



# Roads and Traffic Authority

## Trip Generation and Parking Generation Surveys

### Bulky Goods / Hardware Stores

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#### Analysis Report





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### Analysis Report

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# 1 INTRODUCTION

## 1.1 Study Brief / Outcomes

Since the original publication of the *Guide to Traffic Generating Developments*, there have been numerous changes to retail trading, including trading hours, store sizes and the range of goods offered in individual stores. Shoppers' circumstances have changed as well, with improved access to private vehicles and higher disposable incomes.

The RTA is concerned that the traffic generation and parking data in its guide contains data that was collected prior to the document's initial issue in 1993, and that does not reflect current traffic patterns.

RTA proposes to progressively update its trip generation and parking demand data for a range of land uses. To commence the process, Hyder was appointed to undertake a detailed analysis of the land use covering bulky goods / hardware stores. The study includes new surveys which record not only traffic characteristics relating to vehicle and person trips, but also includes interview surveys with visitors to determine postcode origins and travel mode.

The collected information was then compared to equivalent data in overseas traffic generation and car parking databases. This assessment may help identify an alternative source of trip generation and parking demand databases that could have relevance to Australian conditions.

## 1.2 Bulky goods / Hardware store

From the definition provided by the Bulky Goods Retailers Association Limited, bulky goods retailing includes categories such as furniture, white goods, electrical equipment, bedding and manchester, lighting, automotive parts, camping and outdoor equipment, tools, building materials and DIY and homemaker products. Examples of bulky goods store brands include Freedom Furniture, The Good Guys, Fantastic Furniture, Barbeques Galore, Harvey Norman, Forty Winks, OZ Design Furniture and Bunnings.

However, in the last ten years, the number of large hardware warehouse stores has increased significantly in Australia. Such stores specialise in a variety of hand and power tools, paint, garden, domestic, outdoor furniture, timber and building products. Examples of hardware stores are Bunnings and Mitre 10. The RTA's intention is to analyse this 'newer' type of hardware superstore. Because of their different characteristics, the hardware store data will be reported in this document separately from other bulky goods shops.

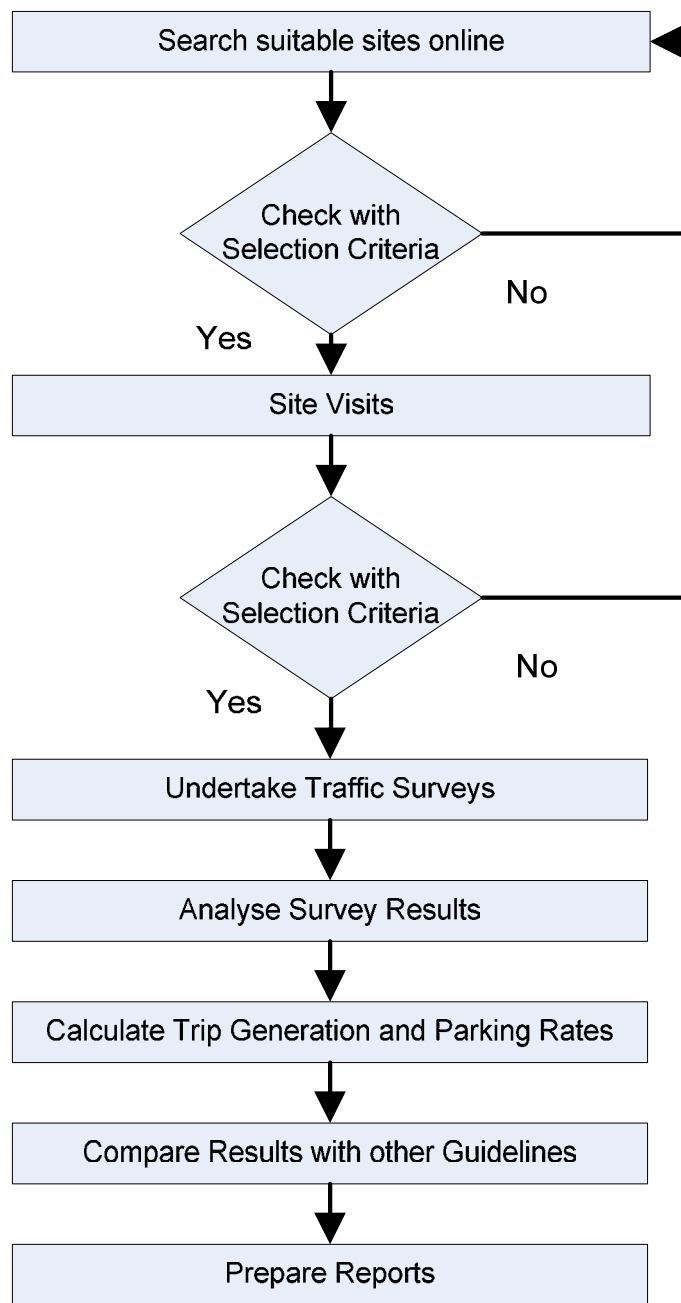
## 1.3 Approach

The approach to this generation study is described below:

- Hyder prepared a list of around 30 sites by using aerial photos and online information and submitted these to RTA for review.
- The initial work identified that there would be significant differences between bulky goods and hardware stores and so RTA agreed to split the surveys so that 9 hardware store surveys and 6 bulky goods store surveys were undertaken.

- When the list of sites was reduced to 15, Hyder undertook detailed site assessments of retail sites, contacting the development managers and occupiers to obtain comprehensive information including gross and leasable floor areas, number of employees, access to public transport, and trading hours.
- Hyder then arranged traffic counts on weekdays and weekends at the sites. The surveys were undertaken during the opening hours of the stores on Thursdays and Saturday. The choice of survey days was based upon discussions with business owners, available historic and international data and reflected observed peak conditions. The survey data included parking accumulation counts, vehicle counts and person counts. Sites that had a minimum number of access points were preferred as this minimised survey costs.
- Where no existing / suitable RTA data was available, automatic traffic counters were placed on adjacent major roads to determine the network morning and evening peak hour periods on the survey day.
- Hyder analysed the data using linear regression and considered the generated data as a function of a number of key variables.
- Hyder then compared the generation rates established with information from other databases from Australia and overseas.
- Hyder prepared a report to summarise the findings of the survey and data analysis.
- The reporting is presented in two documents. The first, this report, contains the analysis covering all of the calculations and comparisons.
- The second report contains the raw data from the surveys and other data such as site plans and tabulated person-trip data (Hyder report no. F0002-AA002363-AAR-01).

The analysis process is captured in the flowchart below



**Figure 1-1 Study Approach**

## 1.4 Report Structure

This analysis report has the following structure:

- **Chapter 1: Introduction** – This contains the background to the study, approach and report structure;
- **Chapter 2: Survey methodology** – This contains a description of the survey and site selection process;
- **Chapter 3: Survey analysis** – This section analyses the survey results using linear regression;
- **Chapter 4: Comparison of survey results with overseas databases** – This section compares the NSW survey results with other country's databases such as TRICS (United Kingdom), NZTDB (New Zealand) and ITE (United States) and assesses the validity of comparing the different databases
- **Chapter 5 : Summary**

## 2 SURVEY METHODOLOGY

### 2.1 Selection of Sites

The selection of appropriate sites was the key process in the project.

It was necessary to ensure that the sites selected represented the whole of the state. The selected sites had to show a geographic spread and range of sizes. To achieve this spread, eight sites were selected in the Sydney Metropolitan Area and seven sites were selected in regional centres.

Furthermore, in order for the study data to be robust, it was necessary to show that the sites operated “independently” in traffic terms and that all traffic movements (vehicles and pedestrians) were generated as a result of the proposed site use (i.e. the site was not shared with another store/use which also generated trips). The table below identifies the factors that were crucial in determining that the selected sites were suitable for isolated analysis.

**Table 2-1 Survey Sites Selection Criteria**

Selection Criteria	Description
Out-of-centre (Isolated)	The business is free-standing and has provided off-street parking for its own exclusive use.
Unconstrained parking	The provision of car parking satisfies peak daily demand and most seasonal demands
Ease for surveying	The number of entrances/exits are minimised and can easily be seen
Fairly recent construction	The building / business has opened within the last 15 years
Accessibility Score	This scoring system was developed by RTA to measure access to public transport. The chosen site should have scores less than 75 to indicate that sites are primarily dependent on cars rather than public transport.
No on-street parking	All customers, staff and visitors can park on site and can be recorded by traffic surveyors
Limited pedestrian access	Pedestrians may only enter the site at a few dedicated entrances.
Reasonable geographic spread	The sites are well distributed across the region.
A range of sizes	The sites should represent a range of sizes

### 2.2 Site Selection Methodology

The selection of sites was, in the first instance, undertaken using local knowledge, the phone book, internet sources and Google Earth.

An initial list of around 30 sites was assembled. Hyder then prepared a check list and examined each site using a more detailed analysis to eliminate unsuitable sites, and this left 21 preferred sites (12 hardware site and 9 bulky goods sites) that best met the requirements of accessibility, variety, and excess parking.

A visit was then undertaken to each of the sites to confirm that they were acceptable and record site specific details such as the number of car parking spaces and the number of access points. Discussions were held with the site owner or landlord to establish more detailed information about the floor area, number of employees etc.

This resulted in a list of 15 sites (9 hardware site and 6 bulky goods sites) which were then discussed and agreed with the RTA. Sites HW1 to HW5 and BG1 to BG3 are located in the Sydney Metropolitan Area whilst HW6 to HW9 and BG4 to BG6 are in NSW regional centres.

The details of the selected sites are summarised in Tables 2.2 & 2.3 below. It should be noted that the floor area is measured in Gross Floor Area (GFA). It is well established that for a retail store with only one major vendor, as in this study, the measurements Gross Floor Area (GFA) and Gross Leasable Floor Area (GLFA) are essentially equal.

The locations of the sites are shown on Figure 2.1 and Figure 2.2.

**Table 2-2 Site Details of the Selected Sites – Hardware/DIY**

Site ID	HW1	HW2	HW3	HW4	HW5	HW6	HW7	HW8	HW9
<b>Name</b>	Bunnings	Bunnings	Mitre10	Bunnings	Mitre10	Mitre10	Mitre10	Bunnings	Mitre10
<b>Suburb</b>	North Parramatta	Bankstown Airport	Windsor	Minchinbury	Narellan	Morisset	Picton	South Nowra	Orange
	2152	2200	2756	2770	2567	2264	2571	2541	2800
<b>Region</b>	Sydney	Sydney	Sydney	Sydney	Sydney	Northern	Northern	Northern	Southern
<b>Network Peak Hours</b>									
<b>Year of Network Survey</b>	2007	2005	2007	2007	2005	2004	2009	2009	2005
<b>Dates</b>							6/4-12/4	18/3-24/3	
<b>AM Peak - Weekdays</b>	0800-0900	0700-0800	0800-0900	0800-0900	0800-0900	0800-0900	0900-1000	0800-0900	0800-0900
<b>PM Peak - Weekdays</b>	1700-1800	1600-1700	1500-1600	1700-1800	1600-1700	1600-1700	1600-1700	1500-1600	1600-1700
<b>Peak - Weekends</b>	1200-1300	1200-1300	1100-1200	1100-1200	1100-1200	1100-1200	1200-1300	1100-1200	1100-1200
<b>Site Details - Bulky Goods/Hardware</b>									
<b>Area Dimension (m<sup>2</sup>)</b>			6,700		3,500		3,600		Unknown
<b>Gross floor area (m<sup>2</sup>)</b>	9,800	14,111	1,800	11,915	2,400	2,000	1,600	9,948	1,800
<b>No. of Employee (Total)</b>			42		20		12		23
<b>No. of employee (at one time)</b>			34		15	15	12		8
<b>Year Constructed</b>			1990		1991-1992		Unknown		1980
<b>Accessibility Score</b>	<79	<79	<79	<79	<79	0.5	1	0	2
<b>Opening Hours</b>									
<b>Mon-Fri</b>	0700-2100	0700-2100	0630-1700	0700-2100	0700-1730	0630-1730	0730-1700	0700-2100	0700-1730
<b>Sat</b>	0800-1800	0800-1800	0800-1600	0800-1800	0730-1600	0700-1600	0700-1600	0800-1800	0800-1600
<b>Sun</b>	0800-1800	0800-1800	0900-1500	0800-1800	0900-1600	0700-1600	0900-1400	0800-1800	0900-1600
<b>Parking Spaces</b>									
<b>Customers</b>	263	464	44	397	35	29	75	209	28
<b>Disabled</b>	2	8	0	6	2	1	0	4	2
<b>Staff</b>			0		0	0	0		10
<b>Loading Bay</b>			2		1	0	5		2
<b>Total</b>	265	472	46	403	38	30	80	213	42
<b>Survey Results</b>									
<b>Date of Survey - Weekdays</b>	12/03/09 (Thurs)	26/03/09 (Thurs)	19/03/09 (Thurs)	19/03/09 (Thurs)	19/03/09 (Thurs)	12/03/09 (Thurs)	26/03/09 (Thurs)	26/03/09 (Thurs)	19/03/09 (Thurs)
<b>Weather</b>	Sunny	Sunny	Sunny	Sunny	Sunny	Sunny	Sunny	Sunny/ Rain Evening	Sunny
<b>Date of Survey - Weekend</b>	14/03/09 (Sat)	28/03/09 (Sat)	21/03/09 (Sat)	21/03/09 (Sat)	21/03/09 (Sat)	14/03/09 (Sat)	28/03/09 (Sat)	28/03/09 (Sat)	21/03/09 (Sat)
<b>Weather</b>	Sunny	Sunny	Sunny	Sunny	Sunny	Sunny/ Rain Evening	Sunny	Sunny	Sunny

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

Site ID	BG1	BG2	BG3	BG4	BG5	BG6
<b>Name</b>	Freedom/	Harvey Norman	Retravision	Domayne	Bing Lee	Fantastic
<b>Suburb</b>	Balgowlah	Auburn	Springwood	Kotara	Warilla	South Nowra
	2093	2144	2777	2289	2528	2541
<b>Region</b>	Sydney	Sydney	Blue Mountain	Newcastle	Southern	Southern
<b>Network Peak Hours</b>						
<b>Year of Network Survey Dates</b>	2005	2007	2005	2004	2007	2009
						18/3-24/3
<b>AM Peak - Weekdays</b>	0800-0900	0800-0900	0800-0900	0800-0900	0800-0900	0800-0900
<b>PM Peak - Weekdays</b>	1700-1800	1700-1800	1700-1800	1600-1700	1500-1600	1500-1600
<b>Peak - Weekends</b>	1200-1300	1200-1300	1100-1200	1200-1300	1100-1200	1100-1200
<b>Site Details - Bulky Goods/Hardware</b>						
<b>Area Dimension (m<sup>2</sup>)</b>		Approx 9000	1,600			
<b>Gross floor area (m<sup>2</sup>)</b>	4,300	25,384 (including car park)	600	6,029	1,200	1,700
<b>No. of Employee (Total)</b>	29	220	5			9
<b>No. of employee (at one time)</b>	10	100	5	50	20	9
<b>Year Constructed</b>	Unknown	2001			2008	
<b>Accessibility Score</b>	80-139	<79	<79	78	26	0
<b>Opening Hours</b>						
<b>Mon-Fri</b>	0900-1800	0900-1730	0900-1730	0900-1730	0900-1730	0900-1730
<b>Sat</b>	0900-1700	0900-1730	0900-1600	0900-1700	0900-1700	0900-1700
<b>Sun</b>	1000-1700	0900-1730	1000-1600	1000-1700	1000-1700	1000-1700
<b>Parking Spaces</b>						
<b>Customers</b>	43	338	13	151	51	30
<b>Disabled</b>	0	12	0	2	4	4
<b>Staff</b>	3	0	0	0	33	9
<b>Loading Bay</b>	4		1	1	4	2
<b>Total</b>	50	350	14	154	92	45
<b>Survey Results</b>						
<b>Date of Survey - Weekdays</b>	19/03/09	12/03/09	12/03/09	12/03/09	19/03/09	26/03/09
	(Thurs)	(Thurs)	(Thurs)	(Thurs)	(Thurs)	(Thurs)
<b>Weather</b>	Sunny	Sunny	Sunny	Sunny/Cloudy	Sunny/Cloudy	Sunny
<b>Date of Survey - Weekend</b>	21/03/09	14/03/09	14/03/09	14/03/09	21/03/09	28/03/09
	(Sat)	(Sat)	(Sat)	(Sat)	(Sat)	(Sat)
<b>Weather</b>	Sunny/Shower	Sunny	Sunny	Sunny/Cloudy	Sunny/Cloudy	Sunny



**Figure 2-1 Site Location - Sydney Metropolitan Area**



**Figure 2-2 Site Location – Non-Metropolitan Area**

## 2.2.1 Challenges

There were a number of difficulties encountered in selecting the sites. Some of these are described below.

- Many hardware store customers come to the site by utility vehicles (i.e. utes), vans or trucks. It was hard to classify whether such vehicles were for service/delivery or whether they belonged to customers. Although the surveyors have tried their best to record this accurately, it may not accurately represent the actual situation.
- Many bulky goods stores are now being developed in “homemaker centres” where over ten bulky goods stores are sharing off-street car parking facilities and others are located in shopping centres. Such developments promote multi-visiting so it is not easy to determine the trip rate for each of the stores or the parking requirement. In these larger centres, it is also easy for customers to undertake comparison shopping and many of the larger centres also have good public transport accessibility. As a result, counts at such sites would be inaccurate as the number of cars entering / exiting one car park would not represent the actual demand of an individual store. As such, it was quite difficult to find completely independent sites that did not share parking/other facilities with other stores.
- In many country towns, it is commonly found that bulky goods shops are located in a town centre. Most of these shops then rely on an element of on-street parking spaces which then makes it difficult to establish the parking demand for one specific store.

## 2.3 Anecdotal Information

Discussions with the owners / site managers of the properties revealed a number of opinions

- For bulky goods shops, the busiest days are generally on weekends and Thursday is the busiest weekday.
- There was no apparent difference for the busiest days for hardware / DIY stores although the busiest times were generally early in the morning and late afternoon during weekdays.
- Bunnings' regional manager was concerned about the choice of the Minchinbury site for surveying purposes as he considered that it was 'overtrading'.

## 2.4 Survey Process

The surveys were undertaken in March 2009 outside of school holidays and public holidays. The surveys were undertaken during the store opening hours on one Thursday and one Saturday. Each shop's business hours varied but generally they opened between 9am and 5.30pm. Hardware stores and shops in Sydney Metropolitan area usually opened longer hours than those in regional centres.

Interview surveys were also conducted over a four hour period at each site. The purpose of these interviews was to establish the following facts

- The travel mode of customers
- Whether people parked on-site or off-site
- Customers' home postcodes
- Trip purpose such as pass by, multi purpose or single purpose

It should be noted that interview surveys were not permitted at all the Bunnings stores. (HW1, HW2, HW4, HW8).

The site managers were also issued with a questionnaire which posed the following questions.

**Table 2-4 Summary of site manager's questionnaire**

<b>Name and address of development</b>	
Type of development	
Area Dimension (square metres)	
Total floor space area (square metres)	
Lettable floor space area (square metres)	
Opening Hours	
Peak days / times for patronage of the business	
Number of employee (average)	
Number of employee (on survey day)	
<b>Number of Parking Spaces</b>	
Customers	
Disabled	
Staff	
Loading bays	
Bicycle	
Year constructed	
start	
end	

Some managers did not have all of the above information but all provided the minimum necessary to analyse the data (i.e. floor area, parking numbers)

## 2.4.1 Data Recorded

The following information was recorded by the traffic surveyors on site:

- Weather on the survey day
- Number of vehicles parked on site at the commencement of the survey.
- Number of vehicles (*cars and commercial vehicles*) entering and leaving the site
- Vehicle occupancy
- Number of pedestrians / cyclists entering and leaving the site
- Number of vehicles parked on site at the completion of the survey
- The travel mode of customers (sample interview survey)
- Whether people had parked on-site or off-site (sample interview survey)
- Customer's home postcode (sample interview survey)
- Trip purpose such as pass by, multi purpose or single purpose. (sample interview survey)

This information would help establish person trips, vehicle trips, and help establish the occupancy of any off-site parking spaces.

Hourly traffic volumes on the adjacent major road were also collected to determine main road peak hours using either automatic traffic counters or existing RTA traffic count stations.

## 3 SURVEY ANALYSIS

### 3.1 Survey Output Requirements

The data was analysed with the key parameters needing to be established being

- Weekday site peak hour generation
- Weekday hourly generation in adjacent network AM peak
- Weekday hourly generation in adjacent network PM peak
- Weekday daily trip generation
- Weekend site peak hour generation
- Weekend peak hourly generation in adjacent network peak
- Weekend daily trip generation

### 3.2 Key Variables for Trip Rate Calculation

The trip generation calculation that was to be performed would depend upon the variable that was interrogated. Of the variables that were considered for the trip rate calculation were the following

- Gross Floor Area (GFA)
- Site area
- Number of staff
- Parking Space

It was noted that TRICS which had the most information of all of the foreign databases primarily used gross floor area although data could be interrogated for retail floor area, parking spaces and number of staff.

The New Zealand database relied on the GFA, site area and number of employees and the ITE guide only used GFA.

The Gross Floor Area (GFA) is considered to be the most reliable variable to choose. The other variables are discussed below in terms of their applicability.

- Site area

It is often the case that sites with a greater site area may simply have more open space for car parking and open space. For example the Harvey Norman in Auburn had a multi-level car park and two floors of retail area although it had a similar site area to Domayne in Kotara (i.e. the site area was the same but the Harvey Norman had more than double the size of retail area and number of parking spaces).

- Number of staff

The number of staff generally relates to how busy the business is. It could be affected by seasonal factors and the type of product they sell. Furthermore, with regard to consideration of future development applications, when a new development is proposed, the number of employees would generally be an estimate by the developer whereas other parameters such as GFA would be fixed.

- Number of parking spaces

In most cases, the number of parking spaces provided on a site would have been determined at development application stage and invariably, this is based upon the GFA.

In summary, therefore, it is considered that the most appropriate key variable is the gross floor area (GFA). As each of the study sites generally contained only one major store, the measurements Gross Floor Area (GFA) and Gross Leasable Floor Area (GLFA) were considered equal.

### 3.3 Average Trip Rates per 100 m<sup>2</sup> GFA

The summary of the survey data for each of the preferred sites is shown in the tables below. The detailed results are contained in **Appendix A**.

### 3.3.1 Hardware / DIY

Table 3-1 Traffic Results Summary – Hardware/DIY

	Sydney Metropolitan Area					Non-Metropolitan Area			
Site ID	HW1	HW2	HW3	HW4	HW5	HW6	HW7	HW8	HW9
Gross floor area (m2)	9,800	14,111	1,800	11,915	2,400	2,000	1,600	9,948	1,800
<b>Weekdays</b>									
<b>Person-based Trips</b>									
- Site Peak Hour	484	565	101	688	119	128	97	393	100
Trips/ 100m <sup>2</sup> GFA	4.94	4.00	5.61	5.77	4.96	6.40	6.06	3.95	5.56
- Vehicle Network AM Peak	162	92	49	273	65	49	76	127	61
Trips/ 100m <sup>2</sup> GFA	1.65	0.65	2.72	2.29	2.71	2.45	4.75	1.28	3.39
- Vehicle Network PM Peak	281	350	88	474	79	93	66	278	64
Trips/ 100m <sup>2</sup> GFA	2.87	2.48	4.89	3.98	3.29	4.65	4.13	2.79	3.56
Daily Total Person Trips	4,397	4,639	816	6,346	858	868	667	2,907	703
Trips/ 100m <sup>2</sup> GFA	44.87	32.88	45.33	53.26	35.75	43.40	41.69	29.22	39.06
<b>Vehicle-based Trips</b>									
- Site Peak Hour	403	444	84	491	98	112	75	273	83
Trips/ 100m <sup>2</sup> GFA	4.11	3.15	4.67	4.12	4.08	5.60	4.69	2.74	4.61
- Network AM Peak	140	84	40	243	51	42	62	108	53
Trips/ 100m <sup>2</sup> GFA	1.43	0.60	2.22	2.04	2.13	2.10	3.88	1.09	2.94
- Network PM Peak	225	289	64	338	66	76	50	198	58
Trips/ 100m <sup>2</sup> GFA	2.30	2.05	3.56	2.84	2.75	3.80	3.13	1.99	3.22
Daily Total LV Trips	3,441	3,643	514	4,558	605	718	523	2,055	575
Trips/ 100m <sup>2</sup> GFA	35.11	25.82	28.56	38.25	25.21	35.90	32.69	20.66	31.94
Daily Total HV Trips	122	139	111	178	51	45	19	69	33
Trips/ 100m <sup>2</sup> GFA	1.24	0.99	6.17	1.49	2.13	2.25	1.19	0.69	1.83
Daily Total Vehicle Trips	3,563	3,782	625	4,736	656	763	542	2,124	608
Trips/ 100m <sup>2</sup> GFA	36.36	26.80	34.72	39.75	27.33	38.15	33.88	21.35	33.78
% HV	3.4%	3.7%	17.8%	3.8%	7.8%	5.9%	3.5%	3.2%	5.4%
Peak Parking Accumulation	119	155	14	199	25	38	30	104	20
Peak Parking/ 100m <sup>2</sup> GFA	1.21	1.10	0.78	1.67	1.04	1.90	1.88	1.05	1.11
<b>Weekend</b>									
<b>Person-based Trips</b>									
- Site Peak Hour	1,000	1,331	123	1,256	205	184	122	739	147
Trips/ 100m <sup>2</sup> GFA	10.20	9.43	6.83	10.54	8.54	9.20	7.63	7.43	8.17
- Vehicle Network Peak	925	1,282	108	1,244	192	174	122	709	120
Trips/ 100m <sup>2</sup> GFA	9.44	9.09	6.00	10.44	8.00	8.70	7.63	7.13	6.67
Daily Total Person Trips	7,100	8,590	665	8,864	1,238	998	655	4,738	723
Trips/ 100m <sup>2</sup> GFA	72.45	60.87	36.94	74.39	51.58	49.90	40.94	47.63	40.17
<b>Vehicle-based Trips</b>									
- Site Peak Hour	656	844	77	754	151	112	78	447	111
Trips/ 100m <sup>2</sup> GFA	6.69	5.98	4.28	6.33	6.29	5.60	4.88	4.49	6.17
- Network Peak	593	805	65	754	119	104	78	426	96
Trips/ 100m <sup>2</sup> GFA	6.05	5.70	3.61	6.33	4.96	5.20	4.88	4.28	5.33
Daily Total LV Trips	4,780	5,493	396	5,440	882	644	489	2,809	571
Trips/ 100m <sup>2</sup> GFA	48.78	38.93	22.00	45.66	36.75	32.20	30.56	28.24	31.72
Daily Total HV Trips	27	115	16	60	3	5	0	15	2
Trips/ 100m <sup>2</sup> GFA	0.28	0.81	0.89	0.50	0.13	0.25	0.00	0.15	0.11
Daily Total Vehicle Trips	4,807	5,608	412	5,500	885	649	489	2,824	573
Trips/ 100m <sup>2</sup> GFA	49.05	39.74	22.89	46.16	36.88	32.45	30.56	28.39	31.83
% HV	0.6%	2.1%	3.9%	1.1%	0.3%	0.8%	0.0%	0.5%	0.3%
Peak Parking Accumulation	196	318	30	264	36	29	45	152	27
Peak Parking/ 100m <sup>2</sup> GFA	2.00	2.59	1.67	2.22	1.50	1.45	2.81	1.53	1.50

Table 3-2 Trips Rate Summary – Hardware/DIY

Trips/ 100m <sup>2</sup> GFA	Sydney Metropolitan Area HW1 to HW5			Non-Metropolitan Area HW6 to HW9			All Survey Sites HW1 to HW9			Avg Non-metro / Metro %
	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	
Weekdays										
Person-based Trips										
- Site Peak Hour	4.00	5.77	5.06	3.95	6.40	5.49	3.95	6.40	5.25	108.6%
- Vehicle Network AM Peak	0.65	2.72	2.01	1.28	4.75	2.97	0.65	4.75	2.43	147.9%
- Vehicle Network PM Peak	2.48	4.89	3.50	2.79	4.65	3.78	2.48	4.89	3.63	108.0%
Daily Total Person Trips	32.88	53.26	42.42	29.22	43.40	38.34	29.22	53.26	40.61	90.4%
Vehicle-based Trips										
- Site Peak Hour	3.15	4.67	4.03	2.74	5.60	4.41	2.74	5.60	4.20	109.6%
- Network AM Peak	0.60	2.22	1.68	1.09	3.88	2.50	0.60	3.88	2.05	148.7%
- Network PM Peak	2.05	3.56	2.70	1.99	3.80	3.03	1.99	3.80	2.85	112.5%
Daily Total LV Trips	25.21	38.25	30.59	20.66	35.90	30.30	20.66	38.25	30.46	99.0%
Daily Total HV Trips	0.99	6.17	2.40	0.69	2.25	1.49	0.69	6.17	2.00	62.0%
Daily Total Vehicle Trips	26.80	39.75	32.99	21.35	38.15	31.79	21.35	39.75	32.46	96.4%
Peak Parking Accumulation	0.78	1.67	1.16	1.05	1.90	1.48	0.78	1.90	1.30	127.8%
Weekend										
Person-based Trips										
- Site Peak Hour	6.83	10.54	9.11	7.43	9.20	8.11	6.83	10.54	8.66	89.0%
- Vehicle Network Peak	6.00	10.44	8.59	6.67	8.70	7.53	6.00	10.44	8.12	87.6%
Daily Total Person Trips	36.94	74.39	59.25	40.17	49.90	44.66	36.94	74.39	52.76	75.4%
Vehicle-based Trips										
- Site Peak Hour	4.28	6.69	5.91	4.49	6.17	5.28	4.28	6.69	5.63	89.3%
- Vehicle Network Peak	3.61	6.33	5.33	4.28	5.33	4.92	3.61	6.33	5.15	92.3%
Daily Total LV Trips	22.00	48.78	38.42	28.24	32.20	30.68	22.00	48.78	34.98	79.9%
Daily Total HV Trips	0.13	0.89	0.52	0.00	0.25	0.13	0.00	0.89	0.35	24.5%
Daily Total Vehicle Trips	22.89	49.05	38.94	28.39	32.45	30.81	22.89	49.05	35.33	79.1%
Peak Parking Accumulation	1.50	2.59	2.00	1.45	2.81	1.82	1.45	2.81	1.92	91.3%
Weekend/Weekdays %										
Person-based Trips										
- Site Peak Hour	170.7%	213.6%	245.4%	238.6%	187.1%	199.1%	241.9%	213.6%	224.0%	
Daily Total Person Trips	112.4%	139.7%	139.7%	137.5%	115.0%	116.5%	126.4%	139.7%	129.9%	
Vehicle-based Trips										
- Site Peak Hour	136.0%	143.4%	146.9%	163.7%	110.1%	119.8%	155.9%	119.5%	134.2%	
Daily Total LV Trips	87.3%	127.5%	125.6%	136.7%	89.7%	101.3%	106.5%	127.5%	114.8%	
Daily Total HV Trips	12.7%	14.4%	21.7%	0.0%	11.1%	8.6%	0.0%	14.4%	17.4%	
Daily Total Vehicle Trips	85.4%	123.4%	118.0%	133.0%	85.1%	96.9%	107.2%	123.4%	108.8%	
Peak Parking Accumulation	192.9%	155.3%	171.9%	138.7%	148.0%	122.9%	186.4%	148.0%	147.2%	

\* 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 1,600 to 14,111 square metres.
- The weekday site peak hour trip generation rate varied from 2.74 to 5.6 vehicle trips per 100 sq m GFA with an average of 4.2 trips.
- The weekday daily trip rate varied from 21.35 to 39.75 vehicle trips per 100 sq m GFA with an average of 32.46 trips.
- The non-metropolitan sites generally had higher trip rates than the metropolitan sites.

- The weekday peak parking demand was between 0.78 and 1.9 spaces per 100 sq m GFA. The weekend peak demand is generally higher than the weekday one.
- Higher trips rates were observed in PM network peak than AM network peak. Therefore, such stores would have a higher traffic impact in the PM peak than the AM peak.
- When comparing weekday and weekend data, all the sites are busier at the weekend.

