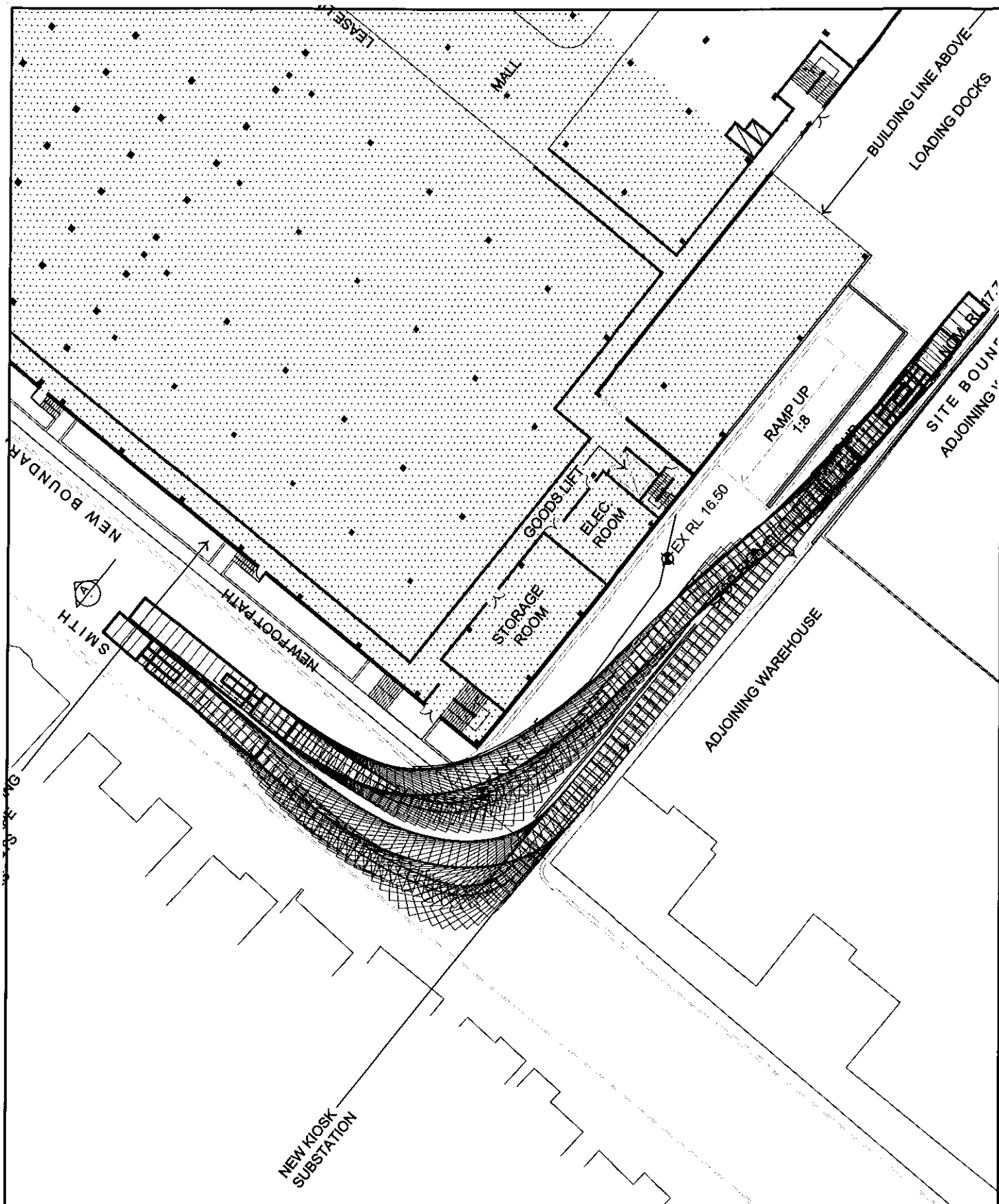
This drawing has been prepared using vehicle modelling computer software AutoTrack V9.21 in conjunction with AutoCAD 2012. The vehicle used is based upon vehicle data provided by Austroads and incorporates a reasonable degree of tolerance. However, it is not possible to account for all vehicle types/characteristics and/or driver ability.



**SWEPT PATH ANALYSIS  
OF A 19m ARTICULATED AND  
A 99th PERCENTILE  
VEHICLE**

**SP 2**





## LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V9.21 in conjunction with AutoCAD 2012. The vehicle used is based upon vehicle data provided by Austroads and incorporates a reasonable degree of tolerance. However, it is not possible to account for all vehicle types/characteristics and/or driver ability.



## SWEPT PATH ANALYSIS OF A 19m ARTICULATED VEHICLES

SP 3

## Ross Nettle

---

**From:** Ross Nettle <Ross@ttpa.com.au>  
**Sent:** Thursday, 13 June 2013 10:25 AM  
**To:** Vince Taranto (vince.taranto@rms.nsw.gov.au)  
**Cc:** Robert W O'Keefe (Robert.Keefe@rms.nsw.gov.au); Richard West (RWest@pb.com.au)  
**Subject:** TDT 2013/04

Vince

My first attempt to use the detail data (Appendix E) was for a proposed major new development at Erskine Park. This development will have an unusual (for that area) high number of employees and I wanted to establish how the traffic generation characteristics of this compared to the established uses and the planning for the road system at Erskine Park.

### 1<sup>st</sup> Problem

Network traffic modelling is based on the common factor of developable ha's. But what is provided is the total area of the Erskine Park Employment Area 326.9 ha whereas the widely published developable area is only 266.7 ha (the percentage developable for any site will vary greatly due to environmental considerations). Then I look to see what is specified as the generation rate per ha (vehicles and persons) and I find that the figures quoted are derived by simply dividing the number of surveyed trips by the 377 ha. This ignores the fact that only some 60-70% of the total site is developed. Presumably a common error across all sites surveyed.

Then I wonder how we got from a peak generation rate of 0.163vtph/100m<sup>2</sup> at Erskine Park to a Sydney average of some 0.58vtph/100m<sup>2</sup> and can see that in averaging the same "weight" has been given to Helensburgh with its total of 0.6ha compared to the 326.9ha at Erskine Park and 114.6ha at Eastern Creek. Then I see that the average occupied unit in Helensburgh is only 123.46m<sup>2</sup> compared to 19,266.9m<sup>2</sup> in Erskine Park and 18,481.8m<sup>2</sup> in Eastern Creek and a similar difference in Riverwood 1,873.9m<sup>2</sup>.

It is simply illogical to aggregate such totally different landuses and specify an average traffic generation rate (the same problem which is evident in the "Hardware" assessment) then classify them as Business/Industrial Parks whereas Erskine Park and Eastern Creek are very largely warehouses and the other 2 are factory units.

Application of the 0.58vtph per 100m<sup>2</sup> (as any LGA in Sydney or throughout Australia could now request given the RMS T.D.) to Erskine Park's 693,605m<sup>2</sup> equates to 4,023vtph whereas there were only 1,128vtph recorded.

I see the very real potential for developers to legitimately challenge Section 94 contributions or State Road contributions based on the RMS updated traffic generation criteria for Low Density Residential or Business Park/Industrial Estate uses.

Regards  
Ross Nettle  
Director

### Transport and Traffic Planning Australia

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## Ross Nettle

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**From:** Ross Nettle <Ross@ttpa.com.au>  
**Sent:** Thursday, 13 June 2013 11:14 AM  
**To:** Vince Taranto (vince.taranto@rms.nsw.gov.au)  
**Cc:** Robert W O'Keefe (Robert.Keefe@rms.nsw.gov.au); Richard West (RWest@pb.com.au); Richard Smyth (rm@smythplan.com)  
**Subject:** TDT 2013/04

Vince

No sooner had I sent my last email I am looking to utilise the data for "seniors living" in relation to an assessment for a new development at Sutherland.

The TDT specifies weekday peak hour vehicle trips as 0.4 per dwelling. When I look at the detail data from the 5 Metropolitan sites and 5 Regional sites I note that:

- the average of the Metropolitan sites during the onstreet PM peak is 0.176vtph per dwelling
- the average of the 10 sites for the site generation peak is some 0.4vtph per dwelling

The TDT specified generation rate is therefore 227% higher than the average recorded for Metropolitan sites in the onstreet peak period (which is what this data is invariably used for).

I think you should seriously consider withdrawing this TDT in order to review it more closely.

Regards  
Ross Nettle  
Director

**Transport and Traffic Planning**  
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## Ross Nettle

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**From:** Ross Nettle <Ross@ttpa.com.au>  
**Sent:** Wednesday, 5 June 2013 2:07 PM  
**To:** Vince Taranto (vince.taranto@rms.nsw.gov.au)  
**Cc:** Robert W O'Keefe (Robert.Keefe@rms.nsw.gov.au); Richard West (RWest@pb.com.au)  
**Subject:** Traffic Generation Rates RMS TDT 2013/04  
**Attachments:** Letter to RMS 20130605.pdf

Vince

Please find attached our letter to RMS for your attention.