**Table 3-3 Trips Rate Summary –Bunnings and Mitre10**

Trips/ 100m <sup>2</sup> GFA	Bunnings			Mitre10			Avg Mitre10 / Bunnings %
	HW1, HW2, HW4, HW8			HW3, HW5, HW6, HW7, HW9			
	Min	Max	Avg	Min	Max	Avg	
Weekdays							
Person-based Trips							
- Site Peak Hour	3.95	5.77	4.67	4.96	6.40	5.72	122.5%
- Vehicle Network AM Peak	0.65	2.29	1.47	2.45	4.75	3.20	218.2%
- Vehicle Network PM Peak	2.48	3.98	3.03	3.29	4.89	4.10	135.4%
Daily Total Person Trips	29.22	53.26	40.06	35.75	45.33	41.05	102.5%
Vehicle-based Trips							
- Site Peak Hour	2.74	4.12	3.53	4.08	5.60	4.73	133.9%
- Network AM Peak	0.60	2.04	1.29	2.10	3.88	2.65	206.1%
- Network PM Peak	1.99	2.84	2.29	2.75	3.80	3.29	143.5%
Daily Total LV Trips	20.66	38.25	29.96	25.21	35.90	30.86	103.0%
Daily Total HV Trips	0.69	1.49	1.10	1.19	6.17	2.71	245.6%
Daily Total Vehicle Trips	21.35	39.75	31.06	27.33	38.15	33.57	108.1%
Peak Parking Accumulation	1.05	1.67	1.26	0.78	1.90	1.34	106.7%
Weekend							
Person-based Trips							
- Site Peak Hour	7.43	10.54	9.40	6.83	9.20	8.07	85.9%
- Vehicle Network Peak	7.13	10.44	9.02	6.00	8.70	7.40	82.0%
Daily Total Person Trips	47.63	74.39	63.84	36.94	51.58	43.91	68.8%
Vehicle-based Trips							
- Site Peak Hour	4.49	6.69	5.87	4.28	6.29	5.44	92.6%
- Vehicle Network Peak	4.28	6.33	5.59	3.61	5.33	4.80	85.8%
Daily Total LV Trips	28.24	48.78	40.40	22.00	36.75	30.65	75.9%
Daily Total HV Trips	0.15	0.81	0.44	0.00	0.89	0.28	63.0%
Daily Total Vehicle Trips	28.39	49.05	40.84	22.89	36.88	30.92	75.7%
Peak Parking Accumulation	1.53	2.59	2.08	1.45	2.81	1.79	85.7%
Weekend/Weekdays %							
Person-based Trips							
- Site Peak Hour	188.0%	262.4%	297.8%	182.3%	178.0%	180.3%	
Daily Total Person Trips	163.0%	139.7%	159.4%	103.3%	113.8%	107.0%	
Vehicle-based Trips							
- Site Peak Hour	163.7%	162.4%	166.4%	104.8%	112.4%	115.1%	
Daily Total LV Trips	136.7%	127.5%	134.8%	87.3%	102.4%	99.3%	
Daily Total HV Trips	21.7%	54.6%	39.5%	0.0%	14.4%	10.1%	
Daily Total Vehicle Trips	133.0%	123.4%	131.5%	83.7%	96.7%	92.1%	
Peak Parking Accumulation	146.2%	155.3%	165.8%	186.4%	148.0%	133.2%	

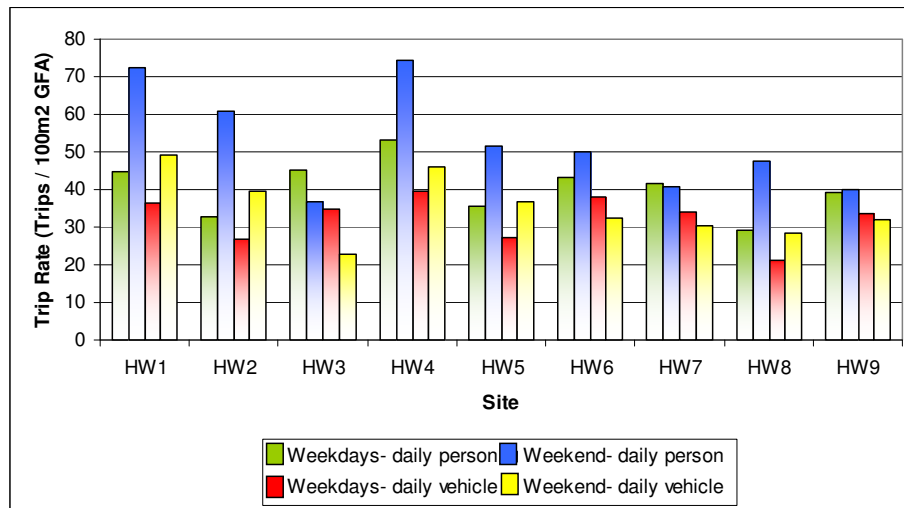
\* LV – Light vehicles, HV – Heavy vehicles

\* 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.

In a comparison of the hardware stores, the trips rates during weekdays at Bunnings are similar to those experienced in Mitre10. However, Mitre10 has lower trip rates than Bunnings at the weekends. Observations suggest that Mitre10 has a higher proportion of tradesmen using the store which explains the higher weekday use.

A summary of the daily trips is shown below both for weekdays and weekends.



**Figure 3-1 Daily Trip Rate – Hardware/DIY - Weekdays and Weekend**

The trip rates for Bunnings (HW1, HW2, HW4, and HW8) at weekends are much higher than in weekdays. The Mitre10 (rest of the sites) are relatively consistent over the week.

### 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	104	55	45
Trips/ 100m <sup>2</sup> GFA	1.33	2.03	opening hrs	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	70	27	19
Trips/ 100m <sup>2</sup> GFA	0.81	1.21	opening hrs	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

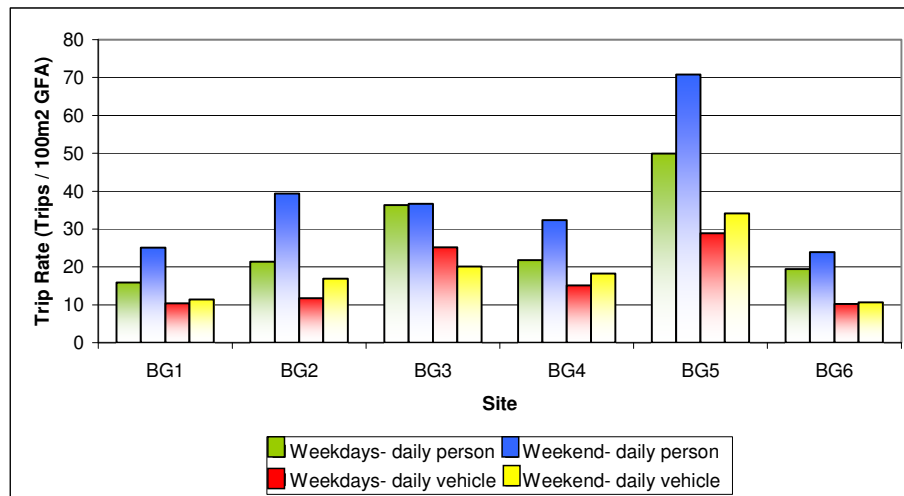
\* The units of parking accumulation are Peak parked cars / 100m<sup>2</sup> GFA.

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.

- The non-metropolitan sites generally had higher trip rates than the metropolitan sites.
- The weekday peak parking demand was between 0.41 and 3.17 spaces per 100 sq m GFA. The weekend peak demand when compared with the weekday demand was extremely variable across the range of sites.
- All of the bulky goods sites opened after the accepted AM peak so the impact on the AM peak traffic from these sites should be minimal.
- In general, there was no significant difference among all the sites except BG5 (Bing Lee Warilla). BG5 has much higher trip rates than the other sites. This has had the effect of making the average rates in non-Metropolitan Area higher than in the Metropolitan Areas. The high trip rates at BG5 could be because the site is only partially occupied and renovation of part of the building was taking place. Even though this was a relatively small refurbishment, it was anticipated that the traffic count may include some tradesmen visiting the site.



**Figure 3-2 Daily Trip Rate – Bulky Goods - Weekdays and Weekend**

The weekend trip rates are generally higher than the weekdays except for site BG3 (Retravisson Springwood). This may be due to the fact that site BG3 is located at Blue Mountains region where local people may undertake shopping trips on weekdays so as to minimise their interaction with weekend tourists.

## 3.4 Simple Linear Regression

As agreed in the project brief, the data has been analysed to determine the most consistent measure of trip generation and parking demand, using a simple linear regression approach that is the highest  $R^2$  value.

The coefficient of determination ( $R^2$ ) has been used to provide a measure of the usefulness of the regression equation. It measures the proportion of variation in Y (trip behaviour) that is explained by the independent variable X (such as gross floor area) in the regression model. The values vary from 0 to 1 with higher value represents higher degree of correlation. In this study,

this correlation coefficient ( $R^2$ ) above 0.8 is preferred in order to accept the results to the desired level of correlation. In other words, at least 80% of the variation in trip behaviour can be explained by the variability in the selected independent variable in the acceptable level.

As stated in Section 3.2, the gross floor area (GFA) is used as the key independent variable for this regression analysis. The trip behaviour in the following periods is plotted against the number of units.

- Site Peak Hour
- Daily Total
- Road Network AM and PM Peak in weekdays and the peak hour at the weekend

'Person' trips and 'vehicle' trips are plotted separately.

### 3.4.1 Hardware / DIY

#### Site Peak Hour

- For the person trips,  $R^2$  is 0.93 on weekdays and 0.97 at the weekend
- $R^2$  of the vehicle trips is 0.93 on weekdays and 0.96 at the weekend
- $R^2$  for the site peak hour is acceptable.

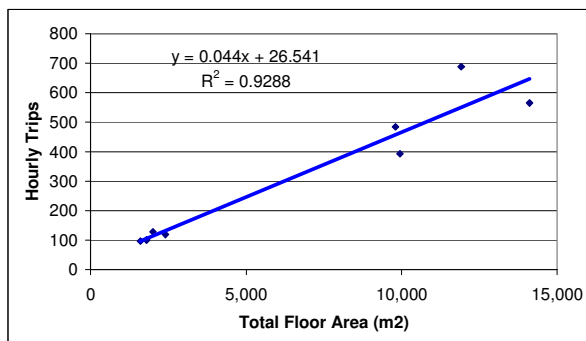


Figure 3-3 HW Person Trips – Site Peak Hour, Weekdays

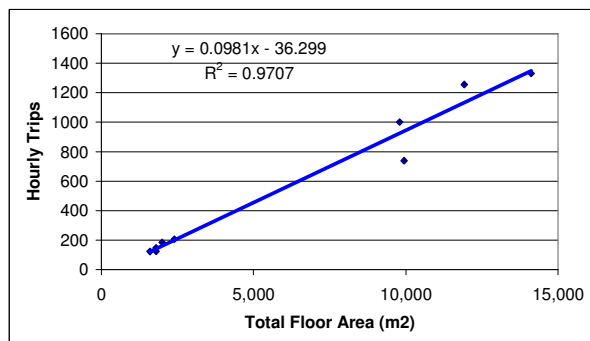
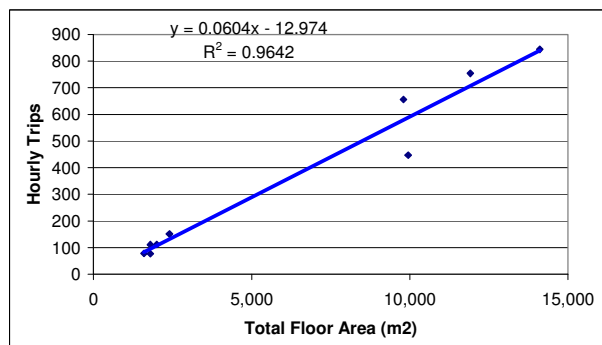
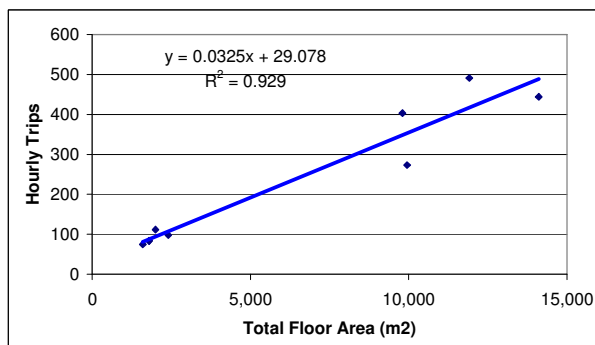


Figure 3-4 HW Person Trips – Site Peak Hour, Weekend

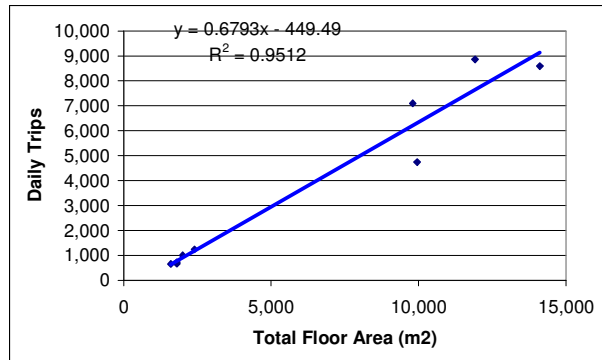
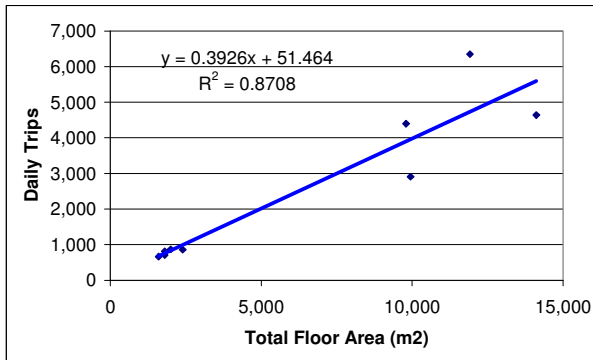


**Figure 3-5 HW Vehicle Trips – Site Peak Hour, Weekdays**

**Figure 3-6 HW Vehicle Trips – Site Peak Hour, Weekend**

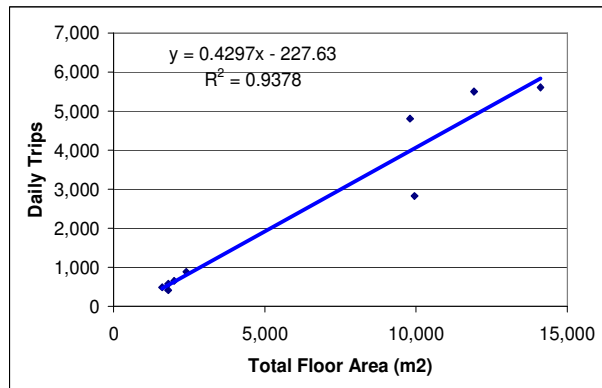
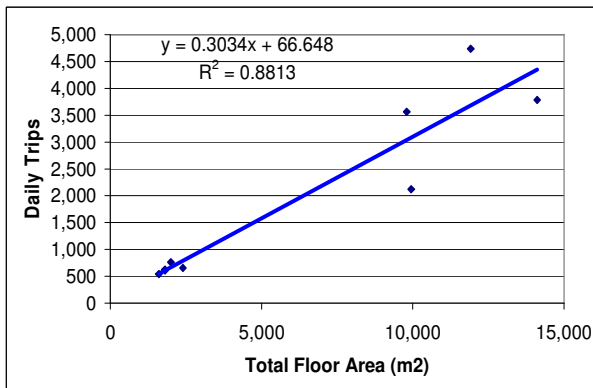
## Daily Total Trips

- For the person trips,  $R^2$  is 0.87 on weekdays and 0.95 at the weekend
- $R^2$  of the vehicle trips is 0.88 on weekdays and 0.94 at the weekend
- $R^2$  is acceptable for daily total trips.



**Figure 3-7 HW Person Trips – Daily, Weekdays**

**Figure 3-8 HW Person Trips – Daily, Weekend**



**Figure 3-9 HW Vehicle Trips – Daily, Weekdays**

**Figure 3-10 HW Vehicle Trips – Daily, Weekend**

## Road Network Peak

- $R^2$  of the Network AM Peak on weekdays for both person trips and vehicle trips are 0.48 and 0.50 respectively. This indicates that the degree of correlation is quite low between trips in the network AM peak hour and GFA. The trip behaviour from the sites during the network AM peak period may not be adequately explained by the GFA. Therefore, if the impact on adjacent network in the AM peak hour is to be considered, site specific data would be better than using average values.
- For the PM network peak on weekdays,  $R^2$  of person trips and vehicle trips are 0.89 and 0.94 respectively, which are acceptable.

- For the network peak at the weekend, both  $R^2$  of person trips and vehicle trips are 0.97, which is acceptable.

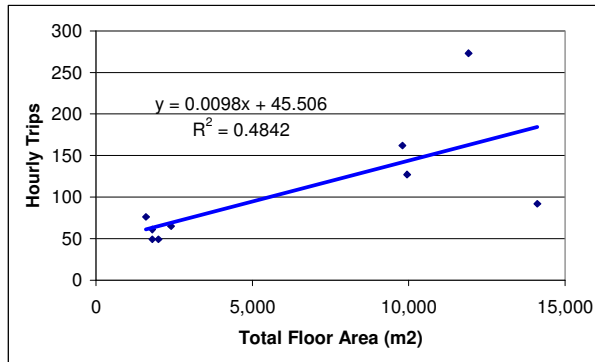


Figure 3-11 HW Person Trips – Network AM Peak, Weekdays

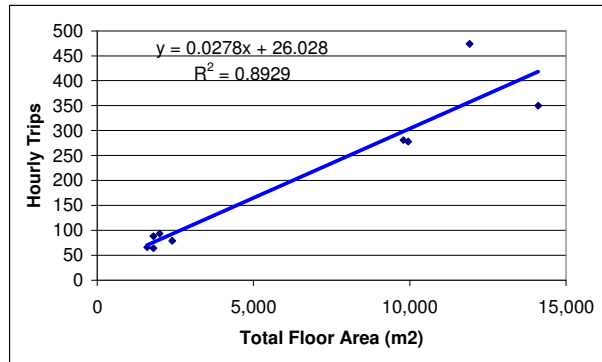


Figure 3-12 HW Person Trips – Network PM Peak, Weekdays

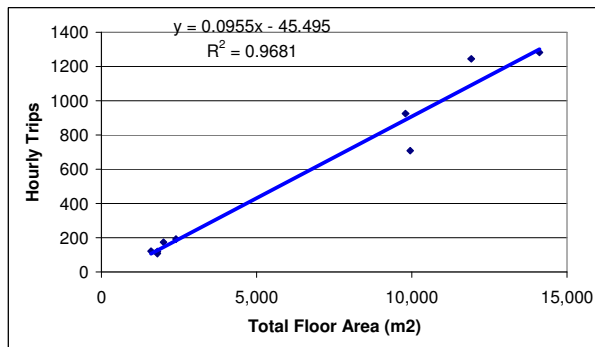


Figure 3-13 HW Person Trips – Network Peak, Weekend

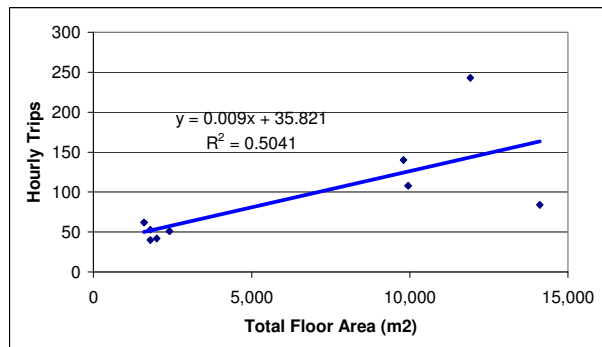


Figure 3-14 HW Vehicle Trips – Network AM Peak, Weekdays

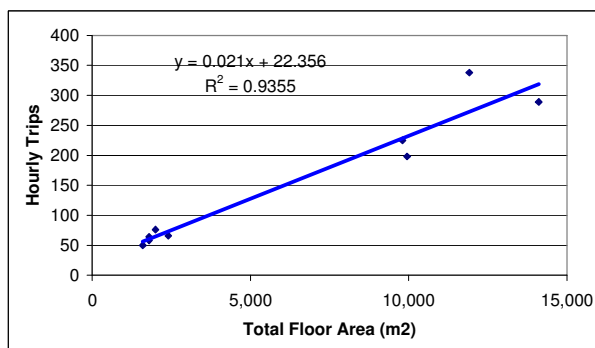


Figure 3-15 HW Vehicle Trips – Network PM Peak, Weekdays

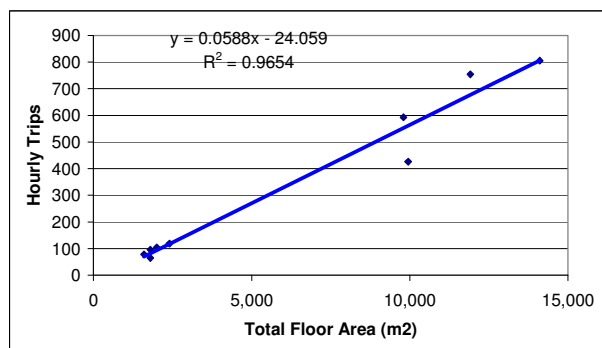


Figure 3-16 HW Vehicle Trips – Network Peak, Weekend

## Peak Parking Accumulation

- $R^2$  of the peak parking accumulation is 0.90 on weekdays and 0.96 at the weekend.
- $R^2$  is acceptable for peak parking accumulation.

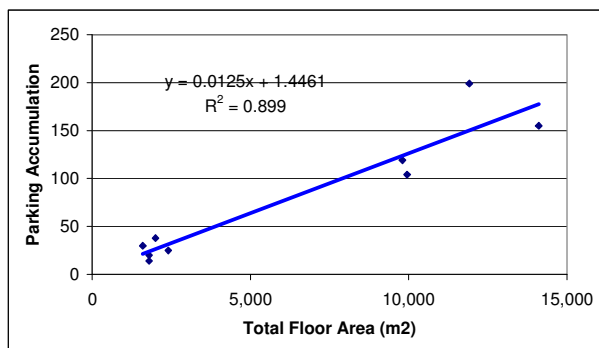


Figure 3-17 HW Peak Parking Accumulation - Weekdays

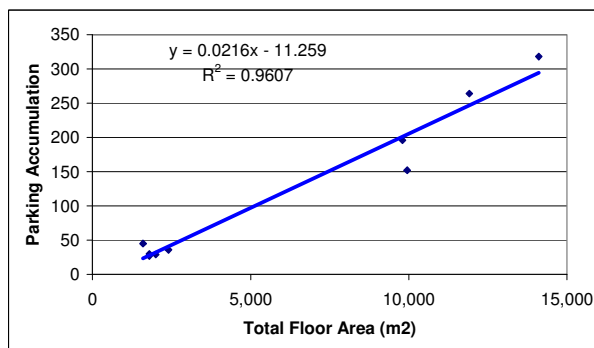


Figure 3-18 HW Peak Parking Accumulation - Weekend

## 3.4.2 Bulky Goods

### Site Peak Hour

- For person trips,  $R^2$  is 0.95 on weekdays and 0.97 at the weekend
- $R^2$  of the vehicle trips is 0.97 on weekdays and 0.98 at the weekend
- $R^2$  for the site peak hour is acceptable.

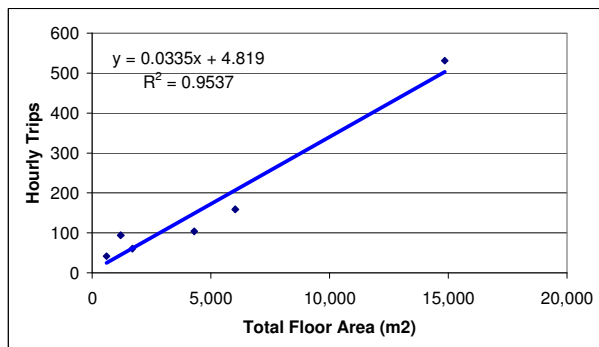


Figure 3-19 BG Person Trips – Site Peak Hour, Weekdays

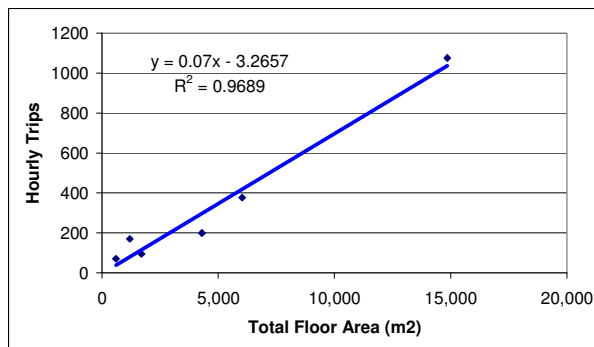


Figure 3-20 BG Person Trips – Site Peak Hour, Weekend

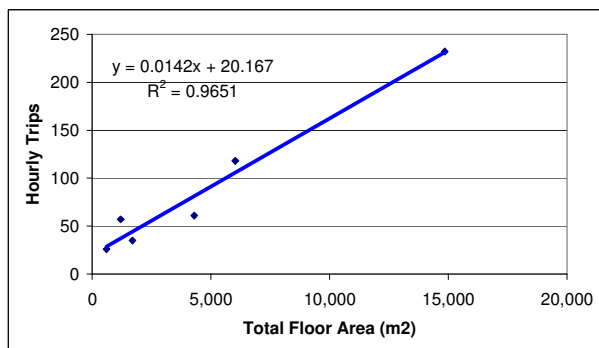


Figure 3-21 BG Vehicle Trips – Site Peak Hour, Weekdays

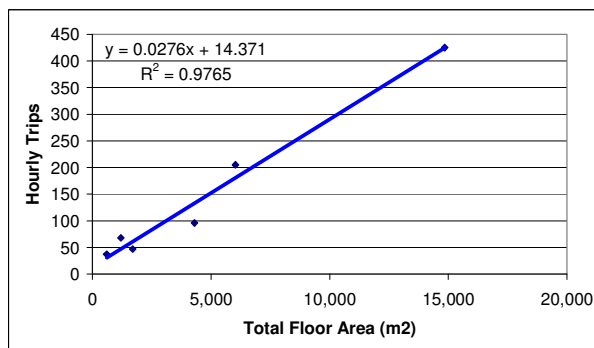


Figure 3-22 BG Vehicle Trips – Site Peak Hour, Weekend

## Daily Total Trips

- For the person trips, both  $R^2$  on weekdays and at the weekend are 0.97.
- $R^2$  of the vehicle trips is 0.97 on weekdays and 0.97 at the weekend
- $R^2$  is acceptable for daily total trips.

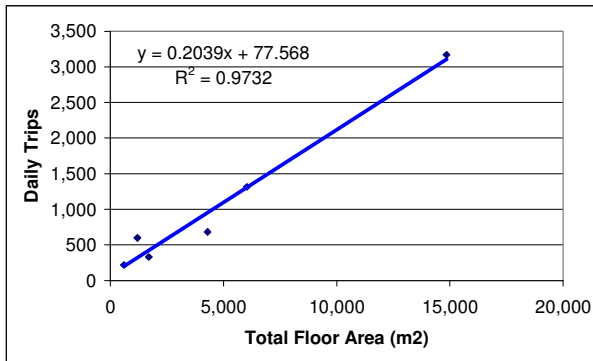


Figure 3-23 BG Person Trips – Daily, Weekdays

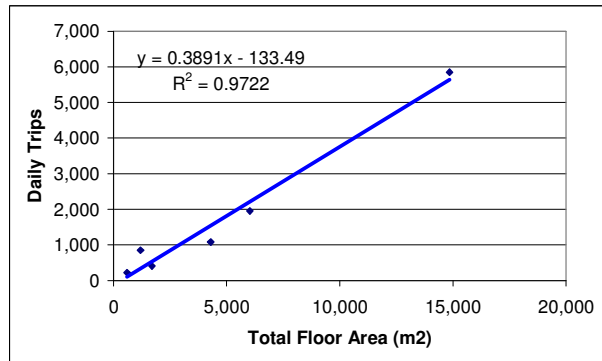


Figure 3-24 BG Person Trips – Daily, Weekend

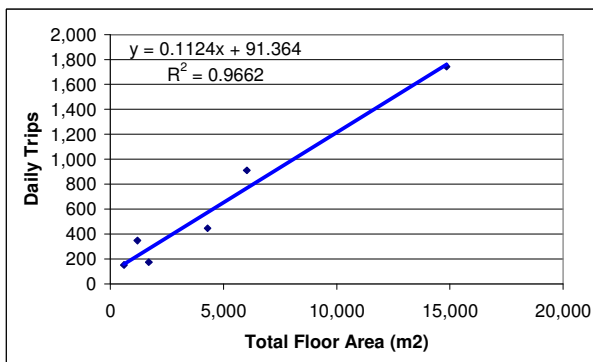


Figure 3-25 BG Vehicle Trips – Daily, Weekdays

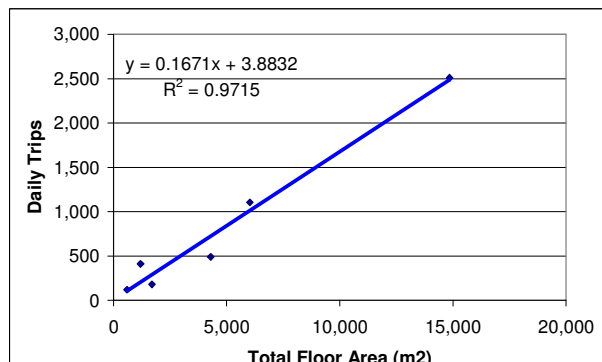


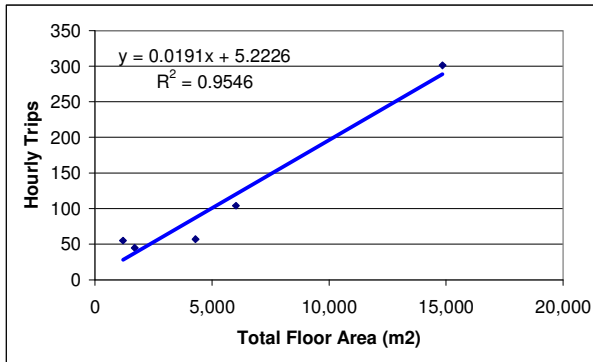
Figure 3-26 BG Vehicle Trips – Daily, Weekend

## Road Network Peak

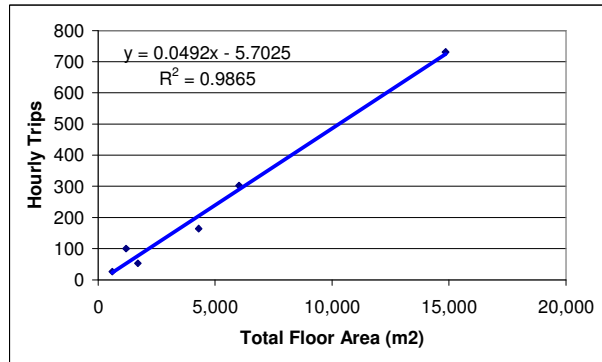
The AM network peak (8am to 9am) on adjacent roads occurs prior to the opening hours of the stores (i.e. generally 9am) which is the time when the surveys commenced. Prior to this time, only staff vehicles would be entering the site which would result in fairly low traffic levels (apart from the Harvey Norman in Auburn which has a relatively high number of staff). However, only the network PM peak in weekday is plotted below.

There is generally only one peak period at the weekend which generally occurred around noon time. Additional graphs are plotted for this.

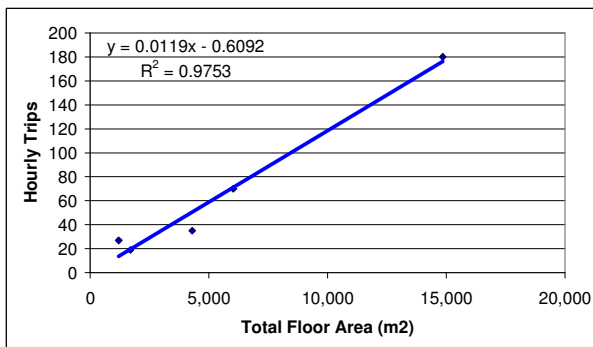
- For the PM network peak on weekdays,  $R^2$  of person trips and vehicle trips are 0.95 and 0.98 respectively, which are acceptable.
- For the network peak at the weekend,  $R^2$  of person trips and vehicle trips are 0.99 and 0.97 respectively, which are also acceptable.



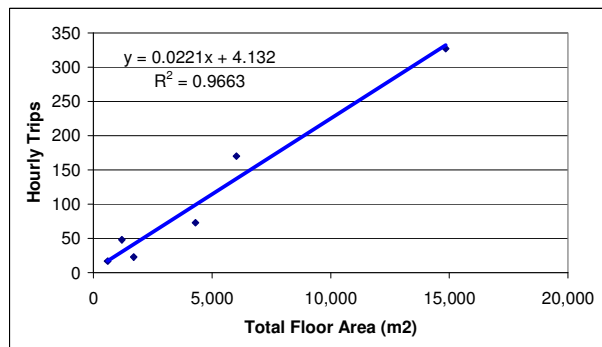
**Figure 3-27 BG Person Trips – Network PM Peak, Weekdays**



**Figure 3-28 BG Person Trips – Network Peak, Weekend**



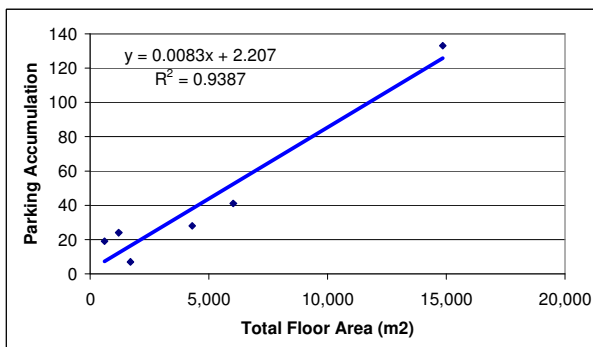
**Figure 3-29 BG Vehicle Trips – Network PM Peak, Weekdays**



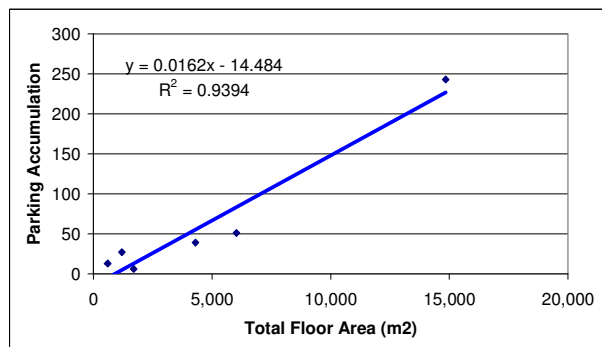
**Figure 3-30 BG Vehicle Trips – Network Peak, Weekend**

## Peak Parking Accumulation

- For the peak parking accumulation, both  $R^2$  in weekdays and at the weekend are 0.94, which is acceptable.



**Figure 3-31 BG Peak Parking Accumulation - Weekdays**



**Figure 3-32 BG Peak Parking Accumulation - Weekend**

### 3.4.3 Conclusions about Linear Regression analysis

In general, the trip behaviour and peak parking accumulation for all the hardware sites have a high correlation with Gross Floor Area except for the trips during the “network AM peak hour”. Confidence levels of 87% to 97% that trip behaviour and peak parking accumulation can be explained by the GFA are obtained. Only 48% to 50% of trips during “network AM peak hour” can be explained.

The bulky goods site trips and peak parking accumulation have a very high correlation with GFA. The confidence levels are from 94% to 99%.