Regards  
Ross Nettle  
Director

**Transport and Traffic Planning Australia**  
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5 June 2013

Mr Vince Taranto  
Roads and Maritime Services

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c.c. Robert W O'Keefe ([Robert.okeefe@rms.nsw.gov.au](mailto:Robert.okeefe@rms.nsw.gov.au))  
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Dear Vince

## **Traffic Generation Rates RMS TDT 2013/04**

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Some things really trouble me particularly when, once published, they become "law" throughout Australia for the next 10, 20 or even 30 years.

- **Low Density Residential**

See attached TTPA Study for a very large totally confined area with little public transport and we have done other smaller studies with similar results. It seems to me that there is something seriously wrong here, particularly when Growth Centres adopt very comparable rates in their transport planning. The disparity marked on the summary sheet is startling.

- **High Density Housing**

This is good but would have been better if it included guidance in relation to the now widespread "contemporary constrained parking provisions" for apartments.

- **Housing for Seniors**

There is a vast range of different housing styles and circumstances and there is no qualification provided in this regard.

- **Office Blocks**

Again there should be qualification for locations with constrained parking provision and I sent you a comprehensive array of data on this.

**Transportation, Traffic and Design Consultants**

- **Business Parks and Industrial Estates**

Needs qualification in regard to large warehouse developments. Anyone could easily be mistaken to think that there is no difference between Macquarie Park and Eskine Park where the former have parking at 1 per 43m<sup>2</sup> and all come and go in the peaks whereas the latter have parking at 1 per 250-300m<sup>2</sup>, work 12 hour shifts and don't travel in the peak periods.

- **Major Hardware**

Extremely misleading, 5 of the 9 sites were only in the 2,000m<sup>2</sup> or less range whereas Bunnings and Masters are now getting up to 20,000m<sup>2</sup>. At least a qualification that:

- the generation rate per 100m<sup>2</sup> decreases as the floor area increases (this is clearly evident in the results)
- the prevalence of competition decreases the generation rate. The Bunnings Minchinbury site was (at the time of survey) the highest trading site in NSW due to lack of competition. It now has (or will soon have) 2 other Bunnings not too far away, a Masters on the adjoining site and a Masters just to the west.

Yours faithfully



Ross Nettle  
Director  
Transport and Traffic Planning Associates

Encl

**PROPOSED  
GLENMORE PARK STAGE 2**  
*Assessment of Traffic, Transport and  
Parking Implications*

September 2003

Reference 0338

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## 5.2 EXISTING GLENMORE PARK

The 2001 Census established that there were some 5,447 occupied dwellings in the existing Glenmore Park development at the time of the survey.

Access to and from the surrounding Arterial Road network (ie The Northern Road and Mulgoa Road) from the existing development is restricted to the Glenmore Parkway and Garswood Road intersection. This circumstance and the circuitous internal road layout provides the relatively unique situation where it is possible to establish the vehicle trip generation rate of the estate without the complication of non-related external through movements. An assessment of the AM and PM peak hour movements at the 3 'access' intersections from the 'June' survey indicate the following IN/OUT movements from the Glenmore Park Estate.

	<b>Total Movements</b>	<b>IN</b>	<b>OUT</b>
AM Peak	3,278	835	2,443
PM Peak	3,645	2,636	1,009

*(NB The earlier survey provided similar results to the June survey being within  $\pm 2\%$  of the total movements)*

On the conservative estimate that there have been some 200 dwellings built and occupied since the undertaking of the 2001 Census (ie 5,647 dwellings), the traffic movements indicated above translate to the following external trip generation rates for the estate and the peak period IN vs OUT ratios.

	<b>Total (vtph)</b>	<b>IN (%)</b>	<b>OUT (%)</b>
AM Peak	0.58	25	75
PM Peak	0.65	72	28



### 5.3 ORIOLE STREET CATCHMENT

The street layout within the existing Glenmore Park development provided an opportunity to undertake a 'sensitivity test' of the published RTA generation rate and the rates established in Section 5.2. To ascertain the traffic generation rate of residential only development, a survey was carried out of the vehicle movements in the AM (7.00 – 9.00am) and PM (4.00 - 6.30pm) peak period travelling to/from Oriole Street at its intersection with Woodlands Drive. This intersection is the only means of vehicular access to some 340 residences and is an area of the estate which is fully developed with no new residential construction activity currently taking place.