## 3.5 Interview Survey Results

### 3.5.1 Primary Trips / Pass-By Trips / Multi-purpose Trips

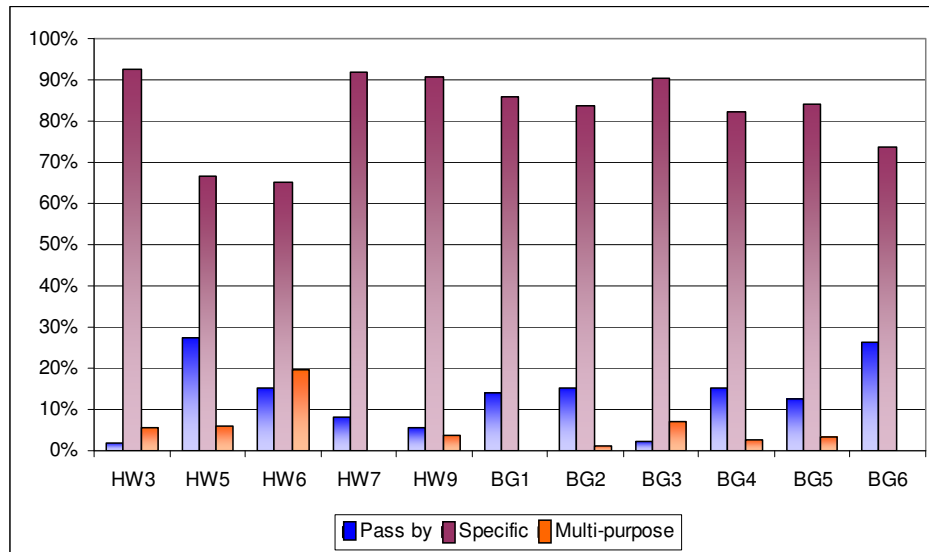


Figure 3-33 Trip Purpose – Weekdays

The majority of trips on weekdays to the hardware / bulky goods sites are specific trips with a smaller proportion of pass-by and multi purpose trips.

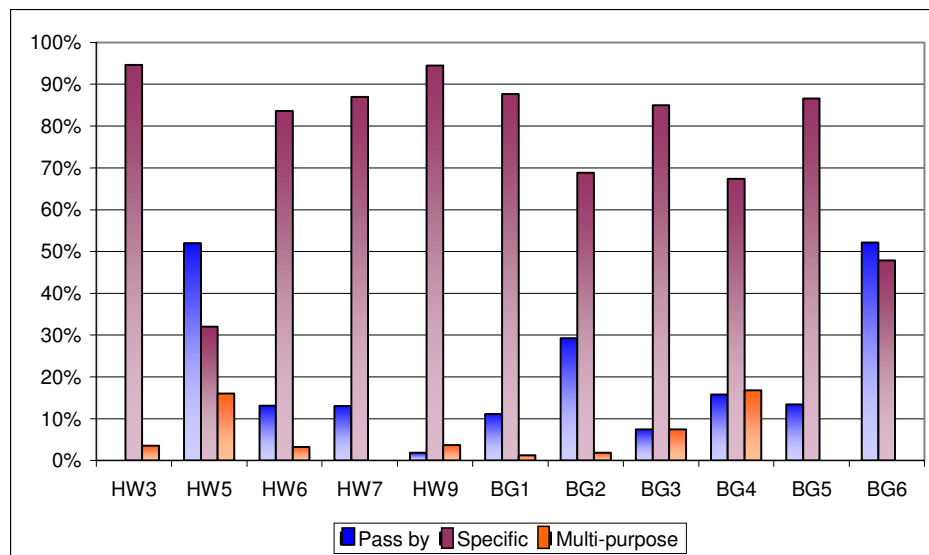


Figure 3-34 Trip Purpose – Weekends

Most trips at the weekend are specific trips except for sites HW5 (Mitre10 Narellan), BG2 (Harvey Norman Auburn) and BG6 (Fantastic South Nowra) which have higher pass-by trips. This could be because there are a number of other bulky goods shops along the main road corridor close to the BG2 and BG6 sites. For example, BG2 is located at Parramatta Road in Auburn where there are other similar shops within one 1km and site BG6 is located on the Princes Highway at South Nowra which is relatively close (i.e. around 500m) to another major bulky goods shopping centre. There appears to be no obvious reason for the high proportion of pass-by trips at HW5 site.

### 3.5.2 Origin Postcode

The following maps show the postcode where customers are coming from. As one postcode commonly has more than one suburb name, only one of the suburb names will be shown.

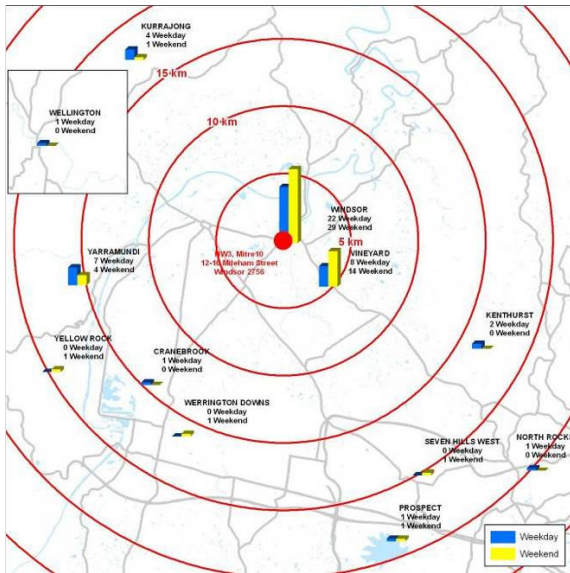


Figure 3-35 HW3 - Origin Postcode

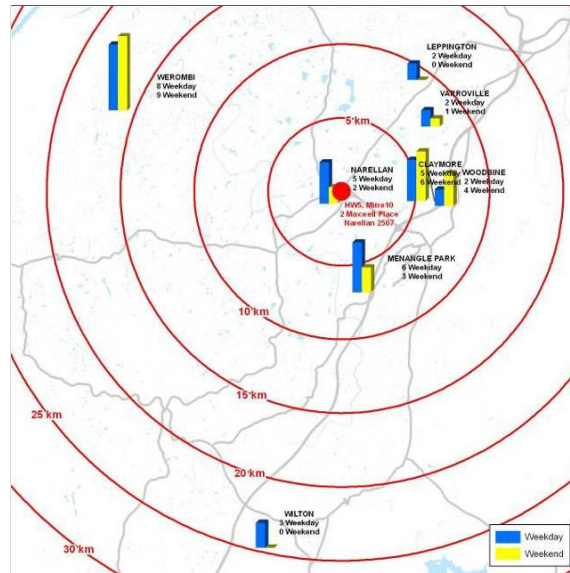


Figure 3-36 HW5 - Origin Postcode

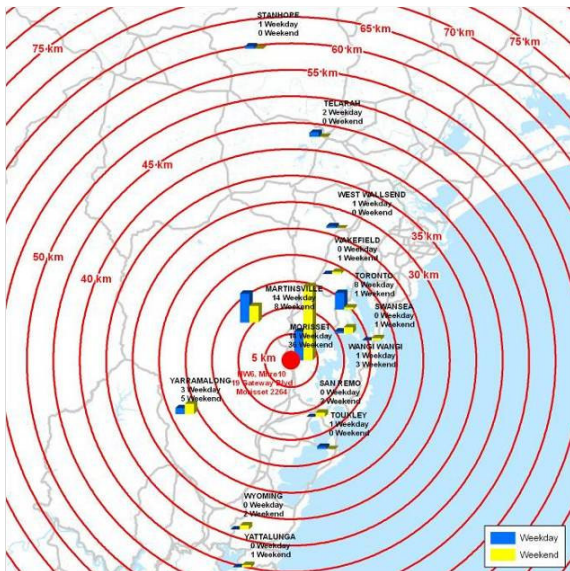


Figure 3-37 HW6 - Origin Postcode

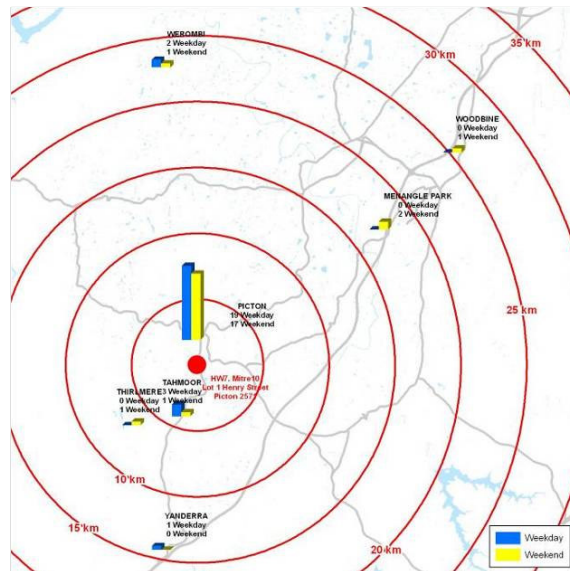
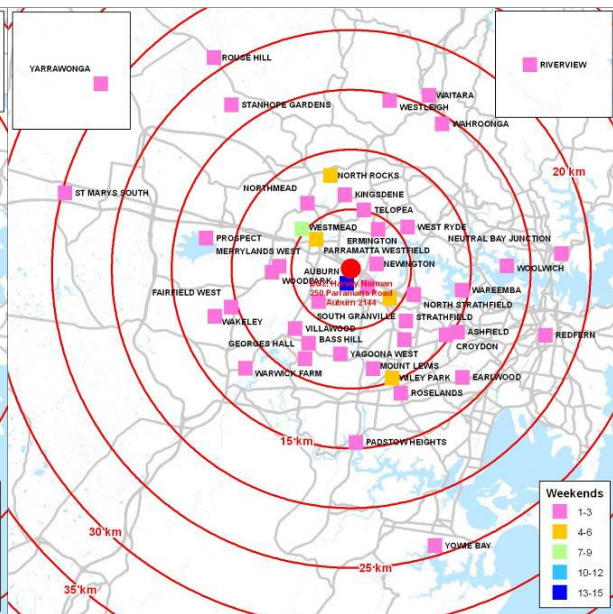
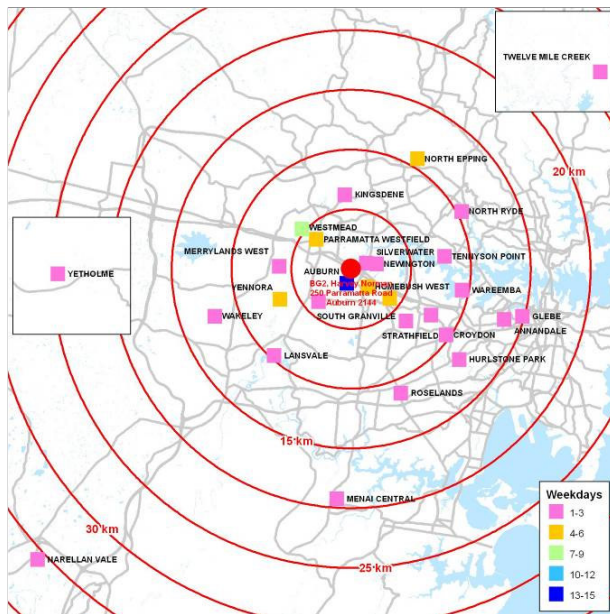
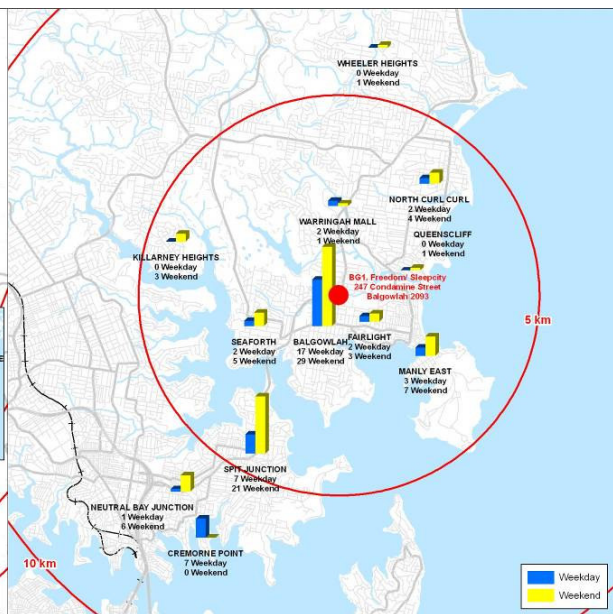
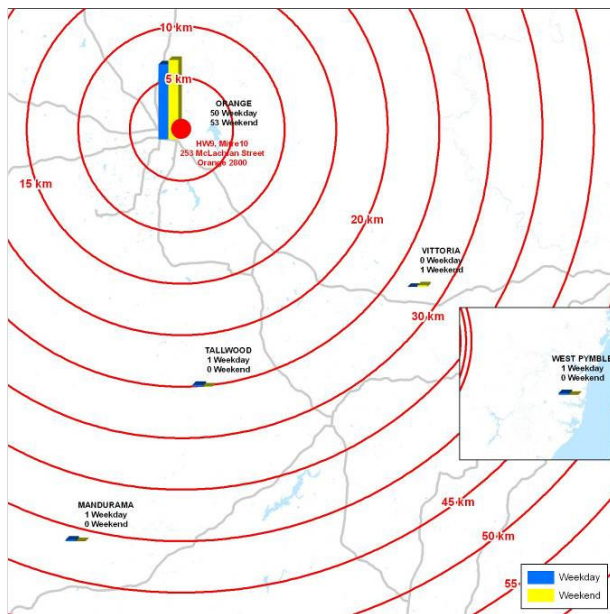
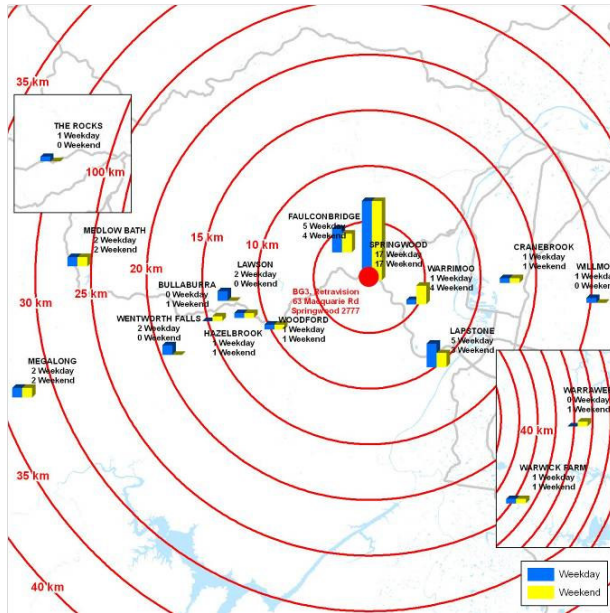
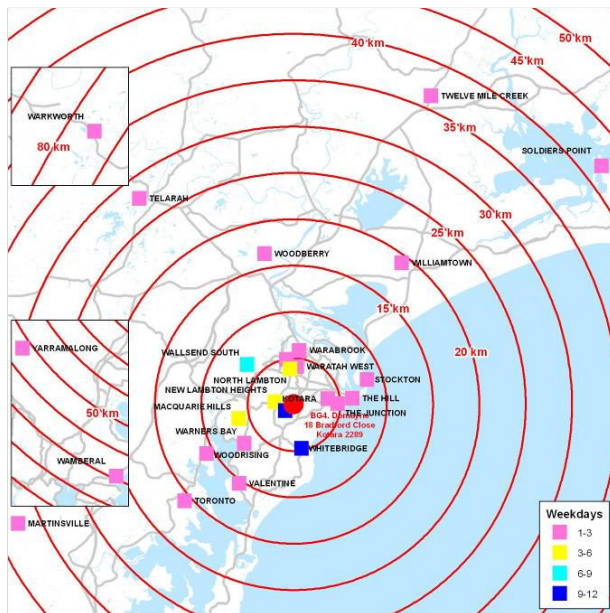


Figure 3-38 HW7 - Origin Postcode

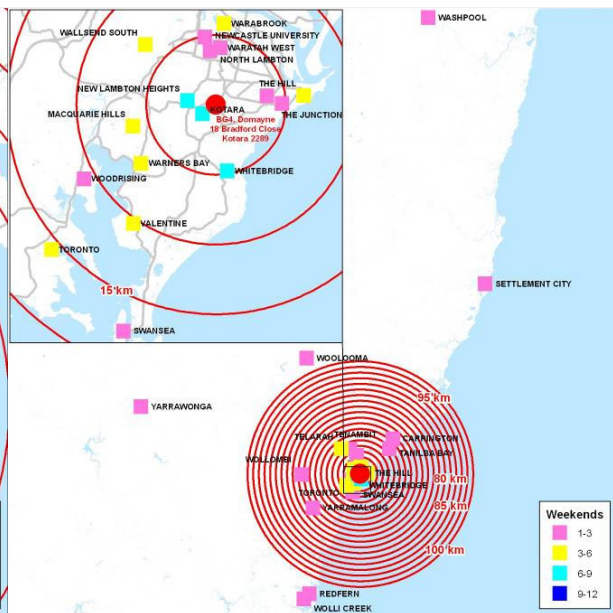




**Figure 3-43 BG3 - Origin Postcode**



**Figure 3-44 BG4 - Origin Postcode, Weekday**



**Figure 3-45 BG4 - Origin Postcode, Weekend**

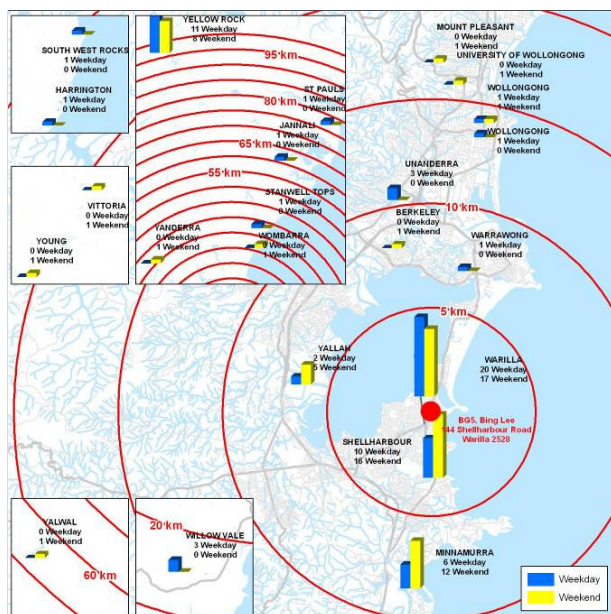


Figure 3-46 BG5 - Origin Postcode

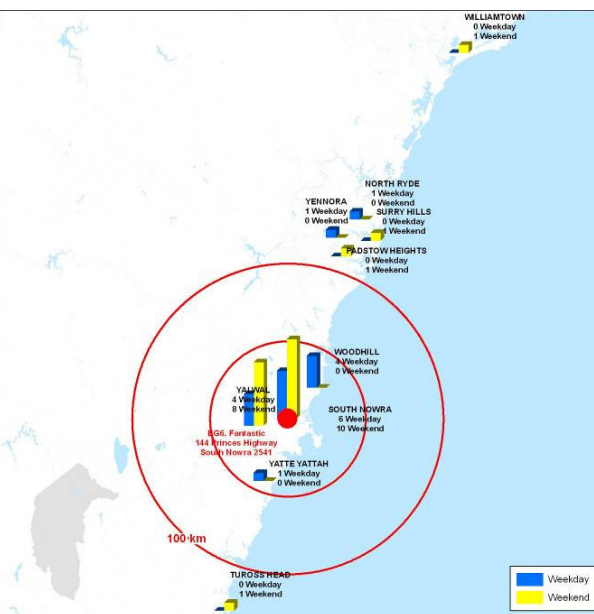


Figure 3-47 BG6 - Origin Postcode

The results indicate that the customers visiting hardware / DIY stores are seldom travelling further than 15km. The travelling distance would be affected by the lack of other available hardware stores in the area.

Similarly for the bulky goods stores, customers do not normally travel further than 15km. Again, such travelling distances would be affected by the lack of other bulky goods shops in the area.

### 3.5.3 Mode of Travel

The results show that most of the customers drive to the stores (some stores recording 100% car use) with a very few people travelling by public transport or walking. This is expected because the accessibility score of the selected survey sites are mostly below 75 which indicates that public transport to the sites is very limited.

The results also show that more commercial vehicle activity occurs during weekdays, which is probably as a result of the higher number of deliveries to / from the hardware sites and the fact that more tradesmen probably visit the store during the week.

The surveyors reported that there were no cyclists observed travelling to / from the site.

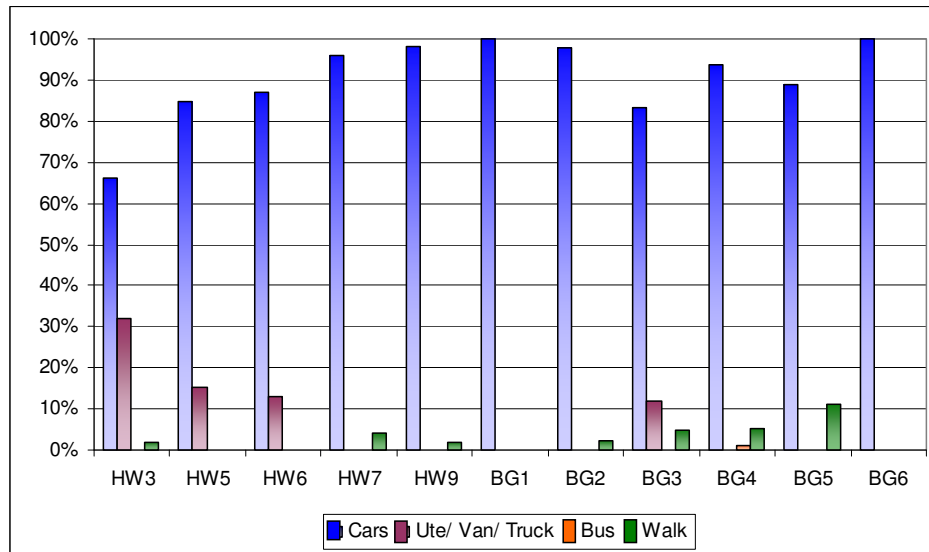


Figure 3-48 Mode of Travel – Weekdays

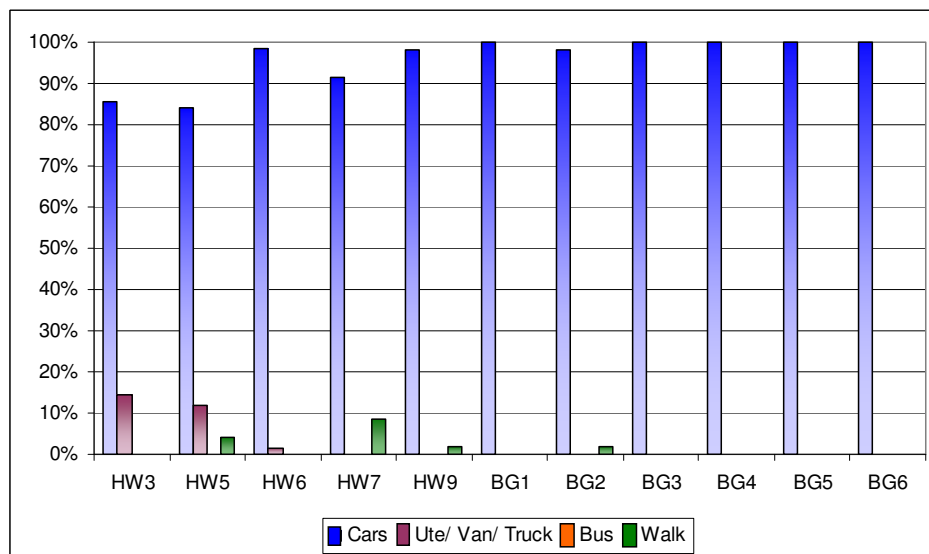


Figure 3-49 Mode of Travel – Weekends

### 3.5.4 Parking On-site / Off-site

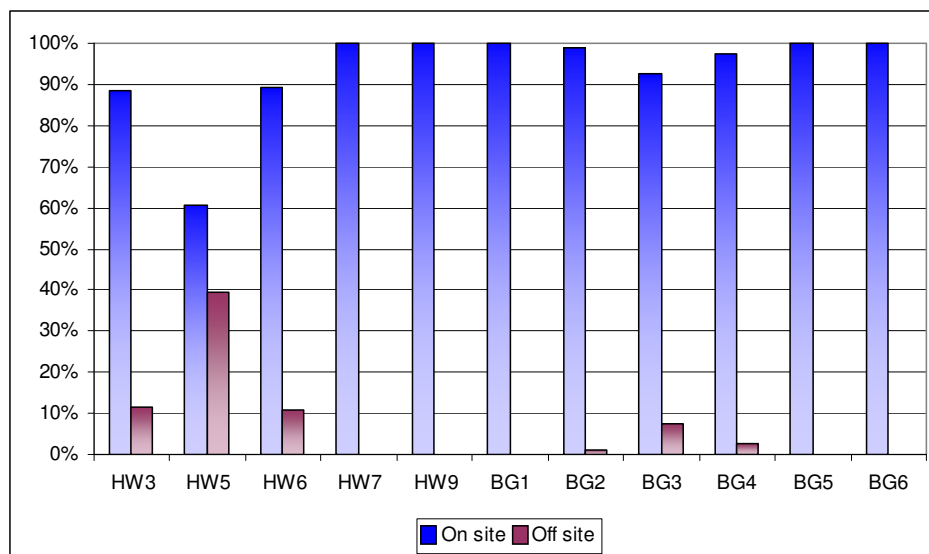


Figure 3-50 Parking on-site / off-site – Weekdays

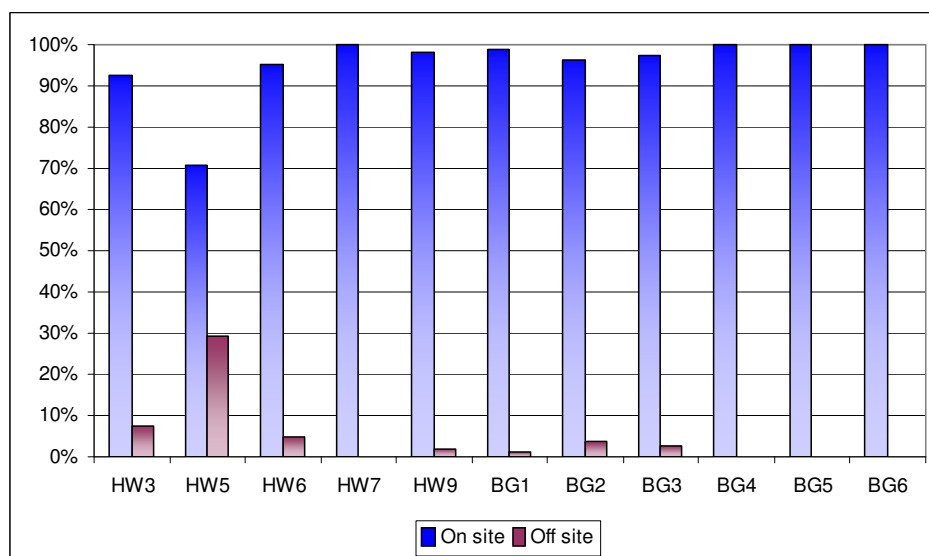


Figure 3-51 Parking on-site / off-site – Weekends

The majority of customers parked on site except at site HW5 (Mitre10 Narellan) where there was a significant amount of off-site parking. There is no obvious reason to explain why this occurs.

## 3.6 Seasonal / Economic Effects

In order to consider the current economic situation on the number of vehicle trips generated by these sites, Hyder contacted some of the operation managers to try and obtain additional information such as visitor entries on a daily or weekly basis to indicate retail activity over the course of a year / number of years. However the operators were unwilling to issue such data presumably because of the commercial sensitivities of such information.

## 3.7 Parking Demand and Provision

With information provided by the site managers and by using the recorded on-site observations, the number of parking spaces per 100m<sup>2</sup> GFA can be calculated. This can then be compared with the actual parking demand from the surveys.

### 3.7.1 Hardware/DIY

Table 3-6 Parking Provision Summary – HW1 to HW9

Site ID	HW1	HW2	HW3	HW4	HW5	HW6	HW7	HW8	HW9
<b>Site Details - Bulky Goods/Hardware</b>									
Area Dimension (m <sup>2</sup> )			6,700		3,500		3,600		
Gross floor area (m <sup>2</sup> )	9,800	14,111	1,800	11,915	2,400	2,000	1,600	9,948	1,800
No. of employee (Total)			42		20		12		23
No. of employee (at one time)			34		15	15	12		8
<b>Parking Spaces</b>									
Customers	263	464	44	397	35	29	75	209	28
Disabled	2	8	0	6	2	1	0	4	2
Staff			0		0	0	0		10
Loading Bay			2		1	0	5		2
Total	265	472	46	403	38	30	80	213	42
<b>Space / 100 m<sup>2</sup> GFA (Provision)</b>									
Customers	2.68	3.29	2.44	3.33	1.46	1.45	4.69	2.10	1.56
Disabled	0.02	0.06	-	0.05	0.08	0.05	-	0.04	0.11
Staff	-	-	-	-	-	-	-	-	0.56
Loading Bay	-	-	0.11	-	0.04	-	0.31	-	0.11
Total	2.70	3.34	2.56	3.38	1.58	1.50	5.00	2.14	2.33
<b>Peak Demand Parking - All Vehicles</b>									
Weekdays	119	155	14	199	25	38	30	104	20
Occupied %	45%	33%	30%	49%	66%	127%	38%	49%	48%
Weekend	196	366	30	264	36	29	45	152	27
Occupied %	74%	78%	65%	66%	95%	97%	56%	71%	64%
<b>Space / 100 m<sup>2</sup> GFA (Peak Demand) - All Vehicles</b>									
Weekdays	1.21	1.10	0.78	1.67	1.04	1.90	1.88	1.05	1.11
Weekend	2.00	2.59	1.67	2.22	1.50	1.45	2.81	1.53	1.50
<b>Trip Generation</b>									
<b>Daily Vehicle Trips / 100 m<sup>2</sup> GFA</b>									
Weekdays	36.36	26.80	34.72	39.75	27.33	38.15	33.88	21.35	33.78
Weekend	49.05	39.74	22.89	46.16	36.88	32.45	30.56	28.39	31.83

Note: Peak parking demand excludes off-site car parking.

- The number of parking spaces provided varied from 1.5 to 5.0 per 100m<sup>2</sup> GFA
- The peak parking demand from the survey data indicated that this varied from 0.78 spaces per 100m<sup>2</sup> GFA to 2.81 spaces per 100m<sup>2</sup> GFA. The weekend had a higher parking demand than weekdays.
- In general, the car parks at most of the sites were not more than 80% occupied, apart from sites HW5 and HW6.

## 3.7.2 Bulky Goods

Table 3-7 Parking Provision Summary – BG1 to BG6

Site ID	BG1	BG2	BG3	BG4	BG5	BG6
<b>Site Details - Bulky Goods/Hardware</b>						
Area Dimension (m <sup>2</sup> )			1,600			
Gross floor area (m <sup>2</sup> )	4,300	14,849	600	6,029	1,100	1,700
No. of employee (Total)	29	220	5			9
No. of employee (at one time)	10	100	5	50		9
<b>Parking Spaces</b>						
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
<b>Space / 100 m<sup>2</sup> GFA</b>						
Customers	1.00	2.28	2.17	2.50	4.64	1.76
Disabled	-	0.08	-	0.03	0.36	0.24
Staff	0.07	-	-	-	3.00	0.53
Loading Bay	0.09	-	0.17	0.02	0.36	0.12
Total	1.16	2.36	2.33	2.55	8.36	2.65
<b>Peak Demand Parking - All Vehicles</b>						
Weekdays	28	133	19	41	24	7
Occupied %	56%	38%	136%	27%	26%	16%
Weekend	39	243	13	51	27	6
Occupied %	78%	69%	93%	33%	29%	13%
<b>Space / 100 m<sup>2</sup> GFA (Peak Demand) - All Vehicles</b>						
Weekdays	0.65	0.90	3.17	0.68	2.18	0.41
Weekend	0.91	1.64	2.17	0.85	2.45	0.35
<b>Trip Generation</b>						
<b>Daily Vehicle Trips / 100 m<sup>2</sup> GFA</b>						
Weekdays	10.37	11.74	25.17	15.09	31.55	11.60
Weekend	11.42	16.90	20.17	18.31	37.27	10.59

Note: Peak parking demand excludes off-site car parking.

- The parking spaces provided on sites varied from 1.16 spaces to 8.36 spaces per 100m<sup>2</sup> GFA. As described previously, BG5 has extremely high parking provision because the site shares its car park with another unoccupied shop. So for this site, parking demand is a more relevant benchmark than parking provision. If this site is excluded, the provision ranges from 1.16 to 2.65 spaces per 100m<sup>2</sup> GFA.
- The peak parking demand from the survey data indicates that the ratio varies from 0.35 spaces per 100m<sup>2</sup> GFA to 3.17 spaces per 100m<sup>2</sup> GFA. Site BG3 has a relatively high parking demand per 100m<sup>2</sup> GFA compared with the other sites. This is probably due to the relatively small GFA so an increase in parking demand of just a few spaces can increase the ratio significantly.
- The weekend generally has a higher parking demand than weekdays.
- In general, the car parks at most of the sites were not more than 80% occupied apart from site BG3.

## 4 COMPARISON OF NSW FINDINGS WITH OVERSEAS DATABASES

### 4.1 Introduction

A number of Australian and overseas guidance documents and traffic generation databases have been examined to see if they are comparable to the results established from this study. These are examined below.

### 4.2 Australian Documents

#### 4.2.1 National Documents

Austroads has a document in production entitled “The Guide to Traffic Management Part 12 – Traffic Impact of Developments”. This is not yet issued or indeed available for comment but the website gives an overview of the processes for assessing the traffic and transport impacts of land use developments: These include

- policy and planning considerations
- development profiles and issues
- traffic impact assessment
- developments and access management

#### 4.2.2 State Documents

Most of the Australian states produce a document(s) which shows how to undertake traffic / transport impact assessments. Most of these documents refer to sources of traffic generation data. The documents, and other anecdotal information, are discussed below for each of the states.

**Table 4-1 Recommended Sources of Trip Rate Information**

NSW	The RTA “Guide to Traffic Generating Developments” is generally used. The latest version of the document was published in 2002 but much of its data is around 20 years old. A number of consultancies use their own data collection efforts to argue variations to the RTA Guide (both up and down) but invariably use the RTA guide as the starting point.
Victoria	The RTA Guide to Traffic Generating Developments is used extensively and some documents refer to a Victorian document “Guidelines for Transport Impact Assessment Reports for major land use and development proposals (2006)” often referred to as “The Transport Impact Assessment Report (TIAR) Guidelines”. To a lesser extent, the Institute of Transportation Engineers (ITE) Trip Generation, 8th Edition publication is still used. Again, consultancies tend to use their own data collection efforts to assemble traffic generation figures.
Queensland	Most Council Planning Guidelines refer to both the RTA Guide to Traffic Generating Developments and the “Guidelines for Assessment of Road Impacts for Developments (2006) produced by Queensland Transport.

South Australia	<p>The library at Department for Transport, Energy and Infrastructure (South Australia) has confirmed that they have “the RTA's version of Guide to Traffic generating developments” although they were also able to provide a copy of the “Land use traffic generation guidelines”(1987) which was produced by the Director-General of Transport South Australia.</p> <p>Anecdotal evidence suggests that traffic assessments still generally refer to the RTA Guide to Traffic Generating Developments whilst historically emphasis was placed on the South Australian “Land Use Traffic Generation Guidelines”. Certain documents suggest that the Director General Transport South Australia has published a Guide to Traffic Generating Developments but its use is not yet extensive and the Departmental Library has failed to find a copy.</p>
Western Australia	<p>Transport Assessment Guidelines for Developments was issued in 2006 for trial and evaluation. The document is divided into 5 volumes with the final volume giving more detailed considerations. The document was endorsed by the Western Australia Planning Commission Transport Committee as a “working” document for voluntary trial and evaluation. Transport officers within the Dept for Planning and Infrastructure are using the guidelines to assist them in assessing the transport implications of land use development proposals and officers within local government are being encouraged to do the same.</p> <p>Anecdotal evidence suggests that there is still an "old school" mentality that is still persisting with the use of the South Australia Land Use Traffic Generation Guidelines (1987), the RTA Guide to Traffic Generating Developments (2002) and the ITE Trip Generation Handbook (USA).</p>
Australian Capital Territory	It is believed that the ACT generally uses the RTA Guide to Traffic Generating Developments.
Northern Territory	Unknown
Tasmania	Tasmania generally uses the RTA guidelines when assessing traffic generating developments. This only varies when contemporary and relevant traffic count data that supports using other figures is available.

This summary generally endorses work undertaken by Ian Clark of Flow Transportation Services who produced a report entitled “Guidelines for Undertaking Transport assessments in New Zealand and Australia”. This included a table showing the documents that some Australian states (and New Zealand) produce and which recommends where practitioners should obtain trip rate information.

Table 4-2 Recommended Sources of Trip Rate Information

Table 4: Recommended Sources of Trip Rate Information

Guideline	Recommended Source (s)
Auckland	Not specified, but to be specified in forthcoming supplementary guidance as: New Zealand Trips and Parking Database (and related Transfund Research Reports) RTA "Guide to Traffic Generating Developments" (2002) ITE "Trip Generation" (2003) TRICS database
Victoria	Not specified
Queensland	RTA "Guide to Traffic Generating Developments" (2002) ITE "Trip Generation" (2003) Main Roads, local government and consultants databases
Western Australia	South Australia Guidelines, (1987) RTA "Guide to Traffic Generating Developments" (2002) ITE "Trip Generation" (2003)

For details of sources, see footnotes to Table 1

Each of the key Australian documents is described below

### **NSW**

The RTA guide includes both traffic generation and parking impact information for a wide range of land uses. Even so, some of the uses range across a broad spectrum of developments. For example, this study has shown how the RTA classification for Bulky goods retail covers a wide range and the RTA guide in fact states that *"the trip generation rates vary so widely that average generation rates cannot be recommended"*. It also confirms that the guide is *"a summary of basic traffic generation information for various land uses to assist people who may not have traffic engineering training"*.

It also recommends that *"comparisons may be drawn however between the traffic generation potential of various land use types enabling a rough assessment of the traffic generation implications of land zoning. Departures from the average generation rates for individual development proposals may be adopted in which case such a departure should be justified with relevant supporting facts"*.

Indeed the report states that *"surveys of existing developments similar to the proposal can also be undertaken and comparisons may be drawn"*.

However, the document is widely used in NSW although its validity is sometimes called into question, particularly at Land and Environment Court cases, when developers often submit their own traffic count data.

## **Queensland**

The Guidelines for Assessment of Road Impacts for Developments states at Section 4.3 that *“traffic generation can be forecast using trip generation rates established for particular land uses. These are available from a number of sources including Main Roads and local government. The use of locally derived trip generation rates is preferred to that applicable elsewhere”*. This is then discussed in more detail at Appendix E of the guidelines which lists a number of sources

- *Guide to Traffic Generating Developments* prepared by the Roads and Traffic Authority of NSW (may need to be modified for particular uses to suit the local situation);
- *Trip Generation* by the Institute of Transportation Engineers (ITE) (United States data – may need to be modified to suit Australian conditions);
- Main Roads’ and local governments’ databases; and
- Traffic / transport consultants’ and surveyors’ databases.

It also confirms that the level of detail in these sources varies from ‘raw data to rates only with some containing parking demand etc’. It also notes that the most reliable source is from an actual development or a similar one in a similar location, preferably in close proximity to the subject site.

## **Victoria**

The Guidelines for Preparation of Transport Impact Assessment Report document (which is part of the VicRoads Toolkit for managing access to Arterial Roads and Freeways) discusses the provision of traffic generation information but gives no indication as to where such trip generation information might be obtained.

## **Western Australia**

The Western Australia document, which is issued for trial and evaluation, comprises a number of volumes giving guidance on transport assessments for developments. Volume 5 however contains some very old data suggesting that *“person-trip generation rates for residential land uses may be derived from household travel surveys such as the 1986 Perth Travel Surveys, the more recent TravelSmart surveys in particular suburbs and the current Perth and regions travel survey (PARTS). However, such person-trip generation data is often unavailable, particularly for other than residential land uses. In these cases it is usually sufficient to use vehicle-trip generation rates with adjustments as appropriate to reflect anticipated higher or lower non-car mode share for the particular development.*

*The person and/or vehicle trip generation of a development can be estimated by:*

- *surveying a comparable development in a similar location;*
- *using existing traffic data for a comparable development(s); and*
- *using typical rates for similar developments”.*

With regard to trip generation, Volume 2 states that *“vehicle trip generation rates are to be based on surveys of comparable land uses or extracted from recognised land use traffic generation databases such as:*

- *Land Use Traffic Generation Guidelines, March 1987 - Director General of Transport, South Australia;*
- *Guide to Traffic Generating Developments Version 2.2, October 2002 – Roads and Traffic Authority, New South Wales;*
- *Trip Generation 7th edition, 2003 - Institute of Transportation Engineers, Washington, USA.*

## **South Australia**

The 1987 South Australia document states that the 'trip rates' used in the document are appropriate for the 1980's and "*care should be taken in applying them after 1980*". It does however contain simplistic trip generation rates for a large number of land uses.

## Summary

- Throughout Australia, the RTA guide seems to be the main source of traffic generation data
- The ITE books are used but in a limited way.
- TRICS and NZTDB appear to be used academically but not in detailed consideration of development impacts
- There are concerns about the RTA data in so far as the age of the data and the relevance of the time of year at which the data surveys were undertaken
- Many practitioners use the RTA guide as a starting point but then do their own surveys to establish traffic generation characteristics at similar sites / land uses
- The RTA guide does not consider multi-modal travel.
- The RTA guide covers uses which have significantly different characteristics. For example in this study, bulky goods & hardware (but currently referred to at 3.6.8 of that guide as bulky goods / retail stores) are different uses and the traffic characteristics of hardware stores can be complicated by ancillary uses such as garden centres. As a comparison, the UK TRICS database separates hardware stores into 2 different database classifications: - DIY with garden centre and DIY without garden centre as their trip generating characteristics are quite different.

In summary, although other documents are used, and many companies seem to undertake their own surveys to establish the traffic generating capabilities of a particular site, the RTA guide seems to be the first point of reference.

## 4.3 Other Countries

### 4.3.1 New Zealand

The former New Zealand Trips and Parking Database Bureau is now known as the Trips Database Bureau. The Bureau was formed in New Zealand in 2002 using an initial database of around 500 survey sites. The Bureau continues to collect surveys of trip rates, parking demand and travel information relative to different land uses from across the country. In addition to developing the trips and parking database, the Bureau also undertakes government sponsored transportation research on travel profiles, trip generation and transportation assessment guidelines. Members of the Bureau include New Zealand organisations including Transit NZ, consultants and councils and recently some Australian councils and consultants.

## 4.3.2 USA

The Institution of Transportation Engineers (ITE) “Trip Generation” book consists of two data volumes with land use descriptions, trip generation rates, equations and data plots. Data is included from more than 4,800 sites and 162 land uses. The most recent (8th) edition was published in 2008. The USA document is produced in book format only which means it is not possible to select the most appropriate site data and it encourages the use of average values.

In addition, the Institution of Transportation Engineers (ITE) “Parking Generation” third edition has 91 land uses represented and it includes parking demand data by hour of day.

## 4.3.3 UK

### TRICS

TRICS is the UK national standard trip generation database and is used as an integral and essential part of the Transport Assessment process. The system is marketed and managed by JMP Consultants Limited on behalf of the TRICS® Consortium of 6 County Councils: Surrey, Kent, East Sussex, West Sussex, Hampshire and Dorset. JMP regularly ask for input from consultants and local authorities with regard to the additional land uses that require additional information. It contains transport generation data for a wide variety of development types, across all regions of the UK and Ireland. The current annual data collection programme consists of 170 multi-modal surveys across all regions, plus another 100 traffic surveys. The database in which 5,600 days of survey data are held uses a flexible system of filtering, to allow users to interrogate trip rates for sites (including a very specialised range of land use categories) which meet their own compatibility criteria. Also, individual trip rates for a given time period for a number of surveys can be calculated and ranked, displaying the worst and best case scenarios.

Nevertheless, with the wide range of data, it is often the case that developers and development control officers fail to agree on the most relevant site data which in turn often leads to disagreements and this often forms the basis of planning appeals (which are the UK equivalent of Land & Environment Courts).

### TRAVL

TRAVL (Trip Rate Assessment Valid for London) is a multi-modal trip generation database designed specifically for use in the capital. It is used by planners working on projects across Greater London to estimate the effect of proposed changes in land use on transport patterns and, in particular, on the amount of road traffic in an area. The TRAVL database contains surveys of over four hundred sites across the capital. There are several types of surveys provided for each site which cover all aspects of traffic and people movement at the specific sites.

### Summary

It is clear that the TRAVL database is primarily used in city centre London which has heavily constrained traffic movements and very high levels of public transport accessibility. Consequently, it is not considered that it is a useful database in the context of this study. Elsewhere in the UK, TRICS is the accepted database for nearly all councils and traffic consultancies.

## 4.4 Interrogation of International Databases

Based on Hyder's international experience, and the examination of data in Section 5 of the traffic generation data available in Australia, the following databases that have been examined as part of this study are as follows

- RTA Guide to Traffic Generating Developments (2002)
- New Zealand Trips Database Bureau (NZTDB)
- United States Institute of Transportation Engineers (ITE)
- Trip Rate Information Computer Systems (TRICS) UK

All of these databases treat parking and traffic generation as two separate discussion areas so the information contained in these documents has been studied in these two key areas.

## 4.5 Parking

### 4.5.1 RTA Guide to Traffic Generating Developments

The Road and Traffic Authority of New South Wales (RTA) Guide to Traffic Generating Developments 2002 indicates that the variation of survey results of peak parking demands are so large that no conclusion has been made. It varied from 0.3 to 5.1 spaces / 100m<sup>2</sup> GLFA.

RTA recommended that comparisons should be drawn with similar developments.

### 4.5.2 New Zealand Trips Database Bureau (NZTDB)

A total of eight bulky goods sites are surveyed. It shows that peak parking demands for bulky goods stores are in the range of 0.91-5.94 spaces per 100m<sup>2</sup> GFA with parking provision from 2.1 to 5.53 spaces per 100m<sup>2</sup> GFA.

Only one hardware store has been surveyed and the results show the parking provision is 2.5 spaces per 100m<sup>2</sup> GFA. No peak parking demand data has been provided.

### 4.5.3 US Institute of Transportation Engineers (ITE)

The Institute of Transportation Engineers (ITE) Parking Generation Manual (3<sup>rd</sup> Edition) covers a number of land uses which coincide with the Australian bulky goods / hardware uses.

**Table 4-3     Parking Data Extracted from ITE – Hardware/DIY**

Land Use	Range of Units	Parking Supply	Weekday peak generation	Weekend / peak generation	Description
812 Building Materials and Lumber Store	11,300 – 26,000 sq ft GFA	2.4 – 3.8 spaces per 1,000 sq ft GFA	1.1 – 1.7 vehicles per 1,000 sq.ft GFA	Information not available	This includes a timber section
			(Larger GFA has higher parking demand)		
816 Hardware / Paint Store	4,000 – 20,000 sq ft GFA	6.7 spaces per 1,000 sq ft GFA (at the larger study site)	1.9 vehicles per 1,000 sq ft GFA	1.5 – 2.87 vehicles per 1,000 sq ft GFA	
				Larger GFA has higher parking demand	
				Peak period 12pm-1pm	
862 Home Improvement Superstore	50,000 - 150,000 sq ft GFA	4.9 spaces per 1,000 sq ft GFA	Average 2.43 vehicles per 1,000 sq ft GFA	Average 3.4 vehicles per 1,000 sq ft GFA	.
			Range 1.47-4.71	Range 2.11-4.64	
			Peak period 11am-5pm 8pm-9pm	Peak period 11am-5pm	

1,000 square foot = 92.90304 square metres

The above data shows a wide range of parking supply ranging from 2.4 to 6.7 spaces per 1,000 sq ft GFA whereas the demand appears to range from 1.1 to 4.71 spaces.

The home improvement superstore (Land use 862) is similar to Bunnings while the other two types (Land use 812 and 816) are similar to Mitre10 shops in Australia.

**Table 4-4 Parking Data Extracted from ITE – Bulky Goods**

Land Use	Range of Units	Parking Supply	Weekday peak generation	Weekend / peak generation	Description
863 Electronics Superstore	30,000 – 46,000 sq ft GFA	2.3 spaces per 1,000 sq ft GFA (Urban)	1.91 – 3.03 vehicles per 1,000 sq.ft GFA Smaller GFA (Suburban) has higher parking demand	Information not available	For comparison, March represents 94% while December is 163% over the years
869 Discount Home Furnishing Superstore	NO INFORMATION AVAILABLE				
890 Furniture Store	Average 35,800 sq ft GFA	2.1 spaces per 1,000 sq ft GFA	0.91-1.53 vehicles per 1,000 sq ft GFA (data available for 8pm-9pm only)	Average 0.94 vehicles per 1,000 sq ft GFA Range 0.67-1.30 Peak period 12pm-1pm 2pm-3pm 4pm-6pm	For comparison, March represents 102% while December is 111% over the years.
892 Carpet Store	Average 9,500 sq ft GFA (Sat) Average 11,700 sq ft GFA (Weekday)	3.9 spaces per 1,000 sq ft GFA	Average 1.33 vehicles per 1,000 sq ft GFA Range 0.90-1.60 Peak period 2pm-3pm 4pm-6pm	Average 1.79 vehicles per 1,000 sq ft GFA Range 0.88-3.00 Peak period 1pm-3pm	

1,000 square foot = 92.90304 square metres

The above data shows a wide range of parking supply ranging from 2.1 to 3.9 spaces per 1,000 sq ft GFA whereas the demand appears to range from 0.67 to 3.03 spaces.

The comparable uses to the surveys undertaken in this study are electronics superstore (Land use 863), discount home furnishing superstore (Land use 869) and furniture store (Land use 890). No carpet store has been surveyed in this study.

#### 4.5.4 Trip Rate Information Computer Systems (TRICS) London

The hardware and bulky goods uses are contained within a number of classifications, these primarily being

##### 01/D – DIY Superstore (with garden centre) (GDO use class A1)

These are non-food retail store specialising in DIY goods, which include a garden centre sharing the same car park. They may be part of a retail park, but site details and survey will only include the DIY superstore element. Trip rates are calculated by Gross Floor Area, Retail Floor Area, Employees, or Parking Spaces.

Reference	Description	Area	Location	GFA	RFA	SPACES	EMPLOY	Survey Type	Most Recent Survey	Status	Travel Plan
AR-01-D-01	B&Q WAREHOUSE, CRAIGAVON	ARMAGH	Town Centre	11149	10313	500	160	VEHICLES	03/11/02	One-Off	
BG-01-D-01	B&Q BRIDGEND	BRIDGEND	Edge of Town	5269	5006	80	50	VEHICLES	07/11/92	One-Off	
CA-01-D-01	B&Q, CAMBRIDGE	CAMBRIDGESHIRE	Edge of Town	4726	4598	228	98	MULTI-MODAL	17/11/00	One-Off	
CH-01-D-01	B&Q, WARRINGTON	CHESHIRE	Suburban Area (PPS)	5634	4414	193		VEHICLES	14/10/89	One-Off	
DC-01-D-01	FOCUS, DORCHESTER	DORSET	Edge of Town Cent	2230	1988	70	21	MULTI-MODAL	05/07/08	One-Off	
DC-01-D-02	B & Q DEPOT, POOLE	DORSET	Not Known	8027	6263	360	169	VEHICLES	03/01/94	One-Off	
DC-01-D-03	HOMEBASE, BLANDFORD FORUM	DORSET	Neighbourhood Cent	1987	1689	77	47	MULTI-MODAL	06/07/08	One-Off	
DE-01-D-01	B&Q, COLERAINE	DERRY	Not Known	3148	2775	247	42	VEHICLES	20/04/95	One-Off	
DG-01-D-01	GREAT MILLS, DUMFRIES	DUMFRIES & GALLOWAY	Suburban Area (PPS)	3716	2396	220	41	VEHICLES	02/06/98	One-Off	
DU-01-D-01	B&Q, DUNDEE	DUNDEE CITY	Not Known	4249	4121	220		VEHICLES	25/03/88	One-Off	
EA-01-D-01	TEXAS, MILNGAVIE	EAST AYRSHIRE	Not Known	3344	2787	103	50	VEHICLES	15/09/91	One-Off	
FA-01-D-01	B&Q, FALKIRK	FALKIRK	Edge of Town	2525	2150	179	74	VEHICLES	03/10/93	Initial Survey	
FA-01-D-02	B&Q SUPACENTRE, FALKIRK	FALKIRK	Edge of Town	2525	2150	164	54	MULTI-MODAL	29/04/07	Re-Survey	
GC-01-D-01	TEXAS, GLASGOW	GLASGOW CITY	Not Known	4500		370		VEHICLES	12/03/89	One-Off	
GC-01-D-02	B&Q WAREHOUSE, GLASGOW	GLASGOW CITY	Edge of Town	13935	13785	616	232	VEHICLES	10/07/99	One-Off	
GC-01-D-03	B&Q, GLASGOW	GLASGOW CITY	Edge of Town	1928	1449	207	39	MULTI-MODAL	29/09/01	One-Off	
GM-01-D-01	B&Q STOCKPORT	GREATER MANCHESTER	Suburban Area (PPS)		5268	310	80	VEHICLES	24/06/89	One-Off	
GM-01-D-02	B&Q WAREHOUSE, BURY	GREATER MANCHESTER	Edge of Town	10910	9000	432	211	VEHICLES	03/07/98	One-Off	
HC-01-D-01	B&Q DEPOT, SOUTHAMPTON	HAMPSHIRE	Edge of Town	8993	7135	512	160	VEHICLES	28/12/93	One-Off	
HC-01-D-02	B&Q DEPOT, HAVANT	HAMPSHIRE	Edge of Town	7618	6662	384	177	VEHICLES	03/01/94	One-Off	
HC-01-D-03	HOMEBASE, BASINGSTOKE	HAMPSHIRE	Suburban Area (PPS)	6350	5575	234	100	VEHICLES	18/11/07	One-Off	
HF-01-D-01	B&Q, WELWYN GARDEN CITY	HERTFORDSHIRE	Suburban Area (PPS)	4791	4645	169	62	VEHICLES	16/02/02	Initial Survey	
HF-01-D-02	B&Q, WELWYN GARDEN CITY	HERTFORDSHIRE	Suburban Area (PPS)	5000	4000	166	37	MULTI-MODAL	13/07/08	Re-Survey	
KC-01-D-01	B&Q, NEAR MAIDSTONE	KENT	Suburban Area (PPS)	3556	3167	137	45	VEHICLES	22/10/00	Re-Survey	
KC-01-D-02	HOMEBASE, DARTFORD	KENT	Suburban Area (PPS)	5000	4070	138	65	VEHICLES	14/10/01	Re-Survey	
KN-01-D-01	HOMEBASE, KENSINGTON	KENSINGTON AND CHELSEA	Suburban Area (PPS)	4459	4088	166	113	MULTI-MODAL	10/11/07	One-Off	
LC-01-D-01	B&Q, CHORLEY	LANCASHIRE	Edge of Town	4808		184		VEHICLES	10/06/89	One-Off	
LC-01-D-02	DO IT ALL, PRESTON	LANCASHIRE	Not Known	3378		199	30	VEHICLES	08/10/89	One-Off	
LE-01-D-01	B&Q DEPOT, LEICESTER	LEICESTERSHIRE	Suburban Area (PPS)	8528	6735	424	134	VEHICLES	21/06/93	One-Off	
MS-01-D-01	B&Q, LIVERPOOL	MERSEYSIDE	Suburban Area (PPS)	4800	4000	112	68	MULTI-MODAL	17/06/07	One-Off	
NA-01-D-01	B&Q, STEVENSTON	NORTH AYRSHIRE	Edge of Town	5500	4822		60	VEHICLES	06/07/99	One-Off	
NF-01-D-01	B&Q, NORWICH	NORFOLK	Edge of Town Cent	3900	3465	247	67	VEHICLES	22/06/90	One-Off	
NF-01-D-02	B&Q WAREHOUSE, NORWICH	NORFOLK	Suburban Area (PPS)	13775	11775	571	243	MULTI-MODAL	17/09/05	One-Off	
NT-01-D-01	B&Q, NEAR NOTTINGHAM	NOTTINGHAMSHIRE	Suburban Area (PPS)	4325	3205	206	64	VEHICLES	28/04/02	One-Off	
SC-01-D-01	B&Q, LEATHERHEAD	SURREY	Edge of Town	4000	3250	155		VEHICLES	14/03/93	One-Off	
SC-01-D-02	HOMEBASE, WALTHAM-ON-THAMES	SURREY	Edge of Town Cent	5500	3385	160	81	VEHICLES	09/03/96	One-Off	
WF-01-D-01	B&Q, LEYTON	WALTHAM FOREST	Suburban Area (PPS)	3550	3100	89	67	VEHICLES	04/08/02	One-Off	
WM-01-D-01	B&Q, BIRMINGHAM	WEST MIDLANDS	Suburban Area (PPS)	3110	2700	131	38	VEHICLES	04/06/00	One-Off	
WM-01-D-02	B&Q WAREHOUSE, BIRMINGHAM	WEST MIDLANDS	Suburban Area (PPS)	12000	11400	488	220	VEHICLES	27/01/02	One-Off	
WM-01-D-03	B&Q, BIRMINGHAM	WEST MIDLANDS	Suburban Area (PPS)	4000	3500	210	62	VEHICLES	16/09/07	One-Off	

## 01/E – DIY Superstore (without garden centre) (GDO use class A1)

These are non-food retail stores specialising in DIY goods, with no garden centre present. They may be part of a retail park, but site details and survey will only include the DIY superstore element. Trip rates are calculated by Gross Floor area, Retail Floor Area, Employees, or Parking Spaces.

Geographic Map	Copy Data	Print	Help	Previous Screen	39 Sites Available			Order	Normal		
Reference	Description	Area	Location	GFA	RFA	SPACES	EMPLOY	Survey Type	Most Recent Survey	Status	Travel Plan
CB-01-E-01	GREAT MILLS, KENDAL	CUMBRIA	Edge of Town	3530	3345	150	35	VEHICLES	05/12/92	One-Off	
CH-01-E-01	TEXAS, WARRINGTON	CHESHIRE	Edge of Town Cent	2323	1983	99	32	VEHICLES	14/10/89	One-Off	
DC-01-E-02	B&Q, BOURNEMOUTH	DORSET	Suburban Area (PPS)	2660	2470	137	40	VEHICLES	14/11/92	One-Off	
DC-01-E-04	GREAT MILLS, POOLE	DORSET	Not Known	3456	2973	220	31	VEHICLES	11/11/89	One-Off	
DS-01-E-01	WICKES, CHESTERFIELD	DERBYSHIRE	Suburban Area (PPS)	1840	1700	155	27	MULTI-MODAL	24/06/06	One-Off	
ES-01-E-01	B&Q, HASTINGS	EAST SUSSEX	Edge of Town	2076		50		VEHICLES	19/09/87	One-Off	
ES-01-E-02	PAYLESS, EASTBOURNE	EAST SUSSEX	Edge of Town	2973	1858	125		VEHICLES	11/09/87	One-Off	
ES-01-E-03	B&Q, EASTBOURNE	EAST SUSSEX	Edge of Town	4756		250		VEHICLES	12/09/87	One-Off	
ES-01-E-04	DO-IT-ALL, BEXHILL	EAST SUSSEX	Edge of Town	1579	1375	70	15	VEHICLES	21/11/92	One-Off	
ES-01-E-05	TEXAS, LEVES	EAST SUSSEX	Edge of Town	2175	1785	44		VEHICLES	26/06/87	One-Off	
ES-01-E-06	B&Q, NEAR BRIGHTON	EAST SUSSEX	Suburban Area (PPS)	2163	1951	60		VEHICLES	04/07/87	One-Off	
ES-01-E-07	DO-IT-ALL, WORTHING	EAST SUSSEX	Edge of Town	3605	3159	180	30	VEHICLES	15/08/92	One-Off	
ES-01-E-08	PAYLESS, BRIGHTON	EAST SUSSEX	Suburban Area (PPS)	2935	2360	76	25	VEHICLES	08/03/86	One-Off	
ES-01-E-09	TEXAS, BRIGHTON	EAST SUSSEX	Edge of Town	3250	1950	161		VEHICLES	14/03/86	Initial Survey	
ES-01-E-10	TEXAS, BRIGHTON	EAST SUSSEX	Edge of Town	3250	1950	161	30	VEHICLES	10/06/89	Re-Survey	
ES-01-E-11	GREEN DIY, UCKFIELD	EAST SUSSEX	Edge of Town	100	98	38	20	MULTI-MODAL	22/06/02	One-Off	
FI-01-E-01	B&Q, KIRKCALDY	FIFE	Edge of Town	2313	2155	108		VEHICLES	22/08/91	One-Off	
GC-01-E-01	B&Q, GLASGOW	GLASGOW CITY	Not Known	3352		217		VEHICLES	19/03/89	One-Off	
GC-01-E-02	TEXAS, GLASGOW	GLASGOW CITY	Not Known	4500		370		VEHICLES	12/03/89	One-Off	
GM-01-E-01	B&Q, MANCHESTER	GREATER MANCHESTER	Suburban Area (PPS)	4181	2787	200	50	VEHICLES	24/10/93	One-Off	
GR-01-E-01	FOCUS DIY, PLUMSTEAD	GREENWICH	Neighbourhood Cent	2408	2124	79	23	VEHICLES	20/01/07	One-Off	
HC-01-E-01	HOMEBASE, BASINGSTOKE	HAMPSHIRE	Suburban Area (PPS)	3020		200		VEHICLES	18/05/85	One-Off	
IM-01-E-01	B&Q, DOUGLAS	ISLE OF MAN	Edge of Town	3160				VEHICLES	02/11/89	One-Off	
KC-01-E-01	B&Q, NEAR MAIDSTONE	KENT	Suburban Area (PPS)	3577		137	50	VEHICLES	24/10/87	Initial Survey	
KC-01-E-02	B&Q, MAIDSTONE	KENT	Suburban Area (PPS)	3205	2787	114	40	VEHICLES	03/10/87	Initial Survey	
KC-01-E-03	B&Q, MAIDSTONE	KENT	Suburban Area (PPS)	3205	2787	114	37	VEHICLES	16/10/94	Re-Survey	
KC-01-E-04	B&Q, MAIDSTONE	KENT	Suburban Area (PPS)	3252	2694	137	44	VEHICLES	03/12/92	Re-Survey	
KC-01-E-05	TEXAS, DARTFORD	KENT	Suburban Area (PPS)	4180	3250	138	60	VEHICLES	23/10/93	Initial Survey	
LC-01-E-01	B&Q, NELSON	LANCASHIRE	Edge of Town	3809	3252	225	50	VEHICLES	02/06/96	One-Off	
LC-01-E-02	DO-IT-ALL, RAWTENSTALL	LANCASHIRE	Town Centre	2230		120	15	VEHICLES	07/07/96	One-Off	
LC-01-E-03	WICKES, PRESTON	LANCASHIRE	Suburban Area (PPS)	2702	2415	131	26	VEHICLES	30/06/96	One-Off	
LN-01-E-01	WICKES, LINCOLN	LINCOLNSHIRE	Edge of Town	2400	2100	128	35	VEHICLES	09/06/02	One-Off	
NF-01-E-01	DO-IT-ALL, GREAT YARMOUTH	NORFOLK	Not Known	3252	2787	200	39	VEHICLES	16/02/91	One-Off	
PK-01-E-01	TEXAS, PERTH	PERTH & KINROSS	Not Known	1492	1212	40		VEHICLES	18/03/88	One-Off	
RC-01-E-01	LEEKES, LLANTRISANT	RHONDDA CYNON TAF	Edge of Town	11800	11200	500	250	VEHICLES	13/11/92	Initial Survey	
SC-01-E-01	TEXAS, REIGATE	SURREY	Edge of Town Cent	3160	2230	80	41	VEHICLES	14/03/93	One-Off	
SR-01-E-01	WICKES, STIRLING	STIRLING	Edge of Town	2500	2340	131	24	VEHICLES	10/10/99	One-Off	
WS-01-E-01	PAYLESS, BOGNOR	WEST SUSSEX	Not Known	2000	1644	128	22	VEHICLES	24/10/87	One-Off	
WY-01-E-01	WICKES, LEEDS	WEST YORKSHIRE	Suburban Area (PPS)	3500	3000	117	24	VEHICLES	09/09/07	One-Off	

## 01/G – Other Individual non-food Superstore (GDO use class A1)

These are all other single non food retail are included in this category. They may be part of a retail park, but the site details and survey will only include the individual store element. Trip rates are calculated by Gross Floor Area, Retail Floor Area, Employees, or Parking Spaces.