The results of the survey indicate the following movements to/from Oriole Street.

**LOCATION: ORIOLE STREET/WOODLANDS DRIVE  
(SURVEY PERIOD – 19<sup>TH</sup> MAY 2003)**

		<b>AM Peak (7.45 – 8.45am)</b>	<b>PM Peak (5.15 – 6.15pm)</b>
Oriole Street (OUT)	Left	24	11
	Right	118	51
Woodlands Drive (IN)	Left	8	35
	Right	34	132
<b>Total</b>		<b>184</b>	<b>229</b>

On the assumption that of the 340 residences within the surveyed area, approximately 6% (20 residences) were unoccupied, the traffic movements represent an AM and PM peak generation of 0.58 vehicle trips per hour per residence and 0.72 vehicle trips per hour per residence respectively.

From the assessment it is apparent that the RTA published trip generation rate for residential development of 0.85 vtph is not a true reflection of the circumstances which prevail at Glenmore Park. On the basis that the trip generation rate attained from the Oriole Street assessment also includes a component of 'internal' trips (say 6%), the data from this analysis and that of the 'whole' of Glenmore Park would suggest that an external trip generation rate of 0.65 vtph per dwelling in the peak periods is a far more accurate interpretation of the existing traffic activity generated by the Glenmore Park Estate.

Application of this rate to the various phases of the proposed development indicates the following likely AM and PM peak vehicle movements:

Phase	0.65 vtph	AM Peak *		PM Peak *	
		OUT (80%)	IN (20%)	OUT (25%)	IN (75%)
1	144	115	29	36	108
2	150	120	30	37	113
3	165-199	132-159	33-40	41-50	124-149
4	135-142	110-114	25-28	34-35	101-107
5	124	120	96	24	30
6	135	108	27	34	101
<b>Total</b>	<b>849-890</b>	<b>681-712</b>	<b>168-178</b>	<b>212-222</b>	<b>637-668</b>

The modelling undertaken of the existing circumstances at the intersection of Mulgoa Road/Glenmore Parkway and The Northern Road/Glenmore Parkway (refer to Section 3.3) confirmed on-site observations that both intersections operate satisfactorily with spare capacity during the AM and PM peak periods.

To establish the impact of the proposed development on these two intersections an assessment was undertaken of the following 2 development scenarios:

# APPENDIX A - LOW DENSITY RESIDENTIAL - SURVEY DETAILS

Source: Trip Generation Surveys Low Density Residential TRF Consulting, in association with Gennadi Consulting Pty Ltd for the NSW Roads and Traffic Authority, June 2010, p3