Geographic Map	Copy Data	Print	Help	Previous Screen	35 Sites Available				Order	Normal		
Reference	Description	Area	Location	GFA	RFA	SPACES	EMPLOY	Survey Type	Most Recent Survey	Status	Travel Plan	
BN-01-G-01	COURTS, STAPLES CORNER	BARNET	Suburban Area (PPSc	4000	2400	94	40	VEHICLES	01/05/04	One-Off		
BT-01-G-01	IKEA, NEASDEN	BRENT	Suburban Area (PPSc	23226	22064	1300	290	VEHICLES	07/03/92	One-Off		
BU-01-G-01	COURTS, MILTON KEYNES	BUCKINGHAMSHIRE	Suburban Area (PPSc	7900	2800	145	35	VEHICLES	10/03/02	One-Off		
CB-01-G-01	CARPHONE WAREHSE, CARLISLE	CUMBRIA	Suburban Area (PPSc	300	125	10	8	MULTI-MODAL	07/09/02	One-Off		
CH-01-G-01	IKEA, WARRINGTON	CHESHIRE	Edge of Town	16600	7700	720	208	VEHICLES	06/10/90	One-Off		
CK-01-G-01	STERLING, TILLCOLTRY	CLACKMANNANSHIRE	Neighbourhood Cent	12500	11000	550	165	VEHICLES	25/10/97	One-Off		
DC-01-G-01	TOYS R US, POOLE	DORSET	Suburban Area (PPSc	4042	3032	369	40	VEHICLES	26/11/92	One-Off		
DU-01-G-01	QUEENSWAY, DUNDEE	DUNDEE CITY	Edge of Town	3680	3505	134		VEHICLES	27/11/86	One-Off		
DU-01-G-02	MFL DUNDEE	DUNDEE CITY	Edge of Town	1951		60		VEHICLES	26/11/86	One-Off		
ES-01-G-01	QUEENSWAY, EASTBOURNE	EAST SUSSEX	Edge of Town	2787	2322	53		VEHICLES	12/09/87	One-Off		
ES-01-G-02	MFL ST. LEONARDS-ON-SEA	EAST SUSSEX	Edge of Town	4552	1672	150		VEHICLES	12/09/87	One-Off		
ES-01-G-04	MFL EASTBOURNE	EAST SUSSEX	Edge of Town	4450	2600	174	23	VEHICLES	10/06/89	One-Off		
EX-01-G-01	MFL COLCHESTER	ESSEX	Edge of Town	1000	800	110	17	MULTI-MODAL	19/07/08	One-Off		
FI-01-G-01	LANDMARK, INVERKEITHING	FIFE	Free Standing (PPS6	2787	2323	25		VEHICLES	04/08/88	One-Off		
FI-01-G-02	MFL DUNFERMLINE	FIFE	Suburban Area (PPSc	2220		44		VEHICLES	11/08/88	One-Off		
GM-01-G-01	AQUATIC SUPERSTORE, BOLTON	GREATER MANCHESTER	Suburban Area (PPSc	7989	4645	70	60	VEHICLES	23/02/91	One-Off		
GM-01-G-02	PC WORLD, MANCHESTER	GREATER MANCHESTER	Suburban Area (PPSc	2787	2230	170		VEHICLES	07/12/95	Initial Survey		
GM-01-G-03	PC WORLD, MANCHESTER	GREATER MANCHESTER	Suburban Area (PPSc	4325	2325	158	32	VEHICLES	12/06/04	Re-Survey		
KC-01-G-01	PREMIUM HOMEMAKER, HRINE BAY	KENT	Suburban Area (PPSc	1248	1100	101	16	VEHICLES	23/06/02	One-Off		
KC-01-G-02	D&A TOYS, CANTERBURY	KENT	Edge of Town	1500	1300	91	29	VEHICLES	08/12/02	One-Off		
KC-01-G-03	TOY SUPERSTORE, CANTERBURY	KENT	Edge of Town	1500	1300	91	29	MULTI-MODAL	07/12/02	One-Off		
NF-01-G-01	TOYS R US, NORWICH	NORFOLK	Edge of Town Centr	3835	3250	128	50	VEHICLES	29/09/02	Re-Survey		
NY-01-G-01	ALLIED CARPETS, YORK	NORTH YORKSHIRE	Edge of Town Centr	2300	2300	58	9	MULTI-MODAL	21/05/05	One-Off		
RC-01-G-01	CRS HOMEWORLD, TALBOT GRN	RHONDDA CYNON TAFF	Edge of Town	9290	6967	450	120	VEHICLES	06/11/92	One-Off		
RC-01-G-02	DEPARTMENT ST., LLANTRISANT	RHONDDA CYNON TAFF	Edge of Town	22300	12000	242	201	VEHICLES	20/10/02	Re-Survey		
RE-01-G-01	TOYS R US, READING	READING	Suburban Area (PPSc	4097		329	100	VEHICLES	10/12/91	One-Off		
RF-01-G-01	IKEA, GLASGOW	RENFREW/SHIRE	Suburban Area (PPSc	26500	24500	1360	500	VEHICLES	14/04/02	One-Off	Yes	
SF-01-G-01	NEVADA BOB'S GOLF, IPSWICH	SUFFOLK	Suburban Area (PPSc	290	258	17	5	MULTI-MODAL	17/11/00	One-Off		
WH-01-G-01	WINE WAREHOUSE, PUTNEY	WANDSWORTH	Edge of Town Centr	600	450	12	4	MULTI-MODAL	19/06/02	One-Off		
WM-01-G-01	STAPLES, BIRMINGHAM	WEST MIDLANDS	Suburban Area (PPSc	1880	1350	101	20	VEHICLES	18/11/00	One-Off		
WM-01-G-02	PC WORLD, SOLIHULL	WEST MIDLANDS	Edge of Town	2800	2250	107	60	VEHICLES	16/09/01	One-Off		
WM-01-G-03	DFS, BIRMINGHAM	WEST MIDLANDS	Suburban Area (PPSc	3600	2500	107	26	VEHICLES	28/10/01	One-Off		
WM-01-G-04	COMET, SOLIHULL	WEST MIDLANDS	Suburban Area (PPSc	2100	1400	147	55	VEHICLES	14/10/01	One-Off		
WS-01-G-01	QUEENSWAY, WORTHING	WEST SUSSEX	Edge of Town	2434	2211	62	14	VEHICLES	24/10/87	One-Off		
WS-01-G-02	COURTS, SHOREHAM	WEST SUSSEX	Suburban Area (PPSc	2750		55		VEHICLES	04/07/87	One-Off		

## 01/L – Builders Merchant (GDO use class A1)

These are individual store specialising in builders' equipment and supplies. Trip rates are calculated by Gross Floor Area, Retail Floor Area, Employees, or Parking Spaces.

Geographic Map	Copy Data	Print	Help	Previous Screen	10 Sites Available				Order	Normal	
Reference	Description	Area	Location	GFA	RFA	SPACES	EMPLOY	Survey Type	Most Recent Survey	Status	Travel Plan
EG-01-L-01	JEWSON, ACTON	EALING	Town Centre	1350	1225	7	5	VEHICLES	10/03/03	One-Off	
EG-01-L-02	BUILDERS MERCHANTS, ACTON	EALING	Suburban Area (PPS	2120	2000	10	5	VEHICLES	11/03/03	One-Off	
GM-01-L-01	TRAVIS PERKINS, STOCKPORT	GREATER MANCHESTER	Suburban Area (PPS	2600		20	9	VEHICLES	29/10/94	One-Off	
LC-01-L-01	BUILDERS MERCHANTS, LEYLAND	LANCASHIRE	Edge of Town	9974		150	140	VEHICLES	24/10/94	One-Off	
RE-01-L-01	BUILDERS MERCHANTS, READING	READING	Edge of Town	1514	540	46	28	VEHICLES	22/11/94	One-Off	
RE-01-L-02	BUILDERS MERCHANTS, THEALE	READING	Edge of Town	2045	605	65	26	VEHICLES	24/11/94	One-Off	
SC-01-L-01	BUILDER CENTRE, LEATHERHEAD	SURREY	Suburban Area (PPS	1390	1100	10	17	VEHICLES	16/11/02	One-Off	
WM-01-L-01	BUILDERS MERCH., BIRMINGHAM	WEST MIDLANDS	Edge of Town	600	500	5	15	VEHICLES	18/05/03	One-Off	
WO-01-L-01	JEWSON, BROMSGROVE	WORCESTERSHIRE	Edge of Town	1000	850	6	20	VEHICLES	26/04/03	One-Off	
WY-01-L-01	BUILDERS MER., HUDDERSFIELD	WEST YORKSHIRE	Suburban Area (PPS	3000	2200	30	40	VEHICLES	17/03/03	One-Off	

All of the above TRICS uses show the parking provision at the sites but it is possible to examine the raw survey data to observe the number of occupied car parking spaces (i.e. the demand) and compare / contrast this with the number of spaces provided.

In terms of parking, the TRICS database has been examined to see what the parking provision and demand were for the sites in the bulky goods related stores. The 01/D and 01/E stores are comparable to the Australian Hardware stores and the 01/G and 01/L stores are comparable to the Australian bulky goods stores.

**Table 4-5 Parking Demand and Provision in UK – Bulky Goods**

Land Use		GFA (m <sup>2</sup> )	SPACES	Parking Provision Space/ 100m <sup>2</sup> GFA	Parking Demand / 100 m <sup>2</sup> GFA Weekday	Parking Demand / 100 m <sup>2</sup> GFA Friday	Parking Demand / 100 m <sup>2</sup> GFA Saturday	Parking Demand / 100 m <sup>2</sup> GFA Sunday	% of Parking in Use Weekday	% of Parking in Use Friday	% of Parking in Use Saturday	% of Parking in Use Sunday
01/D – DIY Superstore (with garden centre)	Avg	5,408	239	4.62	1.97	1.75	2.63	2.68	45	40	65	59
	Min	1,928	70	1.52	1.23	0.76	1.04	0.71	21	19	30	17
	Max	13,935	616	10.74	3.53	3.54	4.87	6.50	76	96	140	121
01/E – DIY Superstore (without garden centre)	Avg	3,148	148	5.52	2.04	2.01	4.04	2.49	60	54	70	51
	Min	100	38	2.02	0.61	0.76	1.25	1.30	14	18	28	27
	Max	11,800	500	38.00	4.44	4.74	31.00	3.60	160	154	200	78
01/G – Other Individual non-food Superstore	Avg	6,796	260	4.15	0.95	1.36	2.52	2.08	23	37	62	55
	Min	290	10	0.88	0.20	0.34	0.43	0.35	5	10	17	19
	Max	26,500	1,360	11.00	2.55	3.29	6.34	4.71	42	83	146	118
01/L – Builders Merchant	Avg	2,559	35	1.26	0.99	1.22	0.89	0.33	82	170	125	40
	Min	600	5	0.47	0.44	0.90	0.12	0.33	28	140	15	40
	Max	9,974	150	3.18	2.10	1.58	1.80	0.33	130	220	250	40

The maximum / minimum number of parking spaces and GFA do not necessary occur at the same site so 'Parking provisions space/100sqm GFA' in the table above is not simply a division of the maximum number of spaces / divided by the maximum area

The table above shows a wide range of parking supply varying from 0.47 spaces per 100m<sup>2</sup> GFA to 38 spaces per 100m<sup>2</sup> GFA. However, the average provided is around 4 spaces per 100m<sup>2</sup> GFA.



## 4.5.5 Comparison of Databases - Parking

Table 4-6 Summary Comparison of Parking Rate - Hardware

(Spaces per 100m <sup>2</sup> GFA)	Parking Supply	Parking Demand
RTA Guide	N/A	0.3 - 5.1
NZTDB	N/A	2.5
ITE	2.6 - 7.2	1.2 - 5.1
TRICS	0.47 - 38	0.12 - 31
2009 Survey	1.5 - 5	1.04 - 2.81

ITE data has been converted from spaces per sq ft to sq m. (1,000 square foot = 92.90304 square metres)

Table 4-7 Summary Comparison of Parking Rate– Bulky Goods

(Spaces per 100m <sup>2</sup> GFA)	Parking Supply	Parking Demand
RTA Guide	N/A	0.3 - 5.1
NZTDB	2.1 - 5.53	0.91 - 5.94
ITE	2.3 - 2.5	0.7 - 3.3
TRICS	0.47 - 38	0.12 - 31
2009 Survey	1.5 - 5	1.04 - 2.81

ITE data has been converted from spaces per sq ft to sq m. (1,000 square foot = 92.90304 square metres)

## 4.6 Comparison of Databases - Person Trips

There is no information available in the New Zealand database or in the ITE database relating to person trips.

However the TRICS database (contained in **Appendix C**) includes information about person trips which can be interrogated to establish person trips for some of the relevant land use classifications.

A comparison of the TRICS data against the study surveys is summarised in the table below.

Table 4-8 Summary of Person Trip Comparison

Person Trips	WEEKDAY		WEEKEND	
	Peak Hour	Daily	Peak Hour	Daily
TRICS DIY Store with garden centre	-	-	15.6	119.2
TRICS DIY store without garden centre	-	-	44.2	362.6
TRICS Builder Merchants	No Information Available			
2009 Surveys Hardware	4.67 - 5.72	40.06 - 41.05	8.07 - 9.40	43.9 - 63.8

Person Trips	WEEKDAY		WEEKEND	
	Peak Hour	Daily	Peak Hour	Daily
TRICS Other Non Food Superstores	2.7	17.3	14.8	91.5
2009 Surveys Bulky Goods	4.4	27.45	8.28	38.05

## 4.7 Vehicle Trip Generation

### 4.7.1 RTA Guide to Traffic Generating Developments

The RTA guide indicates that the trip generation rates varied so widely that average generation rates cannot be recommended. However, it states that during Thursday evening peak, the average trip rate is 2.5 vehicles / hour / 100m<sup>2</sup> GLFA with a range from 0.1 to 6.4 vehicles / hour / 100m<sup>2</sup> GLFA. The mean peak rate on the weekend is 6.6 vehicles / hour / 100m<sup>2</sup> GLFA with a range from 0.7 to 16.9 vehicles / hour / 100m<sup>2</sup> GLFA.

RTA recommends comparison with similar retail outlets and suggests making reference to the *Land Use Traffic Generation* report.

### 4.7.2 New Zealand Trips Database Bureau (NZTDB)

The surveys available in New Zealand database are normally only undertaken for two hours in a day and the peak hours are therefore not known. Therefore, the peak hour trip rates and daily trip rates are not available for comparison to this study.

### 4.7.3 US Institute of Transportation Engineers (ITE)

The Institute of Transportation Engineers (ITE) Trip Generation Manual (8<sup>th</sup> Edition 2008) again splits the bulky goods category into a number of discrete land uses (Nos 812-892 inclusive).

The information contained in this document has been analysed and summarised in the table below.

One thing to note is that the US uses imperial measuring units and so 1,000 square feet = 92.9030 square metre.

## Hardware / DIY

**Table 4-9 Trip Generation of Hardware Store - ITE**

	Range of Units	Weekday Daily Trip generation	WEEKDAY				WEEKEND			
			Network Peak		Generator Peak		Saturday		Sunday	
			AM	PM	AM	PM	Daily	Peak	Daily	Peak
812 Building Materials and Lumber Store	Less than 30,000 sq ft GFA	45.16 trips per 1,000 sq ft GFA	2.6 trips per 1,000 sq ft GFA	4.49 trips per 1,000 sq ft GFA	4.16 trips per 1,000 sq ft GFA	5.56 trips per 1,000 sq ft GFA	51.6 trips per 1,000 sq ft GFA	9.58 trips per 1,000 sq ft GFA	24.5 trips per 1,000 sq ft GFA	4.57 trips per 1,000 sq ft GFA
		Range 39.17-56.27	Range 1.13-5.17	Range 3.45-6.08	Range 1.75-9.2	Range 4.33-7.18	Range 43.7-75.86	Range 6.6-13.26	Range 4.27-48.67	Range 0.67-8.33
816 Hardware / Paint Store		51.29 trips per 1,000 sq ft GFA	1.08 trips per 1,000 sq ft GFA	4.84 trips per 1,000 sq ft GFA	4.91 trips per 1,000 sq ft GFA	4.74 trips per 1,000 sq ft GFA	82.52 trips per 1,000 sq ft GFA	11.18 trips per 1,000 sq ft GFA	68.65 trips per 1,000 sq ft GFA	9.81 trips per 1,000 sq ft GFA
		Range 43.58-74.09	Range 0.42-3.5	Range 1.52-8.45	Range 4.45-7.17	Range 3.98-8.27	Range 78.3-109.09	Range 10.33-14.45	Range 64-87.45	Range 8.77-13.27
862 Home Improvement Superstore	50,000-200,000 sq ft GFA	29.8 trips per 1,000 sq ft GFA	1.26 trips per 1,000 sq ft GFA	2.37 trips per 1,000 sq ft GFA	3.08 trips per 1,000 sq ft GFA	3.32 trips per 1,000 sq ft GFA	56.72 trips per 1,000 sq ft GFA	4.51 trips per 1,000 sq ft GFA	55.8 trips per 1,000 sq ft GFA	8.03 trips per 1,000 sq ft GFA
		Range 18.35-39.31	Range 0.32-2.58	Range 1.2-4.34	Range 1.87-5.31	Range 1.96-5.89	Range 34.77-73.12	Range 2.63-7.28	Range 20.93-70.49	Range 4.2-9.64

N.B The ratio is also available per employee. However, it is not suitable to estimate trip generation for new development because the staff number depends on the actual customer demands.

## Bulky Goods

Table 4-10 Trip Generation of Bulky Goods store - ITE

	Range of Units	Weekday Daily Trip generation	WEEKDAY				WEEKEND			
			Network Peak		Generator Peak		Saturday		Sunday	
			AM	PM	AM	PM	Daily	Peak	Daily	Peak
863 Electronics Superstore		45.04 trips per 1,000 sq ft GFA	N/A	4.50 trips per 1,000 sq ft GFA	3.46 trips per 1,000 sq ft GFA	4.50 trips per 1,000 sq ft GFA				
		Range 33.74-59.17		Range 3.45-5.78	Range 2.91-4.18	Range 3.45-5.78				
869 Discount Home Furnishing Superstore	Over 100,000 sq ft GFA	20 trips per 1,000 sq ft GFA	0.57 trips per 1,000 sq ft GFA	1.57 trips per 1,000 sq ft GFA	3.46 trips per 1,000 sq ft GFA	4.50 trips per 1,000 sq ft GFA	33.29 trips per 1,000 sq ft GFA	3.16 trips per 1,000 sq ft GFA		
		Range 12.01-47.81	Range 0.16-1.00	Range 0.94-4.01	Range 2.91-4.18	Range 3.45-5.78	Range 17.39-70.01	Range 1.44-6.19		
890 Furniture Store		5.06 trips per 1,000 sq ft GFA	0.17 trips per 1,000 sq ft GFA	0.45 trips per 1,000 sq ft GFA	0.40 trips per 1,000 sq ft GFA	0.53 trips per 1,000 sq ft GFA	4.94 trips per 1,000 sq ft GFA	0.95 trips per 1,000 sq ft GFA	4.64 trips per 1,000 sq ft GFA	0.92 trips per 1,000 sq ft GFA
		Range 0.70-15.35	Range 0.03-0.45	Range 0.06-1.70	Range 0.09-1.17	Range 0.09-1.70	Range 0.78-13.96	Range 0.15-2.79	Range 0.14-14.17	Range 0.10-3.42
892 Carpet Store	NO INFORMATION AVAILABLE									

N.B The ratio is also available per employee. However, it is not suitable to estimate trip generation for new development because the staff number depends on the actual customer demands

## 4.7.4 Trip Rate Information Computer Systems (TRICS) London

There is a considerable amount of data available in the TRICS database and there is a specific analysis process for interrogating the trip generation data. TRICS contains three land uses which contain hardware/DIY (01/D, 01/E, 01/L) and one land use for bulky goods (01/G).

The process undertaken in analysing the data is summarised in **Appendix B** but a summary of the information extracted from the database is summarised in the table below.









**Table 4-11 Summary of TRICS Analysis**

	Trip Rate per day	Site Peak Hour	Network AM peak Hour	Network PM peak Hour	Modal Split
Weekday					
01/D – DIY Superstore (with garden centre)	35.4	2.4-5.7	0.4-1.6	1.5-3.7	No Data Available
01/E – DIY Superstore (without garden centre)	85.1	10.1	4	4.2	
01/G – Other Individual non-food Superstore	22.6	0.8-10.3	0.1-0.4	0.6-3.2	
01/L – Builders Merchant	40.3	2.6-7.7	2.7-5.2	0-2	
Saturday					
01/D – DIY Superstore (with garden centre)	58.9	4.6-16.5	See the notes below		Cars 93.8% Peds 4.6% Public Transport 1.2% Cyclist 0.4%
01/E – DIY Superstore (without garden centre)	121.8	6-164			Cars 95% Peds 4.8% Public Transport 0% Cyclist 0.2%
01/G – Other Individual non-food Superstore	26.6	1.5-13.7			Cars 97% Peds 2.2% Public Transport 0.8% Cyclist 0%
01/L – Builders Merchant	32.3	4-5.5			No Data Available

1. Some site data in TRICS shows that Saturday and Sunday are very similar. For comparison to the 2009 Saturday survey data, TRICS data from Saturdays is used.

2. Weekend network peak is generally similar to the site peak hour.

In terms of cyclists, the cycle trip rate was calculated as 0.063 per 100 square metres in the only peak hour when cyclists were recorded. The first principles calculation suggests that this equates to two to three cycle site visits during the survey period for the superstores with garden centre.

TRICS	MAIN MENU ▶ INITIAL PARAMETERS ▶ MAIN PARAMETERS ▶ SECONDARY PARAMETERS ▶ T								
Land Use	01 - RETAIL D - DIY SUPERSTORE - WITH GARDEN CENTRE								
									
Graph	Rank	Copy Data	Print	MM Selection	Modal split	Help	Previous Screen		
MULTI-MODAL CYCLISTS									<input type="checkbox"/> Estimate TRIP rates
TRIP RATE VALUE PER 100 SQM	ARRIVALS Total rate: 0.184 Peak: 11:00-12:00			DEPARTURES Total rate: 0.201 Peak: 12:00-13:00			TOTALS Total rate: 0.385 Peak: 12:00-13:00		
	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00-01:00	0	0	0.000	0	0	0.000	0	0	0.000
01:00-02:00	0	0	0.000	0	0	0.000	0	0	0.000
02:00-03:00	0	0	0.000	0	0	0.000	0	0	0.000
03:00-04:00	0	0	0.000	0	0	0.000	0	0	0.000
04:00-05:00	0	0	0.000	0	0	0.000	0	0	0.000
05:00-06:00	0	0	0.000	0	0	0.000	0	0	0.000
06:00-07:00	0	0	0.000	0	0	0.000	0	0	0.000
07:00-08:00	4	5598	0.000	4	5598	0.000	4	5598	0.000
08:00-09:00	5	4983	0.012	5	4983	0.008	5	4983	0.020
09:00-10:00	7	4558	0.006	7	4558	0.000	7	4558	0.006
10:00-11:00	8	4588	0.016	8	4588	0.016	8	4588	0.032
11:00-12:00	8	4588	0.030	8	4588	0.019	8	4588	0.049
12:00-13:00	8	4588	0.022	8	4588	0.041	8	4588	0.063
13:00-14:00	8	4588	0.025	8	4588	0.030	8	4588	0.055
14:00-15:00	8	4588	0.019	8	4588	0.022	8	4588	0.041
15:00-16:00	8	4588	0.027	8	4588	0.019	8	4588	0.046
16:00-17:00	8	4588	0.019	8	4588	0.014	8	4588	0.033
17:00-18:00	5	4983	0.004	5	4983	0.012	5	4983	0.016
18:00-19:00	5	4983	0.000	5	4983	0.012	5	4983	0.012
19:00-20:00	4	5598	0.004	4	5598	0.004	4	5598	0.008
20:00-21:00	4	5598	0.000	4	5598	0.004	4	5598	0.004
21:00-22:00	0	0	0.000	0	0	0.000	0	0	0.000
22:00-23:00	0	0	0.000	0	0	0.000	0	0	0.000
23:00-24:00	0	0	0.000	0	0	0.000	0	0	0.000

#### 4.7.5 Comparison of Databases - Vehicle Trip Generation

Table 4-12 Summary Trip Generation Comparison - Hardware

Vehicle Trips per 100m <sup>2</sup> GFA	WEEKDAY				WEEKEND	
	Network AM Peak	Network PM Peak	Site Peak	Daily	Site Peak	Daily
RTA Guide	-	-	0.1-6.4	-	0.7-16.9	-
NZTDB	No Data Available					
ITE	1.2-2.8	2.6-5.2	3.6-6	32-55	4.9-12	56-89
TRICS	0.4-5.2	0-3.7	2.4-10.1	35-85	4-164	59-122
STUDY RESULTS	0.6-3.9	2-3.8	2.8-5.6	21-40	4.3-6.7	23-49

ITE data has been converted from spaces per sq ft to sq m. (1,000 square foot = 92.90304 square metres)

Table 4-13 Summary Trip Generation Comparison – Bulky Goods

Vehicle Trips per 100m <sup>2</sup> GFA	WEEKDAY				WEEKEND	
	Network AM Peak	Network PM Peak	Site Peak	Daily	Site Peak	Daily
RTA Guide	-	-	0.1-6.4	-	0.7-16.9	-
NZTDB	No Data Available					
ITE	0.2-0.5	0.5-4.8	0.6-4.8	5.4-48.5	1-3.4	5-36
TRICS	0.1-0.4	0.6-3.2	0.8-10.3	23	1.5-13.7	27
STUDY RESULTS	-	0.8-2.3	1.4-4.8	10-29	2.2-6.2	11-34

ITE data has been converted from spaces per sq ft to sq m. (1,000 square foot = 92.90304 square metres)

## 4.8 Validity of comparison of Database Trip Rates

The planning environment and, in particular, the transport planning environment in each of the countries is different which has a direct effect on the number of vehicle trips generated by a particular site. In order to highlight a few of these differences, a very brief summary of the general planning policy direction of each of the countries is given below.

### 4.8.1 Australian Transport Planning Policy

The Australian Government is investing \$26.7 billion on road and rail infrastructure through the Nation Building Program over the six year period from 2008-09 to 2013-14. This investment involves a range of road and rail programs to improve connections through urban areas, links to ports and airports, rail, road and intermodal connections.

In **New South Wales**, the aim of integrating land use and transport is to ensure that urban structures, building forms, land use locations, development designs, subdivision and street layouts achieve:

- improved access to housing, jobs and services by walking, cycling and public transport
- increased choice of available transport and reducing dependence on cars
- reduced travel demand including the number of trips generated by development and the distances travelled, especially by car
- support the efficient and viable operation of public transport services

**Queensland** Transport has also prepared Integrated Regional Transport Plans that will transform the transport network with more trains, trams and buses, and projects to 'unclog our road network' and take trucks off residential streets.

The **Victorian** Transport Plan delivers short, medium and long term projects for cities, regional centres, country towns and rural areas. This includes new metro trains, new low floor trams, train operational changes to increase peak capacity, new train carriages for the regional rail network, new rail links, a program or works to separate road and rail at key intersections, a program for outer suburban roads, a package for safer country roads, new bike lanes and a public bike hire scheme for Melbourne's CBD.

The Department of Planning and Infrastructure on behalf of **the Northern Territory** Government has a number of transport related reform areas including travel demand management issues.

**ACT** has a *Sustainable Transport Plan* provides the direction and actions to achieve a more sustainable transport system over the next 25 years.

However none of these planning policy documents suggest a sea change in attitude towards out of centre developments and it is likely that these will continue to occur as long as the developer provides the prescribed number of parking spaces, calculates the traffic generated and mitigates the impact of the traffic generated. It is noted that some progressive councils have started to actively encourage travel demand management and are utilising maximum parking standards at developments rather than the minimum parking requirements historically used although these have tended to be in urban areas rather than edge of town areas.

## 4.8.2 New Zealand

New Zealand (NZ) transport policy is guided by the NZ Transport Strategy and the Government Policy Statement on Land Transport Funding; the former having a longer-term focus and ambitious stretch-targets, and the latter having a short to medium term outlook. These documents stress the need to undertake transport planning in a multimodal context, and to integrate it with land use planning to reduce the need to travel. This focus was first introduced in 2002 and has worked through all land transport planning since. It has also resulted in the national funding agent developing a hierarchy of interventions, where undertaking capital investment is the most reluctant measure. The recent election of a new government has resulted in the softening the focus on sustainability in favour of economic development, primarily through infrastructure improvement.

The new government also has a stronger focus on driving productivity growth at a national level and values the road network as supplying the needs of car users rather than public transport or rail to *"reflect the realities of how New Zealanders get around and how we transport our goods"*. This is in part recognition of the geography of New Zealand and the relatively low density of distribution of the population within the islands, which produces conditions that are more economically amenable to more use of private vehicles and road-based freight transport.

NZ does not have centralised prescriptive planning policy. National planning is guided by the Resource Management Act, but there remain significant conflicts between district, regional, and national transport and land planning, whereby the ability to protect inter-regional transport routes over the medium to long-term is severely limited. Transport planning occurs at the regional level, guided by national legislation, and as such, there can be considerable variance in policies across the country.

There are no strong policies for developments occurring in non-urban areas, other than the negotiations that occur on a case by case basis with the respective territorial authorities, where transport infrastructure and services provision competes with other funding priorities. Central government offers financial assistance rates to local councils for partial funding of transport infrastructure and service provision, however the existence of parts of the fully-funded state highway road network within each region tends to see local councils focussed upon pushing for the continued development of this network, over the requirement for large local investments in the network.

Developments in urban areas, such as Auckland, do need to comply with regional policies and growth plans. Growth strategies introduced over the past 10 years have tended to focus on developing dense nodes of activity within a set metropolitan urban limit to avert sprawl, which are connected to each other and serviced by well-developed multi-modal transport corridors. However, there are no strong requirements for developers to include specific focus on alternatives to road improvements.

In summary, the dispersed nature of population and the use of roads to transport goods and people, means that in non urban areas developments would be totally dependent upon the use of cars.

### 4.8.3 USA

There is no an overall policy for the US and the approach is different in city centre and non metropolitan areas. Again, there appear to be no strong policies in non-urban areas and site negotiations occur on a site by site basis with the respective government authorities. Correspondence with the US publication The Urban Transportation Monitor suggests that “*there are only a handful of jurisdictions in the U.S. where parking maximums have been implemented ....and a few more where a lower minimum has been implemented*”. The implication is that any such reductions have been applied in town/city centres and out of town/edge of town developments are still permitted to be developed as long as they provide the prescribed number of parking spaces, calculate the traffic generated and mitigate the impact of any traffic generated.

### 4.8.4 UK

UK transport policy has been very focussed over the last 10 years to achieving sustainable travel patterns with development applications needing to demonstrate that they are accessible by means other than the private car. Indeed, the UK planning policy is such that all development now needs to take place in ‘centres’ be they city, town or village. If the development is beyond the ‘centre’ boundaries there is a presumption that any development application will be refused. Furthermore, there is a requirement on all but the smallest sites for a green travel plan to be submitted and implemented in any development application. These plans generally set targets for reducing single occupancy car use.

The result is that even ‘edge of town’ sites in the UK have some level of accessibility for non car modes of travel and as such the proportion of car trips is probably less than on a comparable Australian site. This has been reflected in the surveys undertaken at some types of site (e.g. elderly housing sites) where the car modal split in Australia was nearly 100% whereas the UK site had car modal split of around 66%.

However, in this planning use (where people would generally buy a product which could be large and awkward), customers would have a tendency to drive rather than travel by other modes. This is reflected in the modal split of this use which is around 95% car 1% public transport and 4% pedestrians.

In this use, therefore, where the travel characteristics of this planning use are comparable (i.e. predominantly using cars) the UK data is more comparable to Australian uses as opposed to some other uses where in the UK access by other modes (e.g. public transport, bike etc) are more realistic.

## 4.9 Comparison between international data – previous studies

A report entitled “Trip Rate and Parking Databases in New Zealand and Australia” presented by Ian Clark (2007) reported some comparable peak hour flows between sites located in Australia, New Zealand and America.

The paper considered that these “indicate a reasonable amount of similarity” but it should be noted that the trip rate for New Zealand was above 40% more than Australia for 3 of the 5 land uses considered

	New Zealand	Australia	America
Dwelling houses	1.2 per dwelling	0.85 per dwelling	1.0 per dwelling
Medium density residential	0.8 per dwelling (*)	0.4 to 0.5 per dwelling	0.5 per dwelling
Commercial premises / offices	2 per 100m <sup>2</sup> GFA	2 per 100m <sup>2</sup> GFA	1.5 per 100m <sup>2</sup> GFA
Supermarkets	17.8 per 100m <sup>2</sup> GFA	15.5 per 100m <sup>2</sup> GLFA	12.3 per 100m <sup>2</sup> GFA
Shopping Centres over 30,000m <sup>2</sup>	9.9 per 100m <sup>2</sup> GFA (*)	6 per 100m <sup>2</sup> GLFA	5 per 100m <sup>2</sup> GFA

Source: Table 6.1 of Transfund Report 209.

Similarly, a comparison between New Zealand and the UK shows that residential and educational trip rates are lower in the UK (where dwellings and schools are generally located much closer to the centre) as opposed to towns in NZ where space is not such an issue and there are no town planning obstacles to prevent development beyond the edge of town and where accessibility for cars cannot be easily achieved. However, this assumption cannot be made for bars & restaurants.

**Table 3: Comparison of New Zealand and UK Peak Hour Trip Generation Rates**

	New Zealand	TRICS UK
Residential dwellings	1.2	0.7
Education: preschools	19.0	13.8
Retail: Bar	9.6	14.2
Retail: Restaurant	12.6	15.2
Supermarket	15.2	14.4

Source: NZTPDB Research Report No 2/2005.

## 4.9.1 Summary

It appears that the New Zealand data is more clearly aligned with non metropolitan Australian sites as the planning policies in both countries are reasonably similar. The USA contains a large range of planning situations but its non metropolitan area data exhibits similar characteristics to New Zealand and Australia.

The planning policy in the UK is noticeably different from the other countries' studies in so far that it promotes non car based trips above all others with the result that trip generation is generally much less and public transport/cycle use/pedestrian numbers are higher than in the other countries considered. However, there are a number of planning uses, such as bulky goods / hardware, where customers will predominantly travel by car in case they buy bulky goods or hardware which would be difficult to transport by other modes.

In making comparisons, there is also clearly a concern that these foreign databases use different land use classes to those being used in Australia and this can make direct comparisons between the databases difficult.

## 5 SUMMARY

Since the original publication of the *Guide to Traffic Generating Developments*, there have been numerous changes to retail trading, including trading hours, store sizes and the range of goods offered in individual stores. The RTA is concerned that the traffic generation and parking data in its guide contains data that was collected in 1990, and that does not reflect current traffic patterns.

A list of 15 sites (9 hardware site and 6 bulky goods sites) was discussed and agreed with the RTA. 8 sites are located in the Sydney Metropolitan Area whilst 7 sites are in NSW regional centres.

There were a number of difficulties encountered in selecting the sites.

- Many hardware store customers come to the site by utility vehicles (i.e. utes), vans or trucks. It was hard to classify whether such vehicles were for service/delivery or retail.
- Many bulky goods stores are now being developed in “homemaker centres” or shopping centre where they are sharing off-street car parking facilities so it was difficult to identify independent sites.

Surveys of the sites were undertaken in March 2009 outside of school holidays and public holidays. The survey periods were during the store opening hours on one Thursday and one Saturday.

Interview surveys were also conducted over a four hour period at each site. The purpose of these interviews was to establish the travel mode of customers; whether people are parked on-site or off-site, customer's home postcodes and the trip purpose (i.e. pass by, multi purpose or single purpose).

The trip generation calculation that was to be performed would depend upon the variable that was interrogated. Of the variables that were considered for the trip rate calculation were the Gross Floor Area (GFA), Site area, number of staff and number of parking spaces. Gross Floor Area (GFA) is considered to be the most reliable variable to choose and this is confirmed by its use in the overseas databases.

A review of the **Hardware** data reveals a number of observations

- The surveys were undertaken on a range of GFA from 1,600 to 14,111 square metres.
- The weekday site peak hour trip generation rate varied from 2.74 to 5.6 vehicle trips per 100 sq m GFA with an average of 4.2 trips.
- The weekday daily trip rate varied from 21.35 to 39.75 vehicle trips per 100 sq m GFA with an average of 32.46 trips.
- The non-metropolitan sites generally had higher trip rates than the metropolitan sites.
- The weekday peak parking demand was between 0.78 and 1.9 spaces per 100 sq m GFA. The weekend peak demand is generally higher than the weekday one.
- Higher trips rates were observed in PM network peak than AM network peak. Therefore, such stores would have a higher traffic impact in the PM peak than the AM peak.
- When comparing weekday and weekend data, all the sites are busier at the weekend.

In a comparison of the hardware stores, the trips rates during weekdays at Bunnings are similar to those experienced in Mitre10. However, Mitre10 has a lower trip rates than Bunnings at the

weekend. Observations suggest that Mitre 10 is more 'tradesman' orientated which explains the higher weekday use. The trip rates for Bunnings at weekends are much higher than in weekdays. The Mitre10 are relatively consistent over the week.

A review of the **bulky goods** 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.
- The non-metropolitan sites generally had higher trip rates than the metropolitan sites.
- The weekday peak parking demand was between 0.41 and 3.17 spaces per 100 sq m GFA. The weekend peak demand when compared with the weekday demand was extremely variable across the range of sites.
- All of the bulky goods sites opened after the accepted AM peak so the impact on the AM peak traffic from these sites should be minimal.

The weekend trip rates are generally higher than the weekdays

In terms of the regression analysis, the trip behaviour and peak parking accumulation for all the hardware sites have a high correlation with Gross Floor Area except the trips during "network AM peak hour". The bulky goods site trips and peak parking accumulation have a very high correlation with GFA.

With regard to trip type, the majority of trips in weekdays to the hardware / bulky goods sites are specific trips with a smaller proportion of pass-by and multi purpose trips. Most trips at the weekend are specific trips although there is a higher element of pass-by trips.

In terms of customers, most visiting hardware / DIY stores seldom travel further than 15km but it appears that this travelling distance could be affected by the lack of other available hardware stores in the area. Similarly, customers at bulky goods stores do not normally travel further than 15km.

The results show that most of the customers drive to the stores (some stores recording 100% car use) with very few people travelling by public transport or walking. This is expected because the accessibility score of the selected survey sites are mostly below 75 which indicates that public transport to the sites is very limited.

The results also show that more commercial vehicle activity occurs during weekdays, which is probably as a result of the higher number of deliveries to / from the hardware sites and the fact that more tradesmen probably visit the store during the week.

Not surprisingly, bearing in mind the criteria that were chosen for site selection, the majority of customers parked on site.

With regard to hardware parking

- The number of parking spaces provided varied from 1.5 to 5.0 per 100m<sup>2</sup> GFA
- The peak parking demand from the survey data indicated that this varied from 0.78 spaces per 100m<sup>2</sup> GFA to 2.81 spaces per 100m<sup>2</sup> GFA. The weekend had a higher parking demand than weekdays.

- In general, the car parks at most of the sites were not more than 80% occupied apart from sites HW5 (Mitre10 Narellan) and HW6 (Mitre10 Morisset).

With regard to Bulky Goods parking

- The parking spaces provided on sites varied from 1.16 spaces to 8.36 spaces per 100m<sup>2</sup> GFA. As described previously, BG5 (Bing Lee Warilla) has extremely high parking provision because the site shared its car park with another unoccupied shop. So for this site, parking demand is a more relevant benchmark than parking provision.
- The peak parking demand from the survey data indicates that such ratio varies from 0.35 spaces per 100m<sup>2</sup> GFA to 3.17 spaces per 100m<sup>2</sup> GFA. Site BG3 (Retravisio Springwood) has a relatively high parking demand per 100m<sup>2</sup> GFA compared with the other sites. This is probably due to the relatively small GFA so an increase in parking demand of just a few spaces can increase the ratio significantly.
- The weekend generally has a higher parking demand than weekdays.
- In general, the car parks at most of the sites were not more than 80% occupied apart from site BG3 (Retravisio Springwood).

A review of existing traffic generation guides and databases, suggests that throughout Australia

- The RTA guide seems to be the main source of traffic generation data
- The ITE books are used but in a limited way.
- TRICS and NZTDP appear to be used academically but not in detailed consideration of development impacts
- There are however concerns about the RTA data in so far as the age of the data and the relevance of the time of year at which the data surveys were undertaken
- Many practitioners use the RTA guide as a starting point but then do their own surveys to establish traffic generation characteristics at similar sites / land uses
- The RTA guide does not consider multi-modal travel.
- The RTA guide covers uses which have significantly different characteristic. For example in this study, bulky goods/hardware are different uses and the traffic characteristics of hardware stores can be complicated by ancillary uses such as garden centres. For example, the TRICS database has 2 different database classifications for DIY with garden centre and DIY without garden centre.

In summary, although other documents are used, and many companies seem to undertake their own surveys to establish the traffic generating capabilities of a particular site, the RTA guide seems to be the first point of reference.

International guides are available such as

- The New Zealand Trips Database Bureau.
- The Institution of Transportation Engineers (ITE) "Trip Generation" book
- UK - TRICS & TRAVL - TRICS is the UK national standard trip generation database and is used as an integral and essential part of the Transport Assessment process. TRAVL is primarily used in city centre London which has heavily constrained traffic movements and very high levels of public transport accessibility. Consequently, it is not considered that it is a useful database in the context of this study.

All of these databases treat parking and traffic generation as two separate discussion areas so the information contained in these documents has been studied in these two key areas.

A comparison of trip rates between these databases is summarised below

**Table 5-14 Summary Trip Generation Comparison - Hardware**

Vehicle Trips per 100m <sup>2</sup> GFA	WEEKDAY				WEEKEND	
	Network AM Peak	Network PM Peak	Site Peak	Daily	Site Peak	Daily
RTA Guide	-	-	0.1-6.4	-	0.7-16.9	-
NZTPDB	No Data Available					
ITE	1.2-2.8	2.6-5.2	3.6-6	32-55	4.9-12	56-89
TRICS	0.4-5.2	0-3.7	2.4-10.1	35-85	4-164	59-122
STUDY RESULTS	0.6-3.9	2-3.8	2.8-5.6	21-40	4.3-6.7	23-49

ITE data has been converted from spaces per sq ft to sq m. (1,000 square foot = 92.90304 square metres)

**Table 5-15 Summary Trip Generation Comparison – Bulky Goods**

Vehicle Trips per 100m <sup>2</sup> GFA	WEEKDAY				WEEKEND	
	Network AM Peak	Network PM Peak	Site Peak	Daily	Site Peak	Daily
RTA Guide	-	-	0.1-6.4	-	0.7-16.9	-
NZTPDB	No Data Available					
ITE	0.2-0.5	0.5-4.8	0.6-4.8	5.4-48.5	1-3.4	5-36
TRICS	0.1-0.4	0.6-3.2	0.8-10.3	23	1.5-13.7	27
STUDY RESULTS	-	0.8-2.3	1.4-4.8	10-29	2.2-6.2	11-34

ITE data has been converted from spaces per sq ft to sq m. (1,000 square foot = 92.90304 square metres)

A comparison of person generation rates is summarised below

**Table 5-16 Summary of Person Trip Comparison**

Person Trips	WEEKDAY		WEEKEND	
	Peak Hour	Daily	Peak Hour	Daily
TRICS DIY Store with garden centre	-	-	15.6	119.2
TRICS DIY store without garden centre	-	-	44.2	362.6
TRICS Builder Merchants	No Information Available			
2009 Surveys Hardware	4.67 - 5.72	40.06 - 41.05	8.07 - 9.40	43.9 - 63.8
Person Trips	WEEKDAY		WEEKEND	
	Peak Hour	Daily	Peak Hour	Daily
TRICS Other Non Food Superstores	2.7	17.3	14.8	91.5
2009 Surveys Bulky Goods	4.4	27.45	8.28	38.05

A summary of the parking comparison is given below

**Table 5-17 Summary Comparison of Parking Rate - Hardware**

(Spaces per 100m2 GFA)	Parking Supply	Parking Demand
<b>RTA Guide</b>	N/A	0.3 - 5.1
<b>NZTDB</b>	N/A	2.5
<b>ITE</b>	2.6 - 7.2	1.2 - 5.1
<b>TRICS</b>	0.47 - 38	0.12 - 31
<b>2009 Survey</b>	1.5 - 5	1.04 - 2.81

ITE data has been converted from spaces per sq ft to sq m. (1,000 square foot = 92.90304 square metres)

**Table 5-18 Summary Comparison of Parking Rate– Bulky Goods**

(Spaces per 100m2 GFA)	Parking Supply	Parking Demand
<b>RTA Guide</b>	N/A	0.3 - 5.1
<b>NZTDB</b>	2.1 - 5.53	0.91 - 5.94
<b>ITE</b>	2.3 - 2.5	0.7 - 3.3
<b>TRICS</b>	0.47 - 38	0.12 - 31
<b>2009 Survey</b>	1.5 - 5	1.04 - 2.81

ITE data has been converted from spaces per sq ft to sq m. (1,000 square foot = 92.90304 square metres)

The validity of comparing trip rates from various databases is summarised below

- The planning environment and in particular the transport planning environment in each of the countries studied is different and this has a direct effect on the number of vehicle trips generated by a particular site.
- It appears that the New Zealand data is more clearly aligned with non metropolitan Australian sites as the planning policies in both countries are reasonably similar. The USA contains a large range of planning situations but its non metropolitan area data exhibits similar characteristics to New Zealand and Australia.
- The planning policy in the UK is noticeably different from the other countries' studies in so far that it promotes non car based trips above all others with the result that trip generation is generally much less and public transport/cycle use/pedestrian numbers are higher than in the other countries considered. However, there are a number of planning uses, such as bulky goods / hardware, where customers will predominantly travel by car in case they buy bulky goods or hardware which would be difficult to transport by other modes.
- There is clearly a concern that these different databases use different land use classes to those being used in Australia and this can make direct comparisons between the databases difficult.



Appendix A

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Survey Results



## Traffic Survey Results –HW1 to HW5 – Hardware - Sydney Metropolitan Area

Site ID	HW1		HW2		HW3		HW4		HW5	
Gross floor area (m <sup>2</sup> )	9,800		14,111		1,800		11,915		2,400	
	Trips	Period	Trips	Period	Trips	Period	Trips	Period	Trips	Period
<b>Weekdays</b>										
<b>Person-based</b>										
Daily Person Trips - LV	4,201	14 hours	4,458	14 hours	610	10.5 hours	6,114	14 hours	756	10.5 hours
Daily Person Trips - HV	131	14 hours	158	14 hours	123	10.5 hours	202	14 hours	59	10.5 hours
Daily Person Trips - All Veh	4,332	14 hours	4,616	14 hours	733	10.5 hours	6,316	14 hours	815	10.5 hours
Average Person Trips (per hour)	314	14 hours	331	14 hours	78	10.5 hours	453	14 hours	82	10.5 hours
Peak Person Trips (per hour)										
- Site Peak Hour	484	1145-1245	565	1000-1100	101	1030-1130	688	1315-1415	119	0930-1030
- Vehicle Network AM Peak	162	0800-0900	92	0700-0800	49	0800-0900	273	0800-0900	65	0800-0900
- Vehicle Network PM Peak	281	1700-1800	350	1600-1700	88	1500-1600	474	1700-1800	79	1600-1700
- Vehicle Peak	484	1145-1245	565	1000-1100	101	1030-1130	688	1315-1415	119	0930-1030
Daily Total Person Trips	4,397	14 hours	4,639	14 hours	816	10.5 hours	6,346	14 hours	858	10.5 hours
<b>Vehicle-based</b>										
Peak Vehicle Trips (per hour)										
- Site Peak Hour	403	1145-1245	444	1000-1100	84	1030-1130	491	1315-1415	98	0930-1030
- Network AM Peak	140	0800-0900	84	0700-0800	40	0800-0900	243	0800-0900	51	0800-0900
- Network PM Peak	225	1700-1800	289	1600-1700	64	1500-1600	338	1700-1800	66	1600-1700
Peak Parking Accumulation	119	1215-1315	155	1215-1315	14	1445-1545	199	1200-1300	25	1215-1315
Average Vehicle Occupancy	1.22	14 hours	1.22	14 hours	1.17	10.5 hours	1.33	14 hours	1.24	10.5 hours
Heavy Vehicle (HV) trips										
- Peak In	19	0930-1030	12	1000-1100	10	1100-1200	15	1300-1400	6	1045-1145
- Peak Out	14	1030-1130	11	1000-1100	10	1100-1200	16	1245-1345	5	1245-1345
Daily Total HV Trips	122	14 hours	139	14 hours	111	10.5 hours	178	14 hours	51	10.5 hours
Daily Total LV Trips	3,441	14 hours	3,643	14 hours	514	10.5 hours	4,558	14 hours	605	10.5 hours
Daily Total All Vehicle Trips	3,563	14 hours	3,782	14 hours	625	10.5 hours	4,736	14 hours	656	10.5 hours
% HV of Daily Trips	3.4%	14 hours	3.7%	14 hours	17.8%	10.5 hours	3.8%	14 hours	7.8%	10.5 hours
<b>Weekend</b>										
<b>Person-based</b>										
Daily Person Trips - LV	7,020	10 hours	8,421	10 hours	565	8 hours	8,723	10 hours	1,143	8.5 hours
Daily Person Trips - HV	35	10 hours	149	10 hours	16	8 hours	73	10 hours	3	8.5 hours
Daily Person Trips - All Veh	7,055	10 hours	8,570	10 hours	581	8 hours	8,796	10 hours	1,146	8.5 hours
Average Person Trips (per hour)	710	10 hours	859	10 hours	83	8 hours	886	10 hours	146	8.5 hours
Peak Person Trips (per hour)										
- Site Peak Hour	1,000	1115-1215	1,331	1145-1245	123	0945-1045	1,256	1045-1145	205	1200-1300
- Vehicle Network Peak	925	1200-1300	1,282	1200-1300	108	1100-1200	1,244	1100-1200	192	1100-1200
- Vehicle Peak	1,000	1115-1215	1,331	1145-1245	123	0945-1045	754	1100-1200	201	1315-1415
Daily Total Person Trips	7,100	10 hours	8,590	10 hours	665	8 hours	8,864	10 hours	1,238	8.5 hours
<b>Vehicle-based</b>										
Peak Vehicle Trips (per hour)										
- Site Peak Hour	656	1115-1215	844	1145-1245	77	0945-1045	754	1100-1200	151	1315-1415
- Network Peak	593	1200-1300	805	1200-1300	65	1100-1200	754	1100-1200	119	1100-1200
Peak Parking Accumulation	196	1045-1145	366	1145-1245	30	1245-1345	264	1200-1300	36	1030-1130
Average Vehicle Occupancy	1.47	10 hours	1.53	10 hours	1.41	8 hours	1.60	10 hours	1.29	8.5 hours
Heavy Vehicle (HV) trips										
- Peak In	4	1115-1215	11	1345-1445	5	0930-1030	7	1015-1115	2	0830-0930
- Peak Out	4	1500-1600	13	1315-1415	3	0930-1030	8	1100-1200	1	0815-0915
Daily Total HV Trips	27	10 hours	115	10 hours	16	8 hours	60	10 hours	3	8.5 hours
Daily Total LV Trips	4,780	10 hours	5,493	10 hours	396	8 hours	5,440	10 hours	882	8.5 hours
Daily Total All Vehicle Trips	4,807	10 hours	5,608	10 hours	412	8 hours	5,500	10 hours	885	8.5 hours
% HV of Daily Trips	0.6%	10 hours	2.1%	10 hours	3.9%	8 hours	1.1%	10 hours	0.3%	8.5 hours

\* Daily Total Person Trips including pedestrians

\* Light Vehicle (LV): Cars, Utes and Vans. Heavy Vehicle (HV): Trucks

## Traffic Survey Results – HW6 to HW9 – Hardware - Non-Metropolitan Area

Site ID	HW6		HW7		HW8		HW9	
Gross floor area (m <sup>2</sup> )	2,000		1,600		9,948		1,800	
	Trips	Period	Trips	Period	Trips	Period	Trips	Period
<b>Weekdays</b>								
<b>Person-based</b>								
Daily Person Trips - LV	808	11 hours	640	10.5 hours	2,781	14 hours	666	10.5 hours
Daily Person Trips - HV	50	11 hours	24	10.5 hours	73	14 hours	35	10.5 hours
Daily Person Trips - All Veh	858	11 hours	664	10.5 hours	2,854	14 hours	701	10.5 hours
Average Person Trips (per hour)	78.9	11 hours	64	10.5 hours	208	14 hours	67	10.5 hours
Peak Person Trips (per hour)								
- Site Peak Hour	128	1315-1415	97	1415-1515	393	1200-1300	100	1230-1330
- Vehicle Network AM Peak	49	0800-0900	76	0900-1000	127	0800-0900	61	0800-0900
- Vehicle Network PM Peak	93	1600-1700	66	1600-1700	278	1500-1600	64	1600-1700
- Vehicle Peak	128	1315-1415	97	1415-1515	393	1200-1300	100	1230-1330
Daily Total Person Trips	868	11 hours	667	10.5 hours	2,907	14 hours	703	10.5 hours
<b>Vehicle-based</b>								
Peak Vehicle Trips (per hour)								
- Site Peak Hour	889	9 hours	641	9 hours	4,700	10 hours	719	8 hours
- Network AM Peak	7	9 hours	0	9 hours	18	10 hours	2	8 hours
- Network PM Peak	76	1600-1700	50	1600-1700	198	1500-1600	58	1600-1700
Peak Parking Accumulation	38	1500-1600	30	1045-1145	104	1130-1230	20	1030-1130
Average Vehicle Occupancy	1.12	11 hours	1.23	10.5 hours	1.34	14 hours	1.15	10.5 hours
Heavy Vehicle (HV) trips								
- Peak In	4	1315-1415	3	1100-1200	10	0945-1045	6	1000-1100
- Peak Out	6	1330-1430	2	0900-1000	8	0945-1045	3	1000-1100
Daily Total HV Trips	45	11 hours	19	10.5 hours	69	14 hours	33	10.5 hours
Daily Total LV Trips	718	11 hours	523	10.5 hours	2,055	14 hours	575	10.5 hours
Daily Total All Vehicle Trips	763	11 hours	542	10.5 hours	2,124	14 hours	608	10.5 hours
% HV of Daily Trips	5.9%	11 hours	3.5%	10.5 hours	3.2%	14 hours	5.4%	10.5 hours
<b>Weekend</b>								
<b>Person-based</b>								
Daily Person Trips - LV	889	9 hours	641	9 hours	4,700	10 hours	719	8 hours
Daily Person Trips - HV	7	9 hours	0	9 hours	18	10 hours	2	8 hours
Daily Person Trips - All Veh	896	9 hours	641	9 hours	4,718	10 hours	721	8 hours
Average Person Trips (per hour)	111	9 hours	73	9 hours	474	10 hours	90	8 hours
Peak Person Trips (per hour)								
- Site Peak Hour	184	0930-1030	122	1200-1300	739	1130-1230	147	1200-1300
- Vehicle Network Peak	174	1100-1200	122	1200-1300	709	1100-1200	120	1100-1200
- Vehicle Peak	179	1015-1115	122	1200-1300	739	1130-1230	147	1200-1300
Daily Total Person Trips	998	9 hours	655	9 hours	4,738	10 hours	723	8 hours
<b>Vehicle-based</b>								
Peak Vehicle Trips (per hour)								
- Site Peak Hour	112	1015-1115	78	1200-1300	447	1130-1230	111	1200-1300
- Network Peak	104	1100-1200	78	1200-1300	426	1100-1200	96	1100-1200
Peak Parking Accumulation	29	1315-1415	45	1200-1300	152	1015-1115	27	1200-1300
Average Vehicle Occupancy	1.38	9 hours	1.31	9 hours	1.67	10 hours	1.26	8 hours
Heavy Vehicle (HV) trips								
- Peak In	2	1000-1100	0		3	0815-0915	1	1345-1445
- Peak Out	2	1000-1100	0		2	1230-1330	1	1230-1330
Daily Total HV Trips	5	9 hours	0	9 hours	15	10 hours	2	8 hours
Daily Total LV Trips	644	9 hours	489	9 hours	2,809	10 hours	571	8 hours
Daily Total All Vehicle Trips	649	9 hours	489	9 hours	2,824	10 hours	573	8 hours
% HV of Daily Trips	0.8%	9 hours	0.0%	9 hours	0.5%	10 hours	0.3%	8 hours

\* Daily Total Person Trips including pedestrians

\* Light Vehicle (LV): Cars, Utes and Vans. Heavy Vehicle (HV): Trucks

## Traffic Survey Results –BG1 to BG6 – Bulky Goods

Site ID	BG1		BG2		BG3		BG4		BG5		BG6	
Gross floor area (m <sup>2</sup> )	4,300		14,849		600		6,029		1,200		1,500	
	Trips	Period	Trips	Period	Trips	Period	Trips	Period	Trips	Period	Trips	Period
<b>Weekdays</b>												
<b>Person-based</b>												
Daily Person Trips - LV	559	12 hours	2,759	12 hours	176	8.5 hours	1,247	12 hours	480	10 hours	308	10 hours
Daily Person Trips - HV	11	12 hours	0	12 hours	20	8.5 hours	10	12 hours	30	10 hours	4	10 hours
Daily Person Trips - All Veh	570	12 hours	2,759	12 hours	196	8.5 hours	1,257	12 hours	510	10 hours	312	10 hours
Average Person Trips (per hour)	57	12 hours	264	12 hours	26	8.5 hours	110	12 hours	60	10 hours	33	10 hours
<b>Peak Person Trips (per hour)</b>												
- Site Peak Hour	104	1545-1645	531	1915-2015	42	1415-1515	159	1745-1845	94	1030-1130	61	1330-1430
- Vehicle Network AM Peak	Network AM peak is outside of opening hours											
- Vehicle Network PM Peak	57	1700-1800	301	1700-1800	0	Outside	104	1600-1700	55	1500-1600	45	1500-1600
- Vehicle Peak	104	1545-1645	531	1915-2015	42	1415-1515	150	1200-1300	94	1030-1130	61	1330-1430
Daily Total Person Trips	683	12 hours	3,169	12 hours	218	8.5 hours	1,315	12 hours	599	10 hours	330	10 hours
<b>Vehicle-based</b>												
<b>Peak Vehicle Trips (per hour)</b>												
- Site Peak Hour	61	1545-1645	232	1915-2015	26	1415-1515	118	1200-1300	57	1030-1130	35	1330-1430
- Network AM Peak	Network AM peak is outside of opening hours											
- Network PM Peak	35	1700-1800	180	1700-1800	0	Outside	70	1600-1700	27	1500-1600	19	1500-1600
Peak Parking Accumulation	28	1530-1630	133	1845-1945	19	1500-1600	41	1530-1630	24	1000-1100	7	1315-1415
Average Vehicle Occupancy	1.28	12 hours	1.58	14 hours	1	8.5 hours	1.38	12 hours	1	10 hours	2	10 hours
<b>Heavy Vehicle (HV) trips</b>												
- Peak In	1	1445-1545			3	1330-1430	2	0900-1000	4	0900-1000	1	0915-1015
- Peak Out	2	1115-1215			3	1330-1430	2	0900-1000	4	1100-1200	1	0915-1015
Daily Total HV Trips	9	12 hours	0	12 hours	18	8.5 hours	12	12 hours	28	10 hours	4	10 hours
Daily Total LV Trips	437	12 hours	1,743	12 hours	133	8.5 hours	898	12 hours	319	10 hours	170	10 hours
Daily Total All Vehicle Trips	446	12 hours	1,743	12 hours	151	8.5 hours	910	12 hours	347	10 hours	174	10 hours
% HV of Daily Trips	2.0%	12 hours	0.0%	12 hours	11.9%	8.5 hours	1.3%	12 hours	8.1%	10 hours	2.3%	10 hours
<b>Weekend</b>												
<b>Person-based</b>												
Daily Person Trips - LV	743	8 hours	5,037	8.5 hours	198	7 hours	1,903	8 hours	733	8 hours	375	8 hours
Daily Person Trips - HV	0	8 hours	0	8.5 hours	4	7 hours	2	8 hours	10	8 hours	4	8 hours
Daily Person Trips - All Veh	743	8 hours	5,037	8.5 hours	202	7 hours	1,905	8 hours	743	8 hours	379	8 hours
Average Person Trips (per hour)	135	8 hours	688	8.5 hours	31	7 hours	244	8 hours	106	8 hours	51	8 hours
<b>Peak Person Trips (per hour)</b>												
- Site Peak Hour	199	1215-1315	1,075	1400-1500	71	1230-1330	377	1445-1545	170	1200-1300	95	1415-1515
- Vehicle Network Peak	164	1200-1300	731	1200-1300	26	1100-1200	302	1200-1300	100	1100-1200	53	1100-1200
- Vehicle Peak	188	1400-1500	1,075	1400-1500	71	1230-1330	360	1300-1400	142	1345-1445	95	1415-1515
Daily Total Person Trips	1,079	8 hours	5,851	8.5 hours	220	7 hours	1,950	8 hours	850	8 hours	407	8 hours
<b>Vehicle-based</b>												
<b>Peak Vehicle Trips (per hour)</b>												
- Site Peak Hour	96	1400-1500	425	1400-1500	37	1230-1330	205	1145-1245	68	1345-1445	47	1415-1515
- Network Peak	73	1200-1300	327	1200-1300	17	1100-1200	170	1200-1300	48	1100-1200	23	1100-1200
Peak Parking Accumulation	39	1400-1500	243	1400-1500	13	1400-1500	51	1430-1530	27	1345-1445	6	1330-1430
Average Vehicle Occupancy	1.51	8 hours	2.01	8.5 hours	1.67	7 hours	1.73	8 hours	1.81	8 hours	2.11	8 hours
<b>Heavy Vehicle (HV) trips</b>												
- Peak In					1	1300-1400	1	1500-1600	2	1115-1215	1	1345-1445
- Peak Out					1	1300-1400	1	1545-1645	2	1115-1215	1	1345-1445
Daily Total HV Trips	0	8 hours	0	8.5 hours	2	7 hours	2	8 hours	6	8 hours	2	8 hours
Daily Total LV Trips	491	8 hours	2,510	8.5 hours	119	7 hours	1,102	8 hours	404	8 hours	178	8 hours
Daily Total All Vehicle Trips	491	8 hours	2,510	8.5 hours	121	7 hours	1,104	8 hours	410	8 hours	180	8 hours
% HV of Daily Trips	0.0%	8 hours	0.0%	8.5 hours	1.7%	7 hours	0.2%	8 hours	1.5%	8 hours	1.1%	8 hours

\* Daily Total Person Trips including pedestrians

\* Light Vehicle (LV): Cars, Utes and Vans. Heavy Vehicle (HV): Trucks



## Appendix B

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### Detailed TRICS analysis - Parking



## 01/D – DIY Superstore (with garden centre) (GDO use class A1)

Reference	Location	GFA (m <sup>2</sup> )	SPACES	Parking Provision Space/ 100m <sup>2</sup> GFA	Parking Accum Other Weekdays	Parking Accum Friday	Parking Accum Saturday	Parking Accum Sunday	Parking Demand / 100 m <sup>2</sup> GFA Weekday	Parking Demand / 100 m <sup>2</sup> GFA Friday	Parking Demand / 100 m <sup>2</sup> GFA Saturday	Parking Demand / 100 m <sup>2</sup> GFA Sunday	% of Parking in Use Weekday	% of Parking in Use Friday	% of Parking in Use Saturday	% of Parking in Use Sunday
BG-01-D-01	Edge of Town	5,269	80	1.52			112				2.1				140	
CA-01-D-01	Edge of Town	4,726	228	4.82		140				3.0				61		
CH-01-D-01	Suburban Area (PPS6 Out of Centre)	5,634	193	3.43		80	110			1.4	2.0			41	57	
DC-01-D-01	Edge of Town Centre	2,230	70	3.14			42				1.9				60	
DC-01-D-02	Not Known	8,027	360	4.48		193	315			2.4	3.9			54	88	
DC-01-D-03	Neighbourhood Centre (PPS6 Local Ce	1,987	77	3.88				38				1.9				49
DE-01-D-01	Not Known	3,148	247	7.85		48	83	132		1.5	2.6	4.2		19	34	53
DG-01-D-01	Suburban Area (PPS6 Out of Centre)	3,716	220	5.92	47				1.3				21			
DU-01-D-01	Not Known	4,249	220	5.18	121	87			2.8	2.0			55	40		
EA-01-D-01	Not Known	3,344	103	3.08	78	99	117	125	2.3	3.0	3.5	3.7	76	96	114	121
FA-01-D-01	Edge of Town	2,525	179	7.09		46	123	164		1.8	4.9	6.5		26	69	92
FA-01-D-02	Edge of Town	2,525	164	6.50				99				3.9				60
GC-01-D-01	Not Known	4,500	370	8.22				162				3.6				44
GC-01-D-02	Edge of Town	13,935	616	4.42	191	142	214		1.4	1.0	1.5		31	23	35	
GC-01-D-03	Edge of Town	1,928	207	10.74			62				3.2				30	
GM-01-D-02	Edge of Town	10,910	432	3.96		192	377			1.8	3.5			44	87	
HC-01-D-01	Edge of Town	8,993	512	5.69	152	145	296	202	1.7	1.6	3.3	2.2	30	28	58	39
HC-01-D-02	Edge of Town	7,618	384	5.04	269		281		3.5		3.7		70		73	
HC-01-D-03	Suburban Area (PPS6 Out of Centre)	6,350	234	3.69				151				2.4				65
HF-01-D-01	Suburban Area (PPS6 Out of Centre)	4,791	169	3.53			126				2.6				75	
HF-01-D-02	Suburban Area (PPS6 Out of Centre)	5,000	166	3.32				62				1.2				37
KC-01-D-01	Suburban Area (PPS6 Out of Centre)	3,556	137	3.85		56	64	93		1.6	1.8	2.6		41	47	68
KC-01-D-02	Suburban Area (PPS6 Out of Centre)	5,000	138	2.76		38	52	55		0.8	1.0	1.1		28	38	40
KN-01-D-01	Suburban Area (PPS6 Out of Centre)	4,459	166	3.72			71				1.6				43	
LC-01-D-01	Edge of Town	4,808	184	3.83		44	58			0.9	1.2			24	32	
LC-01-D-02	Not Known	3,378	199	5.89			122	89			3.6	2.6			61	45
LE-01-D-01	Suburban Area (PPS6 Out of Centre)	8,528	424	4.97	105	143	251	268	1.2	1.7	2.9	3.1	25	34	59	63
MS-01-D-01	Suburban Area (PPS6 Out of Centre)	4,800	112	2.33				84				1.8				75
NF-01-D-01	Edge of Town Centre	3,900	247	6.33		138				3.5				56		
NF-01-D-02	Suburban Area (PPS6 Out of Centre)	13,775	571	4.15			383				2.8				67	
NT-01-D-01	Suburban Area (PPS6 Out of Centre)	4,325	206	4.76		61	111	124		1.4	2.6	2.9		30	54	60
SC-01-D-01	Edge of Town	4,000	155	3.88		67	138	142		1.7	3.5	3.6		43	89	92
SC-01-D-02	Edge of Town Centre	5,500	160	2.91	84		176		1.5		3.2		53		110	
WF-01-D-01	Suburban Area (PPS6 Out of Centre)	3,550	89	2.51		45	61	60		1.3	1.7	1.7		51	69	67
WM-01-D-01	Suburban Area (PPS6 Out of Centre)	3,110	131	4.21		42	45	22		1.4	1.4	0.7		32	34	17
WM-01-D-02	Suburban Area (PPS6 Out of Centre)	12,000	488	4.07		152	290	280		1.3	2.4	2.3		31	59	57
WM-01-D-03	Suburban Area (PPS6 Out of Centre)	4,000	210	5.25				60				1.5				29
AVERAGE		5,408	239	4.62					1.97	1.75	2.63	2.68	45	40	65	59
Min		1,928	70	1.52					1.23	0.76	1.04	0.71	21	19	30	17
Max		13,935	616	10.74					3.53	3.54	4.87	6.50	76	96	140	121