Area Characteristics:	Survey area ID										
	LDR1	LDR2	LDR3	LDR4	LDR5	LDR6	LDR7	LDR8	LDR9	LDR10	LDR11
Suburb	Beaumont Hills	Longueville	North Epping	Werrington Downs	West Hoxton	Westleigh	Coffs Harbour	Goonellabah	Calare	Glenfield Park	Farnborough Heights
Local Government Area	Baulkham Hills	Lane Cove	Hornsby	Penrith	Liverpool	Hornsby	Coffs Harbour	Lismore	Orange	Wagga Wagga	Wollongong
Typical housing type	two-storey	two-storey	one - & two-storey	one-storey	large two-storey	one-storey	one-storey	one - & two-storey	one-storey	one-storey	one - & two-storey
Indicative Public Transport Accessibility Score	6	30	11	8	5	6	3	2	2	3	2
Traffic generating developments within the area	1 School, 2 Childcare centres	1 Private Hospital	1 School, 2 Childcare centres, 1 Shopping Village, 1 Local shop, 1 Retirement Village	1 Childcare centre	3 Childcare, 1 Medical Centre	1 School, 1 Childcare, 1 Shopping centre	None	1 Function Centre	2 Childcare centres, 1 Aged Care facility	None	None
No. of dwellings	956	676	1495	669	1235	1335	509	558	697	554	905
Population	3,346	2,084	4,295	2,095	4,552	4,924	1,250	1,378	2,037	1,391	2,885
Date of survey	04-May-10	28-Apr-10	28-Apr-10	04-May-10	05-May-10	28-Apr-10	13-May-10	12-May-10	08-May-10	05-May-10	06-May-10
Duration of survey	1 day	1 day	1 day	1 day	1 day	1 day	1 day	1 day	1 day	1 day	1 day
Weather	Fine	Fine	Fine	Fine	Fine	Fine	Fine	Fine	Fine	Overcast, light morning showers	Fine
Surrounding roads - AM peak period	08:00-09:00	08:00-09:00	06:00-07:00	08:00-09:00	08:00-09:00	07:00-08:00	08:00-09:00	08:00-09:00	08:00-09:00	08:00-09:00	08:00-09:00
Surrounding roads - PM peak period	17:00-18:00	17:00-18:00	15:00-16:00	15:30-16:30	17:00-18:00	16:00-17:00	15:00-16:00	15:30-16:30	16:00-17:00	16:00-17:00	15:00-16:00
Person Trips:											
o Peak 1-hour person-trips	2170	1083	1390	1286	2807	1207	735	631	1018	733	892
o Time of peak 1-hour person-trips	15:00-16:00	07:15-08:15	07:30-08:30	16:30-17:30	08:00-09:00	17:00-18:00	15:15-16:15	15:30-16:30	08:00-09:00	15:30-16:30	07:45-08:45
o Peak person-trips per dwelling	2.27	1.60	0.93	1.92	2.27	0.90	1.44	1.13	1.46	1.32	0.99
o Peak person-trips per resident	0.65	0.52	0.32	0.61	0.62	0.30	0.59	0.46	0.50	0.53	0.33
o Total daily person-trips	14389	9699	11276	9753	17658	11489	4955	5099	7356	4878	6872
o Total daily person-trips per dwelling	15.05	14.35	7.54	14.58	14.31	8.61	9.73	9.17	10.55	8.81	7.37
o Total daily person-trips per resident	4.30	4.65	2.63	4.85	3.88	2.86	3.96	3.70	3.61	3.51	2.49
o Person-trips in network AM peak	1660	917	401	1046	2807	1042	639	629	1018	569	851
o Person-trips in network PM peak	1517	939	1169	1068	1732	1085	675	557	896	655	854
Vehicle Trips:											
o Peak 1-hour vehicle-trips	1170	710	875	932	1625	944	384	446	627	490	555
o Time of peak 1-hour vehicle-trips	08:00-09:00	17:30-18:30	07:30-08:30	17:00-18:00	08:00-09:00	17:00-18:00	08:00-09:00	17:00-18:00	16:45-17:45	17:15-18:15	07:45-08:45
o Peak vehicle-trips per dwelling	1.22	1.05	0.59	1.39	1.32	0.71	0.75	0.80	0.90	0.87	0.61
o Peak vehicle-trips per resident	0.35	0.34	0.20	0.44	0.36	0.23	0.31	0.32	0.31	0.35	0.21
o Total daily vehicle-trips	9237	6962	7816	6914	11983	8888	3325	3635	4962	3521	4670
o Total daily vehicle-trips per dwelling	9.66	10.30	5.23	10.33	9.70	6.66	6.53	6.54	7.12	6.36	5.16
o Total daily vehicle-trips per resident	2.76	3.34	1.82	3.30	2.63	2.21	2.66	2.64	2.44	2.53	1.74
o Vehicle-trips in network AM peak	1170	598	297	649	1625	790	384	446	591	372	543
o Vehicle-trips in network PM peak	1070	709	653	744	1271	808	334	446	552	460	485
o % of total trips by mode:											
o % Car (as driver)	61.2%	68.7%	67.7%	68.6%	65.3%	75.2%	65.6%	66.2%	66.7%	70.2%	67.1%
o % Car (as passenger)	15.2%	16.8%	20.5%	18.9%	25.0%	16.1%	23.2%	19.0%	27.9%	22.1%	21.9%
o % Train	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
o % Bus	16.3%	4.3%	5.2%	5.8%	4.0%	3.5%	4.3%	7.0%	2.3%	5.3%	6.2%
o % Cycle	0.3%	0.4%	0.7%	0.3%	0.2%	0.3%	1.3%	0.5%	0.3%	0.1%	0.3%
o % On foot	5.4%	6.8%	4.3%	4.9%	3.5%	3.0%	4.4%	3.6%	1.8%	1.0%	2.6%
o % Other	1.0%	2.9%	1.6%	1.3%	2.0%	1.8%	1.3%	1.7%	0.4%	0.8%	1.8%