# 01/E – DIY Superstore (without garden centre) (GDO use class A1)

Reference	Location	GFA (m²)	SPACES	Parking Provision Space/ 100m² GFA	Parking Accum Other Weekdays	Parking Accum Friday	Parking Accum Saturday	Parking Accum Sunday	Parking Demand / 100 m² GFA Weekday	Parking Demand / 100 m² GFA Friday	Parking Demand / 100 m² GFA Saturday	Parking Demand / 100 m² GFA Sunday	% of Parking in Use Weekday	% of Parking in Use Friday	% of Parking in Use Saturday	% of Parking in Use Sunday
CB-01-E-01	Edge of Town	3,530	150	4.25		27	44			0.8	1.2			18	29	
CH-01-E-01	Edge of Town Centre	2,323	99	4.26		30	99			1.3	4.3			30	100	
DC-01-E-02	Suburban Area (PPS6 Out of Centre)	2,660	137	5.15		39	46			1.5	1.7			28	34	
DC-01-E-04	Not Known	3,456	220	6.37		66	115	106		1.9	3.3	3.1		30	52	48
DS-01-E-01	Suburban Area (PPS6 Out of Centre)	1,840	155	8.42			65				3.5				42	
ES-01-E-01	Edge of Town	2,076	50	2.41	70	68	100		3.4	3.3	4.8		140	136	200	
ES-01-E-02	Edge of Town	2,973	125	4.20	18	141			0.6	4.7			14	113		
ES-01-E-03	Edge of Town	4,756	250	5.26	61	111	97		1.3	2.3	2.0		24	44	39	
ES-01-E-04	Edge of Town	1,579	70	4.43	21	19	40		1.3	1.2	2.5		30	27	57	
ES-01-E-05	Edge of Town	2,175	44	2.02	40	48			1.8	2.2			91	109		
ES-01-E-06	Suburban Area (PPS6 Out of Centre)	2,163	60	2.77	96	35	54		4.4	1.6	2.5		160	58	90	
ES-01-E-07	Edge of Town	3,605	180	4.99	93	74	146		2.6	2.1	4.0		52	41	81	
ES-01-E-08	Suburban Area (PPS6 Out of Centre)	2,935	76	2.59	55	38	91		1.9	1.3	3.1		72	50	120	
ES-01-E-09	Edge of Town	3,250	161	4.95	40	45	109		1.2	1.4	3.4		25	28	68	
ES-01-E-10	Edge of Town	3,250	161	4.95	66	69	197		2.0	2.1	6.1		41	43	122	
ES-01-E-11	Edge of Town	100	38	38.00			31				31.0				82	
FI-01-E-01	Edge of Town	2,313	108	4.67	52				2.2				48			
GC-01-E-01	Not Known	3,352	217	6.47				101				3.0				47
GC-01-E-02	Not Known	4,500	370	8.22				162				3.6				44
GM-01-E-01	Suburban Area (PPS6 Out of Centre)	4,181	200	4.78		42		114		1.0		2.7		21		57
GR-01-E-01	Neighbourhood Centre (PPS6 Local Cent	2,408	79	3.28			43				1.8				54	
HC-01-E-01	Suburban Area (PPS6 Out of Centre)	3,020	200	6.62		100	164			3.3	5.4			50	82	
KC-01-E-01	Suburban Area (PPS6 Out of Centre)	3,577	137	3.83	43	53	152		1.2	1.5	4.2		31	39	111	
KC-01-E-02	Suburban Area (PPS6 Out of Centre)	3,205	114	3.56	56	120	44		1.7	3.7	1.4		49	105	39	
KC-01-E-03	Suburban Area (PPS6 Out of Centre)	3,205	114	3.56	65	33	45	71	2.0	1.0	1.4	2.2	57	29	39	62
KC-01-E-04	Suburban Area (PPS6 Out of Centre)	3,252	137	4.21	51				1.6				37			
KC-01-E-05	Suburban Area (PPS6 Out of Centre)	4,180	138	3.30			99				2.4				72	
LC-01-E-01	Edge of Town	3,809	225	5.91		52	79	102		1.4	2.1	2.7		23	35	45
LC-01-E-03	Suburban Area (PPS6 Out of Centre)	2,702	131	4.85		27	37	35		1.0	1.4	1.3		21	28	27
LN-01-E-01	Edge of Town	2,400	128	5.33		48	65	62		2.0	2.7	2.6		38	51	48
NF-01-E-01	Not Known	3,252	200	6.15			104				3.2				52	
PK-01-E-01	Not Known	1,492	40	2.68	39	61			2.6	4.1			98	153		
RC-01-E-01	Edge of Town	11,800	500	4.24		128	397			1.1	3.4			26	79	
SC-01-E-01	Edge of Town Centre	3,160	80	2.53		123	50	48		3.9	1.6	1.5		154	63	60
SR-01-E-01	Edge of Town	2,500	131	5.24		24		52		1.0		2.1		18		40
WS-01-E-01	Not Known	2,000	128	6.40	54	35	94		2.7	1.8	4.7		42	27	73	
WY-01-E-01	Suburban Area (PPS6 Out of Centre)	3,500	117	3.34				91				2.6				78
AVERAGE		3,148	148	5.52					2.04	2.01	4.04	2.49	60	54	70	51
Min		100	38	2.02					0.61	0.76	1.25	1.30	14	18	28	27
Max		11,800	500	38.00					4.44	4.74	31.00	3.60	160	154	200	78

## 01/G – Other Individual non-food Superstore (GDO use class A1)

Reference	Location	GFA (m <sup>2</sup> )	SPACES	Parking Provision Space/ 100m <sup>2</sup> GFA	Parking Accum Other Weekdays	Parking Accum Friday	Parking Accum Saturday	Parking Accum Sunday	Parking Demand / 100 m <sup>2</sup> GFA Weekday	Parking Demand / 100 m <sup>2</sup> GFA Friday	Parking Demand / 100 m <sup>2</sup> GFA Saturday	Parking Demand / 100 m <sup>2</sup> GFA Sunday	% of Parking in Use Weekday	% of Parking in Use Friday	% of Parking in Use Saturday	% of Parking in Use Sunday
BN-01-G-01	Suburban Area (PPS6 Out of Centre)	4,000	94	2.35			35				0.9				37	
BT-01-G-01	Suburban Area (PPS6 Out of Centre)	23,226	1300	5.60		177	1079			0.8	4.6			14	83	
BU-01-G-01	Suburban Area (PPS6 Out of Centre)	7,900	145	1.84		34	43	28		0.4	0.5	0.4		23	30	19
CB-01-G-01	Suburban Area (PPS6 Out of Centre)	300	10	3.33			7				2.3				70	
CH-01-G-01	Edge of Town	16,600	720	4.34		307	1053			1.8	6.3			43	146	
CK-01-G-01	Neighbourhood Centre (PPS6 Local Centre)	12,500	550	4.40			222				1.8				40	
ES-01-G-01	Edge of Town	2,787	53	1.90	19	33	42		0.7	1.2	1.5		36	62	79	
ES-01-G-02	Edge of Town	4,552	150	3.30	16	38	111		0.4	0.8	2.4		11	25	74	
ES-01-G-04	Edge of Town	4,450	174	3.91	9	17	32		0.2	0.4	0.7		5	10	18	
EX-01-G-01	Edge of Town	1,000	110	11.00			25				2.5				23	
GM-01-G-01	Suburban Area (PPS6 Out of Centre)	7,989	70	0.88		27	71			0.3	0.9			39	101	
GM-01-G-02	Suburban Area (PPS6 Out of Centre)	2,787	170	6.10	71		166		2.5		6.0		42		98	
GM-01-G-03	Suburban Area (PPS6 Out of Centre)	4,325	158	3.65			49				1.1				31	
KC-01-G-01	Suburban Area (PPS6 Out of Centre)	1,248	101	8.09		41	49	40		3.3	3.9	3.2		41	49	40
NY-01-G-01	Edge of Town Centre	2,300	58	2.52			10				0.4				17	
RC-01-G-01	Edge of Town	9,290	450	4.84		87	213			0.9	2.3			19	47	
RC-01-G-02	Edge of Town	22,300	242	1.09		202	219	285		0.9		1.3		83	90	118
RF-01-G-01	Suburban Area (PPS6 Out of Centre)	26,500	1360	5.13		565	877	1248		2.1	3.3	4.7		42	64	92
SF-01-G-01	Suburban Area (PPS6 Out of Centre)	290	17	5.86		9				3.1				53		
WM-01-G-01	Suburban Area (PPS6 Out of Centre)	1,880	101	5.37		46	91			2.4	4.8			46	90	
WM-01-G-02	Edge of Town	2,800	107	3.82		48	81	49		1.7	2.9	1.8		45	76	46
WM-01-G-03	Suburban Area (PPS6 Out of Centre)	3,600	107	2.97		33	59	48		0.9	1.6	1.3		31	55	45
WM-01-G-04	Suburban Area (PPS6 Out of Centre)	2,100	147	7.00		39	93	41		1.9	4.4	2.0		27	63	28
WS-01-G-01	Edge of Town	2,434	62	2.55	17	16	28			0.7	1.2			26	45	
WS-01-G-02	Suburban Area (PPS6 Out of Centre)	2,750	55	2.00	19	20	39			0.7	1.4			36	71	
AVERAGE		6,796	260	4.15					0.95	1.36	2.52	2.08	23	37	62	55
Min		290	10	0.88					0.20	0.34	0.43	0.35	5	10	17	19
Max		26,500	1,360	11.00					2.55	3.29	6.34	4.71	42	83	146	118

## 01/L – Builders Merchant (GDO use class A1)

Reference	Location	GFA (m <sup>2</sup> )	SPACES	Parking Provision Space/ 100m <sup>2</sup> GFA	Parking Accum Other Weekdays	Parking Accum Friday	Parking Accum Saturday	Parking Accum Sunday	Parking Demand / 100 m <sup>2</sup> GFA Weekday	Parking Demand / 100 m <sup>2</sup> GFA Friday	Parking Demand / 100 m <sup>2</sup> GFA Saturday	Parking Demand / 100 m <sup>2</sup> GFA Sunday	% of Parking in Use Weekday	% of Parking in Use FRIDAY	% of Parking in Use Saturday	% of Parking in Use Sunday
EG-01-L-01	Town Centre	1,350	7	0.52	6				0.4				86			
EG-01-L-02	Suburban Area (PPS6 Ou	2,120	10	0.47	13				0.6				130			
GM-01-L-01	Suburban Area (PPS6 Ou	2,600	20	0.77	13		3		0.5		0.1		65		15	
LC-01-L-01	Edge of Town	9,974	150	1.50	114				1.1				76			
RE-01-L-01	Edge of Town	1,514	46	3.04	13				0.9				28			
RE-01-L-02	Edge of Town	2,045	65	3.18	43				2.1				66			
SC-01-L-01	Suburban Area (PPS6 Ou	1,390	10	0.72		22	25			1.6	1.8			220	250	
WM-01-L-01	Edge of Town	600	5	0.83		7	5	2		1.2	0.8	0.3		140	100	40
WO-01-L-01	Edge of Town	1,000	6	0.60		9	8			0.9	0.8			150	133	
WY-01-L-01	Suburban Area (PPS6 Ou	3,000	30	1.00	37				1.2				123			
AVERAGE		2,559	35	1.26					0.99	1.22	0.89	0.33	82	170	125	40
Min		600	5	0.47					0.44	0.90	0.12	0.33	28	140	15	40
Max		9,974	150	3.18					2.10	1.58	1.80	0.33	130	220	250	40

## Appendix C

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### Detailed TRICS analysis - Trip Generation



# Vehicle Trips

## 01/D - DIY Superstore (with garden centre)

There are a great number of surveys available over the period of a week although most are at the weekend.

TRICS	MAIN MENU ▶ INITIAL PARAMETERS ▶ MAIN PARAMETERS		Help Desk	Log Out	Off-Line
Land Use 01 - RETAIL D - DIY SUPERSTORE - WITH GARDEN CENTRE					
Reset Main Selections Secondary Parameters Help Previous Screen					
<b>Main selection</b>		<b>Week days to include</b>			
Description	No. of surveys Include	Day of week	No. of surveys Include		
Gross floor area	102 <input checked="" type="radio"/>	Monday		<input checked="" type="checkbox"/>	
Retail floor area	99 <input type="radio"/>	Tuesday		<input checked="" type="checkbox"/>	
Parking spaces	101 <input type="radio"/>	Wednesday		<input checked="" type="checkbox"/>	
Number of Employees	91 <input type="radio"/>	Thursday		<input checked="" type="checkbox"/>	
		Friday	5	<input checked="" type="checkbox"/>	
		Saturday	10	<input checked="" type="checkbox"/>	
		Sunday	11	<input checked="" type="checkbox"/>	
<b>Minimum/maximum range</b>		<b>Location Types to include</b>			
Selection by: Gross floor area		Town Centre 3 <input checked="" type="checkbox"/>			
Units: sqm		Edge of Town Centre 1 <input checked="" type="checkbox"/>			
Minimum: 1928 From: 1928		Suburban Area 19 <input checked="" type="checkbox"/>			
Maximum: 13935 To: 13935		Edge of Town 2 <input checked="" type="checkbox"/>			
		Neighbourhood Centre 1 <input checked="" type="checkbox"/>			
		Free Standing <input checked="" type="checkbox"/>			
		Not Known <input checked="" type="checkbox"/>			
		<b>Sub-categories</b>			
		Industrial Zone 4 <input checked="" type="checkbox"/>			
		Commercial Zone 3 <input checked="" type="checkbox"/>			
		Development Zone <input checked="" type="checkbox"/>			
		Retail Zone 4 <input checked="" type="checkbox"/>			
		Residential Zone 7 <input checked="" type="checkbox"/>			
		Built-Up Zone 1 <input checked="" type="checkbox"/>			
		Village <input checked="" type="checkbox"/>			
		Out of Town <input checked="" type="checkbox"/>			
		High Street <input checked="" type="checkbox"/>			
		No Sub Category 7 <input checked="" type="checkbox"/>			
<b>Date range</b>					
Minimum: 04/09/86 From: 01/01/01		20th century dates: 01/01/70-31/12/99			
Maximum: 13/07/08 To: 13/07/08		21st century dates: 01/01/00-31/12/69			
The default lower date has been set to 01/01/01 in order to exclude old data from the calculation. If this is accepted, 76 days will be excluded. The minimum date may be manually set to any date down to the lowest date shown which will have the effect of including some or all of these days. The default cut-off is set in Settings from the Main Menu (note for TRICS 6.2.1 this date is preset to 01/01/00 until changed by the user).					
<b>Survey Types to include</b>					
Survey type	No. of surveys Include				
Manual count	26 <input checked="" type="checkbox"/>				
Directional ATC Count	<input checked="" type="checkbox"/>				
<b>GFA not in use statistics</b>					
Include "GFA not in use" in GFA trip rate calculations		YES			
Number of selected surveys that include a known "GFA not in use" figure		9			
Number of surveys that do not have this information available		17			

## FRIDAY

An analysis of these figures on a Friday shows the following daily profile with the peak site traffic generation occurring between 12 noon and 1PM.

Land Use 01 - RETAIL D - DIY SUPERSTORE - WITH GARDEN CENTRE									
Graph Rank Copy Data Print Selection Help Previous Screen									
VEHICLES <input type="checkbox"/> Estimate TRIP rates									
TRIP RATE VALUE PER 100 SQM	ARRIVALS Total rate: 17.695 Peak: 12:00-13:00			DEPARTURES Total rate: 17.706 Peak: 12:00-13:00			TOTALS Total rate: 35.401 Peak: 12:00-13:00		
	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00-01:00	0	0	0.000	0	0	0.000	0	0	0.000
01:00-02:00	0	0	0.000	0	0	0.000	0	0	0.000
02:00-03:00	0	0	0.000	0	0	0.000	0	0	0.000
03:00-04:00	0	0	0.000	0	0	0.000	0	0	0.000
04:00-05:00	0	0	0.000	0	0	0.000	0	0	0.000
05:00-06:00	0	0	0.000	0	0	0.000	0	0	0.000
06:00-07:00	1	12000	0.100	1	12000	0.025	1	12000	0.125
07:00-08:00	4	7756	0.313	4	7756	0.142	4	7756	0.455
08:00-09:00	5	7205	0.663	5	7205	0.378	5	7205	1.041
09:00-10:00	5	7205	1.185	5	7205	0.922	5	7205	2.107
10:00-11:00	5	7205	1.493	5	7205	1.369	5	7205	2.862
11:00-12:00	5	7205	1.510	5	7205	1.535	5	7205	3.045
12:00-13:00	5	7205	1.704	5	7205	1.704	5	7205	3.408
13:00-14:00	5	7205	1.704	5	7205	1.663	5	7205	3.367
14:00-15:00	5	7205	1.699	5	7205	1.618	5	7205	3.317
15:00-16:00	5	7205	1.480	5	7205	1.607	5	7205	3.087
16:00-17:00	5	7205	1.341	5	7205	1.446	5	7205	2.787
17:00-18:00	5	7205	1.144	5	7205	1.319	5	7205	2.463
18:00-19:00	5	7205	1.474	5	7205	1.402	5	7205	2.876
19:00-20:00	5	7205	1.310	5	7205	1.604	5	7205	2.914
20:00-21:00	2	11575	0.575	2	11575	0.972	2	11575	1.547
21:00-22:00	0	0	0.000	0	0	0.000	0	0	0.000
22:00-23:00	0	0	0.000	0	0	0.000	0	0	0.000
23:00-24:00	0	0	0.000	0	0	0.000	0	0	0.000

## FRIDAY – SITE PEAK HOUR

As this analysis comprises a number of sites, the individual sites can be ranked as to their trip generating abilities. This shows a wide range of trip rates per 100sq.m. in this peak period.

TRICS

MAIN MENU

INITIAL PARAMETERS

MAIN PARAMETERS

SECONDARY PARAMETERS

TRIP RATE

RANK

Help Desk

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Land Use

01 - RETAIL

D - DIY SUPERSTORE - WITH GARDEN CENTRE

Graph

Geographic Map

Recalc Rank

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Search

VEHICLES

Rank order for: Gross floor area

Calculated on: TOTALS

Time range: 12:00-13:00

Total: 5

15th and 85th percentile trip rates cannot be highlighted in selected data sets of under 6 survey days

Note

WARNING: Using 85th and 15th percentile highlighted trip rates in data sets of under 20 surveys is not recommended by TRICS, and may be misleading.

Sorted by Trip Rate

Arrivals

Departures

Totals

Rank	Site Ref	Description	Area	GFA	Day	Date	Arrivals	Departures	Totals	Trip Rate
1	NT-01-D-01	B&Q, NEAR NOTTINGHAM	NOTTINGHAMSHIRE	4325	Friday	19/04/02	2.890	2.844	5.734	1.326
2	WF-01-D-01	B&Q, LEYTON	WALTHAM FOREST	3550	Friday	12/07/02	2.141	2.197	4.338	1.225
3	WM-01-D-02	B&Q WAREHOUSE, BIRMINGHAM	WEST MIDLANDS	12000	Friday	25/01/02	1.800	1.742	3.542	0.295
4	KC-01-D-02	HOMEbase, DARTFORD	KENT	5000	Friday	12/10/01	1.220	1.340	2.560	0.512
5	AR-01-D-01	B&Q WAREHOUSE, CRAIGAVON	ARMAGH	11149	Friday	01/11/02	1.220	1.229	2.449	0.219

## FRIDAY – AM PEAK HOUR

TRICS

MAIN MENU

INITIAL PARAMETERS

MAIN PARAMETERS

SECONDARY PARAMETERS

TRIP RATE

RANK

Help Desk

Log Out

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Land Use

01 - RETAIL

D - DIY SUPERSTORE - WITH GARDEN CENTRE

Graph

Geographic Map

A

Z

↓

Recalc Rank

Copy Data

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Search

VEHICLES

Rank order for: Gross floor area

Calculated on: TOTALS

Time range: 08:00-09:00

Total: 5

15th and 85th percentile trip rates cannot be highlighted in selected data sets of under 6 survey days

Note

WARNING: Using 85th and 15th percentile highlighted trip rates in data sets of under 20 surveys is not recommended by TRICS, and may be misleading.

Sorted by Trip Rate

☐ Arrivals

☐ Departures

☒ Totals

							TRIP RATE			
Rank	Site Ref	Description	Area	GFA	Day	Date	Arrivals	Departures	Totals	Trip Rate
1	NT-01-D-01	B&Q, NEAR NOTTINGHAM	NOTTINGHAMSHIRE	4325	Friday	19/04/02	0.971	0.671	1.642	0.379
2	WM-01-D-02	B&Q WAREHOUSE, BIRMINGHAM	WEST MIDLANDS	12000	Friday	25/01/02	0.992	0.592	1.584	0.132
3	WF-01-D-01	B&Q, LEYTON	WALTHAM FOREST	3550	Friday	12/07/02	0.676	0.423	1.099	0.310
4	KC-01-D-02	HOMEbase, DARTFORD	KENT	5000	Friday	12/10/01	0.420	0.140	0.560	0.112
5	AR-01-D-01	B&Q WAREHOUSE, CRAIGAVON	ARMAGH	11149	Friday	01/11/02	0.296	0.126	0.422	0.037

## FRIDAY – PM PEAK HOUR

However, of more interest, is the volume of traffic that would be generated at the likely network peak. The individual sites have therefore been ranked over the peak network period (assumed to be 5PM to 6PM)

TRICS

MAIN MENU

INITIAL PARAMETERS

MAIN PARAMETERS

SECONDARY PARAMETERS

TRIP RATE

RANK

Help Desk

Log Out

Off-Line Ver

Land Use

01 - RETAIL D - DIY SUPERSTORE - WITH GARDEN CENTRE

Graph

Geographic Map

Recalc Rank

Copy Data

Print

Help

Previous Screen

Search

VEHICLES

Rank order for: Gross floor area

Calculated on: TOTALS

Time range: 17:00-18:00

Total: 5

15th and 85th percentile trip rates cannot be highlighted in selected data sets of under 6 survey days

Note

WARNING: Using 85th and 15th percentile highlighted trip rates in data sets of under 20 surveys is not recommended by TRICS, and may be misleading.

Sorted by Trip Rate

Arrivals








Departures

Totals

Rank	Site Ref	Description	Area	GFA	Day	Date	Arrivals	Departures	Totals	Trip Rate
1	NT-01-D-01	B&Q, NEAR NOTTINGHAM	NOTTINGHAMSHIRE	4325	Friday	19/04/02	1.734	1.919	3.653	0.845
2	WM-01-D-02	B&Q WAREHOUSE, BIRMINGHAM	WEST MIDLANDS	12000	Friday	25/01/02	1.367	1.525	2.892	0.241
3	WF-01-D-01	B&Q, LEYTON	WALTHAM FOREST	3550	Friday	12/07/02	1.324	1.324	2.648	0.746
4	KC-01-D-02	HOMEbase, DARTFORD	KENT	5000	Friday	12/10/01	1.040	1.300	2.340	0.468
5	AR-01-D-01	B&Q WAREHOUSE, CRAIGAVON	ARMAGH	11149	Friday	01/11/02	0.664	0.870	1.534	0.138

## SATURDAY

An analysis of the figures on a Saturday shows the following daily profile with peak generation occurring between 3PM and 4PM.

TRICS	MAIN MENU ▶ INITIAL PARAMETERS ▶ MAIN PARAMETERS ▶ SECONDARY PARAMETERS ▶ TRIP								
Land Use	01 - RETAIL D - DIY SUPERSTORE - WITH GARDEN CENTRE								
 Graph	 Rank	 Copy Data	 Print	 Selection	 Help	 Previous Screen			
VEHICLES									<input type="checkbox"/> Estimate TRIP rates
TRIP RATE VALUE PER 100 SQM	ARRIVALS Total rate: 29.437 Peak: 14:00-15:00			DEPARTURES Total rate: 29.456 Peak: 15:00-16:00			TOTALS Total rate: 58.893 Peak: 15:00-16:00		
	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00-01:00	0	0	0.000	0	0	0.000	0	0	0.000
01:00-02:00	0	0	0.000	0	0	0.000	0	0	0.000
02:00-03:00	0	0	0.000	0	0	0.000	0	0	0.000
03:00-04:00	0	0	0.000	0	0	0.000	0	0	0.000
04:00-05:00	0	0	0.000	0	0	0.000	0	0	0.000
05:00-06:00	0	0	0.000	0	0	0.000	0	0	0.000
06:00-07:00	1	12000	0.092	1	12000	0.025	1	12000	0.117
07:00-08:00	8	6677	0.256	8	6677	0.154	8	6677	0.410
08:00-09:00	10	6321	0.888	10	6321	0.549	10	6321	1.437
09:00-10:00	10	6321	1.815	10	6321	1.350	10	6321	3.165
10:00-11:00	10	6321	2.739	10	6321	2.250	10	6321	4.989
11:00-12:00	10	6321	3.375	10	6321	3.033	10	6321	6.408
12:00-13:00	10	6321	3.074	10	6321	3.161	10	6321	6.235
13:00-14:00	10	6321	3.441	10	6321	3.307	10	6321	6.748
14:00-15:00	10	6321	3.678	10	6321	3.489	10	6321	7.167
15:00-16:00	10	6321	3.558	10	6321	3.756	10	6321	7.314
16:00-17:00	10	6321	2.788	10	6321	3.313	10	6321	6.101
17:00-18:00	10	6321	1.892	10	6321	2.305	10	6321	4.197
18:00-19:00	10	6321	1.191	10	6321	1.514	10	6321	2.705
19:00-20:00	10	6321	0.582	10	6321	0.959	10	6321	1.541
20:00-21:00	8	5882	0.068	8	5882	0.291	8	5882	0.359
21:00-22:00	0	0	0.000	0	0	0.000	0	0	0.000
22:00-23:00	0	0	0.000	0	0	0.000	0	0	0.000
23:00-24:00	0	0	0.000	0	0	0.000	0	0	0.000

## SATURDAY – SITE PEAK HOUR

Again the individual sites within this land use can be ranked according to their traffic generating capabilities. This shows a wide range of values from 4.6 trips per 100sq.m. GFA to 16.5 trips per 100sq.m.

Land Use

01 - RETAIL D - DIY SUPERSTORE - WITH GARDEN CENTRE

Graph

Geographic Map

Recalc Rank

Copy Data

Print

Help

Previous Screen

Search

VEHICLES

Rank order for: Gross floor area

Calculated on: TOTALS

Time range: 15:00-16:00

Total: 10

\*\*85th Percentile = no. 2

\*\*15th Percentile = no. 9

Note

WARNING: Using 85th and 15th percentile highlighted trip rates in data sets of under 20 surveys is not recommended by TRICS, and may be misleading.

Sorted by Trip Rate

☐ Arrivals

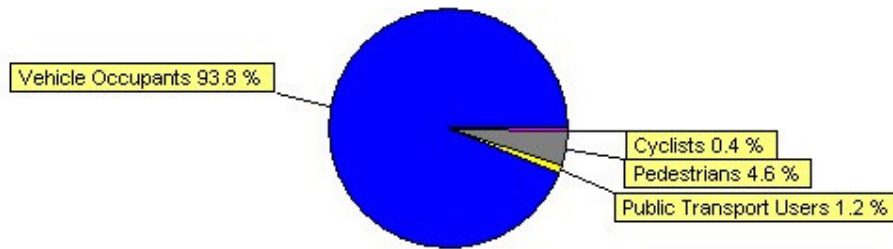
☐ Departures

☒ Totals

							TRIP RATE		
Rank	Site Ref	Description	Area	GFA	Day	Date	Arrivals	Departures	Totals
1	GC-01-D-03	B&O, GLASGOW	GLASGOW CITY	1928	Saturday	29/09/01	8.817	7.728	16.545
2 **	NT-01-D-01	B&O, NEAR NOTTINGHAM	NOTTINGHAMSHIRE	4325	Saturday	27/04/02	6.197	6.751	12.948
3	HF-01-D-01	B&O, WELWYN GARDEN CITY	HERTFORDSHIRE	4791	Saturday	16/02/02	4.529	4.905	9.434
4	NF-01-D-02	B&O WAREHOUSE, NORWICH	NORFOLK	13775	Saturday	17/09/05	3.593	4.044	7.637
5	WM-01-D-02	B&O WAREHOUSE, BIRMINGHAM	WEST MIDLANDS	12000	Saturday	26/01/02	3.392	3.517	6.909
6	WF-01-D-01	B&O, LEYTON	WALTHAM FOREST	3550	Saturday	03/08/02	3.352	3.268	6.620
7	AR-01-D-01	B&O WAREHOUSE, CRAIGAVON	ARMAGH	11149	Saturday	02/11/02	2.511	2.924	5.435
8	KN-01-D-01	HOMEbase, KENSINGTON	KENSINGTON AND	4459	Saturday	10/11/07	2.355	2.758	5.113
9 **	KC-01-D-02	HOMEbase, DARTFORD	KENT	5000	Saturday	13/10/01	2.440	2.340	4.780
10	DC-01-D-01	FOCUS, DORCHESTER	DORSET	2230	Saturday	05/07/08	2.960	1.659	4.619

The majority of trips are undertaken by car.

## Modal Split Percentages










## 01/E - DIY Superstore (without garden centre)

There are seven surveys for this category.

TRICS MAIN MENU ▶ INITIAL PARAMETERS ▶ MAIN PARAMETERS				Help Desk	Log Out	Off-																																																																																									
Land Use 01 - RETAIL E - DIY SUPERSTORE - WITHOUT GARDEN CENT																																																																																															
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<b>Minimum/maximum range</b> Selection by: Gross floor area Units: sqm Minimum: 100 From: 100 Maximum: 11800 To: 11800																																																																																															
<b>Date range</b> Minimum: 17/05/85 From: 01/01/01 Maximum: 09/09/07 To: 09/09/07 <small>20th century dates: 01/01/70-31/12/99 21st century dates: 01/01/00-31/12/69</small> The default lower date has been set to 01/01/01 in order to exclude old data from the calculation. If this is accepted, 103 days will be excluded. The minimum date may be manually set to any date down to the lowest date shown which will have the effect of including some or all of these days. The default cut-off is set in Settings from the Main Menu (note for TRICS 6.2.1 this date is preset to 01/01/00 until changed by the user).																																																																																															
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<b>GFA not in use statistics</b> Include "GFA not in use" in GFA trip rate calculations YES Number of selected surveys that include a known "GFA not in use" figure 3 Number of surveys that do not have this information available 4																																																																																															

## FRIDAY

An analysis of these figures on a Friday shows the following daily profile with peak generation occurring between 11am and 12noon. There is only one Friday survey available.

TRICS	MAIN MENU ► INITIAL PARAMETERS ► MAIN PARAMETERS ► SECONDARY PARAMETERS ► TRIP								
Land Use	01 - RETAIL E - DIY SUPERSTORE - WITHOUT GARDEN CENT								
									
Graph	Rank	Copy Data	Print	Selection	Help				
									
					Previous Screen				
VEHICLES									
<input type="checkbox"/> Estimate TRIP rates									
TRIP RATE VALUE PER 100 SQM	ARRIVALS			DEPARTURES			TOTALS		
	Total rate: 42.584 Peak: 11:00-12:00			Total rate: 42.543 Peak: 11:00-12:00			Total rate: 85.127 Peak: 11:00-12:00		
	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00-01:00	0	0	0.000	0	0	0.000	0	0	0.000
01:00-02:00	0	0	0.000	0	0	0.000	0	0	0.000
02:00-03:00	0	0	0.000	0	0	0.000	0	0	0.000
03:00-04:00	0	0	0.000	0	0	0.000	0	0	0.000
04:00-05:00	0	0	0.000	0	0	0.000	0	0	0.000
05:00-06:00	0	0	0.000	0	0	0.000	0	0	0.000
06:00-07:00	0	0	0.000	0	0	0.000	0	0	0.000
07:00-08:00	1	2400	1.208	1	2400	0.958	1	2400	2.166
08:00-09:00	1	2400	2.125	1	2400	1.875	1	2400	4.000
09:00-10:00	1	2400	3.542	1	2400	2.792	1	2400	6.334
10:00-11:00	1	2400	3.708	1	2400	3.250	1	2400	6.958
11:00-12:00	1	2400	4.833	1	2400	5.292	1	2400	10.125
12:00-13:00	1	2400	4.167	1	2400	4.250	1	2400	8.417
13:00-14:00	1	2400	4.167	1	2400	4.375	1	2400	8.542
14:00-15:00	1	2400	4.667	1	2400	4.542	1	2400	9.209
15:00-16:00	1	2400	3.417	1	2400	3.333	1	2400	6.750
16:00-17:00	1	2400	3.417	1	2400	3.750	1	2400	7.167
17:00-18:00	1	2400	1.875	1	2400	2.292	1	2400	4.167
18:00-19:00	1	2400	3.000	1	2400	2.667	1	2400	5.667
19:00-20:00	1	2400	2.458	1	2400	3.167	1	2400	5.625
20:00-21:00	0	0	0.000	0	0	0.000	0	0	0.000
21:00-22:00	0	0	0.000	0	0	0.000	0	0	0.000
22:00-23:00	0	0	0.000	0	0	0.000	0	0	0.000
23:00-24:00	0	0	0.000	0	0	0.000	0	0	0.000

## SATURDAY

An analysis of these figures on a Saturday shows the following daily profile with peak generation occurring between 12 noon and 1pm.

TRIP RATE VALUE PER 100 SQM	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
	Total rate: 60.919 Peak: 11:00-12:00			Total rate: 60.881 Peak: 12:00-13:00			Total rate: 121.800 Peak: 12:00-13:00		
00:00-01:00	0	0	0.000	0	0	0.000	0	0	0.000
01:00-02:00	0	0	0.000	0	0	0.000	0	0	0.000
02:00-03:00	0	0	0.000	0	0	0.000	0	0	0.000
03:00-04:00	0	0	0.000	0	0	0.000	0	0	0.000
04:00-05:00	0	0	0.000	0	0	0.000	0	0	0.000
05:00-06:00	0	0	0.000	0	0	0.000	0	0	0.000
06:00-07:00	0	0	0.000	0	0	0.000	0	0	0.000
07:00-08:00	3	2216	0.421	3	2216	0.241	3	2216	0.662
08:00-09:00	4	1687	2.267	4	1687	1.526	4	1687	3.793
09:00-10:00	4	1687	5.068	4	1687	4.149	4	1687	9.217
10:00-11:00	4	1687	6.343	4	1687	5.987	4	1687	12.330
11:00-12:00	4	1687	7.336	4	1687	7.069	4	1687	14.405
12:00-13:00	4	1687	7.261	4	1687	7.365	4	1687	14.626
13:00-14:00	4	1687	6.520	4	1687	6.965	4	1687	13.485
14:00-15:00	4	1687	7.291	4	1687	7.217	4	1687	14.508
15:00-16:00	4	1687	7.113	4	1687	7.098	4	1687	14.211
16:00-17:00	4	1687	5.483	4	1687	5.765	4	1687	11.248
17:00-18:00	4	1687	3.334	4	1687	4.446	4	1687	7.780
18:00-19:00	3	2216	1.685	3	2216	1.925	3	2216	3.610
19:00-20:00	3	2216	0.797	3	2216	1.128	3	2216	1.925
20:00-21:00	0	0	0.000	0	0	0.000	0	0	0.000
21:00-22:00	0	0	0.000	0	0	0.000	0	0	0.000
22:00-23:00	0	0	0.000	0	0	0.000	0	0	0.000
23:00-24:00	0	0	0.000	0	0	0.000	0	0	0.000

## SATURDAY – SITE PEAK HOUR

The individual sites within this land use can be ranked according to their traffic generating capabilities. This shows a wide range of values from 6 trips per 100sq.m. GFA to 164 trips per 100sq.m.

TRICS

MAIN MENU

INITIAL PARAMETERS

MAIN PARAMETERS

SECONDARY PARAMETERS

TRIP RATE

RANK

Help Desk

Log Out

Off-Line Version - Click here

Land Use

01 - RETAIL

E - DIY SUPERSTORE - WITHOUT GARDEN CENT

Graph

Geographic Map

Recalc Rank

Copy Data

Print

Help

Previous Screen

Search

VEHICLES

Rank order for: Gross floor area

Calculated on: TOTALS

Time range: 12:00-13:00

Total: 4

15th and 85th percentile trip rates cannot be highlighted in selected data sets of under 6 survey days

Note

WARNING: Using 85th and 15th percentile highlighted trip rates in data sets of under 20 surveys is not recommended by TRICS, and may be misleading.

Sorted by Trip Rate

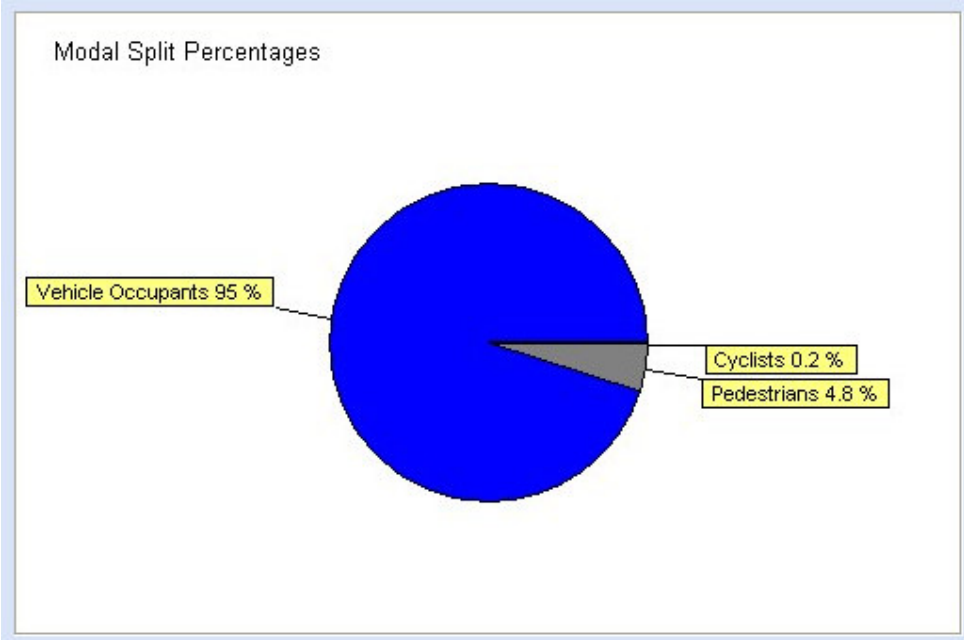
☐ Arrivals

☐ Departures

☒ Totals

Rank	Site Ref	Description	Area	GFA	Day	Date	TRIP RATE			Travel Plan
							Arrivals	Departures	Totals	
1	ES-01-E-11	GREEN DIY, UCKFIELD	EAST SUSSEX	100	Saturday	22/06/02	88.000	76.000	164.000	
2	DS-01-E-01	WICKES, CHESTERFIELD	DERBYSHIRE	1840	Saturday	24/06/06	10.000	9.783	19.783	
3	LN-01-E-01	WICKES, LINCOLN	LINCOLNSHIRE	2400	Saturday	08/06/02	6.083	7.000	13.083	
4	GR-01-E-01	FOCUS DIY, PLUMSTEAD	GREENWICH	2408	Saturday	20/01/07	2.990	3.032	6.022	

The modal split of these trips is shown below.



## 01/G – Other Individual non-food Superstore

There are a number of surveys over the period of a week.

TRICS MAIN MENU ▶ INITIAL PARAMETERS ▶ MAIN PARAMETERS

Land Use 01 - RETAIL G - OTHER INDIVIDUAL NON-FOOD SUPERSTORE

Reset Main Selections Secondary Parameters Help Previous Screen

**Main selection**

Description	No. of surveys	Include
Gross floor area	70	<input checked="" type="checkbox"/>
Retail floor area	64	<input type="checkbox"/>
Parking spaces	70	<input type="checkbox"/>
Number of Employees	55	<input type="checkbox"/>

Definitions

**Minimum/maximum range**

Selection by: Gross floor area

Units: sqm

Minimum: 290 From: 290

Maximum: 26500 To: 26500

**Date range**

Minimum: 26/11/86 From: 01/01/01

Maximum: 19/07/08 To: 19/07/08

20th century dates: 01/01/70-31/12/99

21st century dates: 01/01/00-31/12/69

The default lower date has been set to 01/01/01 in order to exclude old data from the calculation. If this is accepted, 37 days will be excluded. The minimum date may be manually set to any date down to the lowest date shown which will have the effect of including some or all of these days. The default cut-off is set in Settings from the Main Menu (note for TRICS 6.2.1 this date is preset to 01/01/00 until changed by the user).

**Survey Types to include**

Survey type	No. of surveys	Include
Manual count	33	<input checked="" type="checkbox"/>
Directional ATC Count		<input checked="" type="checkbox"/>

**GFA not in use statistics**

Include "GFA not in use" in GFA trip rate calculations	YES
Number of selected surveys that include a known "GFA not in use" figure	2
Number of surveys that do not have this information available	31

**Week days to include**

Day of week	No. of surveys	Include
Monday		<input checked="" type="checkbox"/>
Tuesday		<input checked="" type="checkbox"/>
Wednesday	1	<input checked="" type="checkbox"/>
Thursday		<input checked="" type="checkbox"/>
Friday	9	<input checked="" type="checkbox"/>
Saturday	14	<input checked="" type="checkbox"/>
Sunday	9	<input checked="" type="checkbox"/>

**Location Types to include**

	No. of surveys	Include
Town Centre		<input checked="" type="checkbox"/>
Edge of Town Centre	5	<input checked="" type="checkbox"/>
Suburban Area	18	<input checked="" type="checkbox"/>
Edge of Town	10	<input checked="" type="checkbox"/>
Neighbourhood Centre		<input checked="" type="checkbox"/>
Free Standing		<input checked="" type="checkbox"/>
Not Known		<input checked="" type="checkbox"/>
<b>Sub-categories</b>		
Industrial Zone	7	<input checked="" type="checkbox"/>
Commercial Zone	7	<input checked="" type="checkbox"/>
Development Zone		<input checked="" type="checkbox"/>
Retail Zone	9	<input checked="" type="checkbox"/>
Residential Zone	4	<input checked="" type="checkbox"/>
Built-Up Zone	2	<input checked="" type="checkbox"/>
Village		<input checked="" type="checkbox"/>
Out of Town		<input checked="" type="checkbox"/>
High Street		<input checked="" type="checkbox"/>
No Sub Category	4	<input checked="" type="checkbox"/>

## FRIDAY

An analysis of these figures on a Friday shows the following daily profile with the peak traffic generation occurring between 1PM and 2PM.

TRICS MAIN MENU ▶ INITIAL PARAMETERS ▶ MAIN PARAMETERS ▶ SECONDARY PARAMETERS ▶ TRIP RATE

Land Use 01 - RETAIL G - OTHER INDIVIDUAL NON-FOOD SUPERSTORE

Graph Rank Copy Data Print Selection Help Previous Screen

☐ Estimate TRIP rates

TRIP RATE VALUE PER 100 SQM	ARRIVALS Total rate: 11.043 Peak: 12:00-13:00			DEPARTURES Total rate: 11.583 Peak: 14:00-15:00			TOTALS Total rate: 22.626 Peak: 13:00-14:00		
	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00-01:00	0	0	0.000	0	0	0.000	0	0	0.000
01:00-02:00	0	0	0.000	0	0	0.000	0	0	0.000
02:00-03:00	0	0	0.000	0	0	0.000	0	0	0.000
03:00-04:00	0	0	0.000	0	0	0.000	0	0	0.000
04:00-05:00	0	0	0.000	0	0	0.000	0	0	0.000
05:00-06:00	0	0	0.000	0	0	0.000	0	0	0.000
06:00-07:00	0	0	0.000	0	0	0.000	0	0	0.000
07:00-08:00	1	22300	0.063	1	22300	0.009	1	22300	0.072
08:00-09:00	6	7089	0.223	6	7089	0.056	6	7089	0.279
09:00-10:00	9	7976	0.585	9	7976	0.295	9	7976	0.880
10:00-11:00	9	7976	1.068	9	7976	0.655	9	7976	1.723
11:00-12:00	9	7976	1.172	9	7976	0.951	9	7976	2.123
12:00-13:00	9	7976	1.190	9	7976	1.057	9	7976	2.247
13:00-14:00	9	7976	1.184	9	7976	1.234	9	7976	2.418
14:00-15:00	9	7976	1.173	9	7976	1.244	9	7976	2.417
15:00-16:00	9	7976	0.938	9	7976	1.127	9	7976	2.065
16:00-17:00	9	7976	0.780	9	7976	0.921	9	7976	1.701
17:00-18:00	9	7976	0.713	9	7976	0.804	9	7976	1.517
18:00-19:00	7	9862	0.591	7	9862	0.749	7	9862	1.340
19:00-20:00	7	9862	0.516	7	9862	0.552	7	9862	1.068
20:00-21:00	5	8580	0.406	5	8580	0.786	5	8580	1.192
21:00-22:00	1	26500	0.362	1	26500	0.743	1	26500	1.105
22:00-23:00	1	26500	0.079	1	26500	0.400	1	26500	0.479
23:00-24:00	0	0	0.000	0	0	0.000	0	0	0.000

As this analysis comprises a number of sites, the individual sites can be ranked as to the trip generating abilities. This shows a wide range of trip rates per 100sq.m. in this peak period. The AM & PM network peaks are also investigated.

## FRIDAY – AM PEAK HOUR

FRIDAY – PM PEAK HOUR

TRICS

MAIN MENU

INITIAL PARAMETERS

MAIN PARAMETERS

SECONDARY PARAMETERS

TRIP RATE

RANK

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Land Use

01 - RETAIL

G - OTHER INDIVIDUAL NON-FOOD SUPERSTORE

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VEHICLES

Rank order for: **Gross floor area**  
 Calculated on: **TOTALS** Time range: **17:00-18:00**  
 Total: **9**    **\*\*85th Percentile = no. 2**  
                   **\*\*15th Percentile = no. 8**








**Note**  
**WARNING: Using 85th and 15th percentile highlighted trip rates in data sets of under 20 surveys is not recommended by TRICS, and may be misleading.**

**Sorted by Trip Rate**  
☐ Arrivals  
☐ Departures  
☒ Totals

							TRIP RATE			
Rank	Site Ref	Description	Area	GFA	Day	Date	Arrivals	Departures	Totals	Travel Plan
1	WM-01-G-04	COMET, SOLIHULL	WEST MIDLANDS	2100	Friday	12/10/01	1.333	1.857	3.190	
2 **	KC-01-G-01	PREMUS HOMEMAKER, HRNE BAY	KENT	1248	Friday	21/06/02	1.442	1.683	3.125	
3	KC-01-G-02	D&A TOYS, CANTERBURY	KENT	1500	Friday	06/12/02	1.067	1.733	2.800	
4	WM-01-G-02	PC WORLD, SOLIHULL	WEST MIDLANDS	2800	Friday	14/09/01	1.107	1.571	2.678	
5	RF-01-G-01	IKEA, GLASGOW	RENFREWSHIRE	26500	Friday	12/04/02	0.913	0.906	1.819	Yes
6	WM-01-G-03	DFS, BIRMINGHAM	WEST MIDLANDS	3600	Friday	26/10/01	0.667	0.833	1.500	
7	NF-01-G-01	TOYS R US, NORWICH	NORFOLK	3835	Friday	27/09/02	0.808	0.652	1.460	
8 **	RC-01-G-02	DEPARTMENT ST., LLANTRISANT	RHONDDA CYNON TAFF	22300	Friday	11/10/02	0.435	0.565	1.000	
9	BU-01-G-01	COURTS, MILTON KEYNES	BUCKINGHAMSHIRE	7900	Friday	08/03/02	0.316	0.329	0.645	

## SATURDAY

An analysis of the figures on a Saturday shows the following daily profile with peak generation occurring between 3PM and 4PM.

TRICS	MAIN MENU ▶ INITIAL PARAMETERS ▶ MAIN PARAMETERS ▶ SECONDARY PARAMETERS ▶ TRIP RATES								
Land Use	01 - RETAIL G - OTHER INDIVIDUAL NON-FOOD SUPERSTORE								
									
Graph	Rank	Copy Data	Print	Selection	Help	Previous Screen			
VEHICLES							<input type="checkbox"/> Estimate TRIP rates		
TRIP RATE VALUE PER 100 SQM	ARRIVALS			DEPARTURES			TOTALS		
	Total rate: 13.070 Peak: 14:00-15:00			Total rate: 13.507 Peak: 15:00-16:00			Total rate: 26.577 Peak: 15:00-16:00		
	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00-01:00	0	0	0.000	0	0	0.000	0	0	0.000
01:00-02:00	0	0	0.000	0	0	0.000	0	0	0.000
02:00-03:00	0	0	0.000	0	0	0.000	0	0	0.000
03:00-04:00	0	0	0.000	0	0	0.000	0	0	0.000
04:00-05:00	0	0	0.000	0	0	0.000	0	0	0.000
05:00-06:00	0	0	0.000	0	0	0.000	0	0	0.000
06:00-07:00	0	0	0.000	0	0	0.000	0	0	0.000
07:00-08:00	3	8533	0.031	3	8533	0.016	3	8533	0.047
08:00-09:00	10	5416	0.183	10	5416	0.059	10	5416	0.242
09:00-10:00	14	5979	0.633	14	5979	0.286	14	5979	0.919
10:00-11:00	14	5979	1.338	14	5979	0.774	14	5979	2.112
11:00-12:00	14	5979	1.552	14	5979	1.238	14	5979	2.790
12:00-13:00	14	5979	1.621	14	5979	1.446	14	5979	3.067
13:00-14:00	14	5979	1.712	14	5979	1.591	14	5979	3.303
14:00-15:00	14	5979	1.849	14	5979	1.680	14	5979	3.529
15:00-16:00	14	5979	1.744	14	5979	1.877	14	5979	3.621
16:00-17:00	14	5979	1.266	14	5979	1.753	14	5979	3.019
17:00-18:00	14	5979	0.773	14	5979	1.312	14	5979	2.085
18:00-19:00	11	7333	0.243	11	7333	0.699	11	7333	0.942
19:00-20:00	4	8834	0.125	4	8834	0.696	4	8834	0.821
20:00-21:00	2	2500	0.000	2	2500	0.080	2	2500	0.080
21:00-22:00	1	1000	0.000	1	1000	0.000	1	1000	0.000
22:00-23:00	0	0	0.000	0	0	0.000	0	0	0.000
23:00-24:00	0	0	0.000	0	0	0.000	0	0	0.000

## SATURDAY – SITE PEAK HOUR

Again the individual sites within this land use can be ranked according to their traffic generating capabilities. This shows a wide range of values from 1.5 trips per 100sq.m. GFA to 13.7 trips per 100sq.m.

TRICS

MAIN MENU

INITIAL PARAMETERS

MAIN PARAMETERS

SECONDARY PARAMETERS

TRIP RATE

RANK

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Land Use

01 - RETAIL

G - OTHER INDIVIDUAL NON-FOOD SUPERSTORE

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VEHICLES

Rank order for: Gross floor area

Calculated on: TOTALS

Time range: 15:00-16:00

Total: 14

\*\*85th Percentile = no. 3

\*\*15th Percentile = no. 12

Note

WARNING: Using 85th and 15th percentile highlighted trip rates in data sets of under 20 surveys is not recommended by TRICS, and may be misleading.

Sorted by Trip Rate

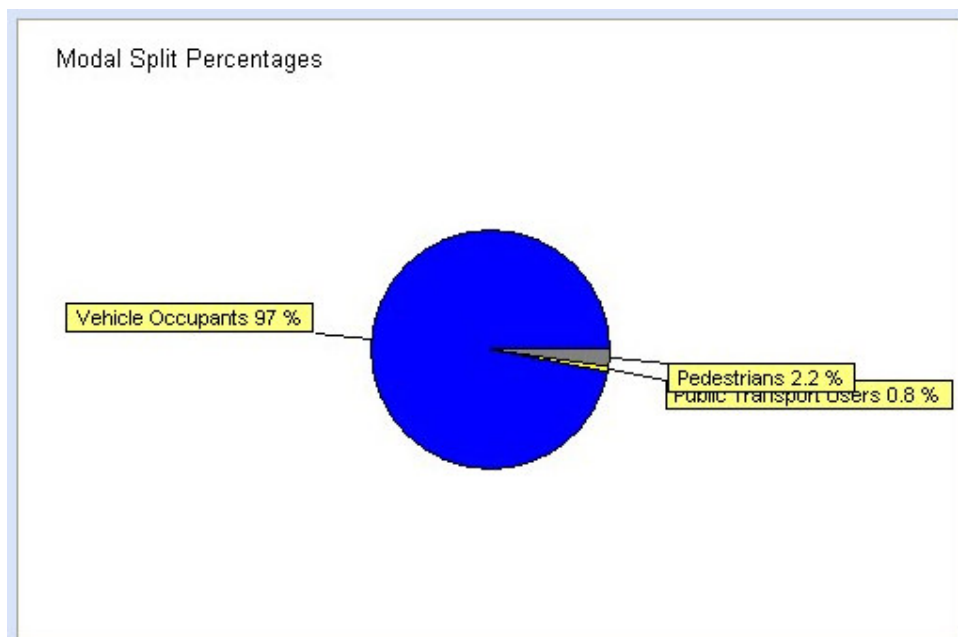
☐ Arrivals

☐ Departures

☒ Totals

Rank	Site Ref	Description	Area	GFA	Day	Date	TRIP RATE			Tr
							Arrivals	Departures	Totals	
1	KC-01-G-01	PREMUS HOMEMAKER, HRNE BAY	KENT	1248	Saturday	22/06/02	6.811	6.891	13.702	
2	KC-01-G-03	TOY SUPERSTORE, CANTERBURY	KENT	1500	Saturday	07/12/02	4.467	6.667	11.134	
3 **	CB-01-G-01	CARPHONE WAREHSE, CARLISLE	CUMBRIA	300	Saturday	07/09/02	4.667	3.667	8.334	
4	WM-01-G-02	PC WORLD, SOLIHULL	WEST MIDLANDS	2800	Saturday	15/09/01	4.071	4.071	8.142	
5	WM-01-G-04	COMET, SOLIHULL	WEST MIDLANDS	2100	Saturday	13/10/01	3.476	3.857	7.333	
6	RF-01-G-01	IKEA, GLASGOW	RENFREWSHIRE	26500	Saturday	13/04/02	2.102	2.245	4.347	
7	WM-01-G-03	DFS, BIRMINGHAM	WEST MIDLANDS	3600	Saturday	27/10/01	1.889	2.222	4.111	
8	GM-01-G-03	PC WORLD, MANCHESTER	GREATER MANCHESTER	4325	Saturday	12/06/04	2.012	1.873	3.885	
9	EX-01-G-01	MFI, COLCHESTER	ESSEX	1000	Saturday	19/07/08	1.700	1.900	3.600	
10	NF-01-G-01	TOYS R US, NORWICH	NORFOLK	3835	Saturday	28/09/02	1.591	1.904	3.495	
11	BN-01-G-01	COURTS, STAPLES CORNER	BARNET	4000	Saturday	01/05/04	1.325	1.200	2.525	
12 **	NY-01-G-01	ALLIED CARPETS, YORK	NORTH YORKSHIRE	2300	Saturday	21/05/05	1.217	1.087	2.304	
13	BU-01-G-01	COURTS, MILTON KEYNES	BUCKINGHAMSHIRE	7900	Saturday	09/03/02	0.924	1.076	2.000	
14	RC-01-G-02	DEPARTMENT ST., LLANTRISANT	RHONDDA CYNON TAFF	22300	Saturday	19/10/02	0.731	0.776	1.507	

The following modal splits are recorded.



## 01/L – Builders Merchant

There are a number of surveys over the period of a week.

TRICS MAIN MENU ► INITIAL PARAMETERS ► MAIN PARAMETERS [Help Desk](#) [Log Out](#)

Land Use 01 - RETAIL L - BUILDER'S MERCHANTS

[Reset Main Selections](#) [Secondary Parameters](#) [Help](#) [Previous Screen](#)

**Main selection**

Description	No. of surveys	Include
Gross floor area	15	<input checked="" type="radio"/>
Retail floor area	12	<input type="radio"/>
Parking spaces	15	<input type="radio"/>
Number of Employees	15	<input type="radio"/>

[Definitions](#)

**Minimum/maximum range**

Selection by: Gross floor area

Units: sqm

Minimum: 600 From: 600

Maximum: 9974 To: 9974

**Date range**

Minimum: 24/10/94 From: 01/01/01 20th century dates: 01/01/70-31/12/99

Maximum: 18/05/03 To: 18/05/03 21st century dates: 01/01/00-31/12/69

The default lower date has been set to 01/01/01 in order to exclude old data from the calculation. If this is accepted, 5 days will be excluded. The minimum date may be manually set to any date down to the lowest date shown which will have the effect of including some or all of these days. The default cut-off is set in Settings from the Main Menu (note for TRICS 6.2.1 this date is preset to 01/01/00 until changed by the user).

**Survey Types to include**

Survey type	No. of surveys	Include
Manual count	10	<input checked="" type="checkbox"/>
Directional ATC Count		<input checked="" type="checkbox"/>

**GFA not in use statistics**

Include "GFA not in use" in GFA trip rate calculations	YES
Number of selected surveys that include a known "GFA not in use" figure	0
Number of surveys that do not have this information available	10

**Week days to include**

Day of week	No. of surveys	Include
Monday	2	<input checked="" type="checkbox"/>
Tuesday	1	<input checked="" type="checkbox"/>
Wednesday		<input checked="" type="checkbox"/>
Thursday		<input checked="" type="checkbox"/>
Friday	3	<input checked="" type="checkbox"/>
Saturday	3	<input checked="" type="checkbox"/>
Sunday	1	<input checked="" type="checkbox"/>

**Location Types to include**

	No. of surveys	Include
Town Centre	1	<input checked="" type="checkbox"/>
Edge of Town Centre		<input checked="" type="checkbox"/>
Suburban Area	4	<input checked="" type="checkbox"/>
Edge of Town	5	<input checked="" type="checkbox"/>
Neighbourhood Centre		<input checked="" type="checkbox"/>
Free Standing		<input checked="" type="checkbox"/>
Not Known		<input checked="" type="checkbox"/>
<b>Sub-categories</b>		
Industrial Zone	1	<input checked="" type="checkbox"/>
Commercial Zone		<input checked="" type="checkbox"/>
Development Zone		<input checked="" type="checkbox"/>
Retail Zone		<input checked="" type="checkbox"/>
Residential Zone	6	<input checked="" type="checkbox"/>
Built-Up Zone		<input checked="" type="checkbox"/>
Village		<input checked="" type="checkbox"/>
Out of Town		<input checked="" type="checkbox"/>
High Street	1	<input checked="" type="checkbox"/>
No Sub Category	2	<input checked="" type="checkbox"/>

## FRIDAY

An analysis of these figures on a Friday shows the following daily profile with peak generation occurring between 11AM and 12noon.

TRICS MAIN MENU ► INITIAL PARAMETERS ► MAIN PARAMETERS ► SECONDARY PARAMETERS ► TR									
Land Use 01 - RETAIL L - BUILDER'S MERCHANTS									
<a href="#">Graph</a> <a href="#">Rank</a> <a href="#">Copy Data</a> <a href="#">Print</a> <a href="#">Selection</a> <a href="#">Help</a> <a href="#">Previous Screen</a>									
VEHICLES <input type="checkbox"/> Estimate TRIP rates									
TRIP RATE VALUE PER 100 SQM	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00-01:00	0	0	0.000	0	0	0.000	0	0	0.000
01:00-02:00	0	0	0.000	0	0	0.000	0	0	0.000
02:00-03:00	0	0	0.000	0	0	0.000	0	0	0.000
03:00-04:00	0	0	0.000	0	0	0.000	0	0	0.000
04:00-05:00	0	0	0.000	0	0	0.000	0	0	0.000
05:00-06:00	0	0	0.000	0	0	0.000	0	0	0.000
06:00-07:00	0	0	0.000	0	0	0.000	0	0	0.000
07:00-08:00	3	997	1.237	3	997	0.669	3	997	1.906
08:00-09:00	3	997	2.107	3	997	1.906	3	997	4.013
09:00-10:00	3	997	2.074	3	997	2.341	3	997	4.415
10:00-11:00	3	997	2.441	3	997	2.274	3	997	4.715
11:00-12:00	3	997	2.609	3	997	3.043	3	997	5.652
12:00-13:00	3	997	2.207	3	997	2.074	3	997	4.281
13:00-14:00	3	997	1.839	3	997	2.007	3	997	3.846
14:00-15:00	3	997	2.508	3	997	2.241	3	997	4.749
15:00-16:00	3	997	1.438	3	997	1.839	3	997	3.277
16:00-17:00	3	997	1.338	3	997	1.304	3	997	2.642
17:00-18:00	3	997	0.334	3	997	0.468	3	997	0.802
18:00-19:00	0	0	0.000	0	0	0.000	0	0	0.000
19:00-20:00	0	0	0.000	0	0	0.000	0	0	0.000
20:00-21:00	0	0	0.000	0	0	0.000	0	0	0.000
21:00-22:00	0	0	0.000	0	0	0.000	0	0	0.000
22:00-23:00	0	0	0.000	0	0	0.000	0	0	0.000
23:00-24:00	0	0	0.000	0	0	0.000	0	0	0.000

## FRIDAY – SITE PEAK HOUR

As this analysis comprises a number of sites, the individual sites can be ranked as to the trip generating abilities. This shows a wide range of values from 2.6 trips per 100sq.m. GFA to 7.7 trips per 100sq.m.

The AM & PM Network peak hours are also investigated.

TRICS

MAIN MENU ▶ INITIAL PARAMETERS ▶ MAIN PARAMETERS ▶ SECONDARY PARAMETERS ▶ TRIP RATE ▶ RANK

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Land Use

01 - RETAIL L - BUILDER'S MERCHANTS

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VEHICLES

Rank order for: Gross floor area

Calculated on: TOTALS

Time range: 11:00-12:00

Total: 3

15th and 85th percentile trip rates cannot be highlighted in selected data sets of under 6 survey days

Note

WARNING: Using 85th and 15th percentile highlighted trip rates in data sets of under 20 surveys is not recommended by TRICS, and may be misleading.

Sorted by Trip Rate

☐ Arrivals

☐ Departures

☒ Totals

							TRIP RATE			
Rank	Site Ref	Description	Area	GFA	Day	Date	Arrivals	Departures	Totals	Tri
1	WM-01-L-01	BUILDERS MERCH., BIRMINGHAM	WEST MIDLANDS	600	Friday	16/05/03	3.500	4.167	7.667	
2	SC-01-L-01	BUILDER CENTRE, LEATHERHEAD	SURREY	1390	Friday	15/11/02	3.237	3.741	6.978	
3	WO-01-L-01	JEWSON, BROMSGROVE	WORCESTERSHIRE	1000	Friday	25/04/03	1.200	1.400	2.600	

## FRIDAY – AM PEAK HOUR

TRICS

MAIN MENU ▶ INITIAL PARAMETERS ▶ MAIN PARAMETERS ▶ SECONDARY PARAMETERS ▶ TRIP RATE ▶ RANK

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Land Use

01 - RETAIL L - BUILDER'S MERCHANTS

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VEHICLES

Rank order for: Gross floor area

Calculated on: TOTALSTime range: 08:00-09:00

Total: 315th and 85th percentile trip rates cannot be highlighted in selected data sets of under 6 survey days

Note

WARNING: Using 85th and 15th percentile highlighted trip rates in data sets of under 20 surveys is not recommended by TRICS, and may be misleading.

Sorted by Trip Rate

☐ Arrivals

☐ Departures

☒ Totals

							TRIP RATE			
Rank	Site Ref	Description	Area	GFA	Day	Date	Arrivals	Departures	Totals	Tri
1	WM-01-L-01	BUILDERS MERCH., BIRMINGHAM	WEST MIDLANDS	600	Friday	16/05/03	2.833	2.333	5.166	
2	SC-01-L-01	BUILDER CENTRE, LEATHERHEAD	SURREY	1390	Friday	15/11/02	2.230	2.230	4.460	
3	WO-01-L-01	JEWSON, BROMSGROVE	WORCESTERSHIRE	1000	Friday	25/04/03	1.500	1.200	2.700	

## FRIDAY – PM PEAK HOUR

TRICS

MAIN MENU ▶ INITIAL PARAMETERS ▶ MAIN PARAMETERS ▶ SECONDARY PARAMETERS ▶ TRIP RATE ▶ RANK

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Land Use

01 - RETAIL L - BUILDER'S MERCHANTS

Graph

Geographic Map

Recalc Rank

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VEHICLES

Rank order for: Gross floor area

Calculated on: TOTALS

Time range: 17:00-18:00

Total: 3

15th and 85th percentile trip rates cannot be highlighted in selected data sets of under 6 survey days

Note

WARNING: Using 85th and 15th percentile highlighted trip rates in data sets of under 20 surveys is not recommended by TRICS, and may be misleading.

Sorted by Trip Rate

☐ Arrivals

☐ Departures

☒ Totals

							TRIP RATE			
Rank	Site Ref	Description	Area	GFA	Day	Date	Arrivals	Departures	Totals	Tr
1	WO-01-L-01	JEWSON, BROMSGROVE	WORCESTERSHIRE	1000	Friday	25/04/03	0.800	1.200	2.000	
2	WM-01-L-01	BUILDERS MERCH., BIRMINGHAM	WEST MIDLANDS	600	Friday	16/05/03	0.333	0.333	0.666	
3	SC-01-L-01	BUILDER CENTRE, LEATHERHEAD	SURREY	1390	Friday	15/11/02	0.000	0.000	0.000	

## SATURDAY

An analysis of the figures on a Saturday shows the following daily profile with peak generation occurring between 9AM and 10AM.

TRICS	MAIN MENU ▶ INITIAL PARAMETERS ▶ MAIN PARAMETERS ▶ SECONDARY PARAMETERS ▶ TR										
Land Use	01 - RETAIL L - BUILDER'S MERCHANTS										
Graph	Rank	Copy Data	Print	Selection	Help	Previous Screen					
VEHICLES											<input type="checkbox"/> Estimate TRIP rates
TRIP RATE VALUE PER 100 SQM	ARRIVALS			DEPARTURES			TOTALS				
	Total rate: 15.760 Peak: 09:00-10:00			Total rate: 16.497 Peak: 09:00-10:00			Total rate: 32.257 Peak: 09:00-10:00				
	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate		
00:00-01:00	0	0	0.000	0	0	0.000	0	0	0.000		
01:00-02:00	0	0	0.000	0	0	0.000	0	0	0.000		
02:00-03:00	0	0	0.000	0	0	0.000	0	0	0.000		
03:00-04:00	0	0	0.000	0	0	0.000	0	0	0.000		
04:00-05:00	0	0	0.000	0	0	0.000	0	0	0.000		
05:00-06:00	0	0	0.000	0	0	0.000	0	0	0.000		
06:00-07:00	0	0	0.000	0	0	0.000	0	0	0.000		
07:00-08:00	3	997	0.769	3	997	0.435	3	997	1.204		
08:00-09:00	3	997	1.839	3	997	1.672	3	997	3.511		
09:00-10:00	3	997	2.308	3	997	2.508	3	997	4.816		
10:00-11:00	3	997	2.274	3	997	2.274	3	997	4.548		
11:00-12:00	3	997	2.074	3	997	2.375	3	997	4.449		
12:00-13:00	3	997	1.973	3	997	2.107	3	997	4.080		
13:00-14:00	2	995	1.357	2	995	1.658	2	995	3.015		
14:00-15:00	2	995	1.608	2	995	1.307	2	995	2.915		
15:00-16:00	2	995	1.156	2	995	1.357	2	995	2.513		
16:00-17:00	2	995	0.352	2	995	0.653	2	995	1.005		
17:00-18:00	2	995	0.050	2	995	0.151	2	995	0.201		
18:00-19:00	1	1390	0.000	1	1390	0.000	1	1390	0.000		
19:00-20:00	0	0	0.000	0	0	0.000	0	0	0.000		
20:00-21:00	0	0	0.000	0	0	0.000	0	0	0.000		
21:00-22:00	0	0	0.000	0	0	0.000	0	0	0.000		
22:00-23:00	0	0	0.000	0	0	0.000	0	0	0.000		
23:00-24:00	0	0	0.000	0	0	0.000	0	0	0.000		

## SATURDAY – SITE PEAK HOUR

Again the individual sites within this land use can be ranked according to their traffic generating capabilities. This shows a range of values from 4 trips per 100sq.m. GFA to 4.5 trips per 100sq.m.

TRICS

MAIN MENU ▶ INITIAL PARAMETERS ▶ MAIN PARAMETERS ▶ SECONDARY PARAMETERS ▶ TRIP RATE ▶ RANK

Help Desk

Log Out

Off-Line Ver

Land Use

01 - RETAIL L - BUILDER'S MERCHANTS

Graph

Geographic Map

Recalc Rank

Copy Data

Print

Help

Previous Screen

Search

VEHICLES

Rank order for: Gross floor area

Calculated on: TOTALS

Time range: 09:00-10:00

Total: 3

15th and 85th percentile trip rates cannot be highlighted in selected data sets of under 6 survey days

Note

WARNING: Using 85th and 15th percentile highlighted trip rates in data sets of under 20 surveys is not recommended by TRICS, and may be misleading.

Sorted by Trip Rate

☐ Arrivals

☐ Departures

☒ Totals

							TRIP RATE			
Rank	Site Ref	Description	Area	GFA	Day	Date	Arrivals	Departures	Totals	T
1	SC-01-L-01	BUILDER CENTRE, LEATHERHEAD	SURREY	1390	Saturday	16/11/02	2.662	2.878	5.540	
2	WM-01-L-01	BUILDERS MERCH., BIRMINGHAM	WEST MIDLANDS	600	Saturday	17/05/03	2.167	2.333	4.500	
3	WO-01-L-01	JEWSON, BROMSGROVE	WORCESTERSHIRE	1000	Saturday	26/04/03	1.900	2.100	4.000	



## Appendix D

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### Detailed TRICS analysis – Person Trips



## PERSON TRIPS - DIY with garden Centre - WEEKEND

Land Use 01 - RETAIL D - DIY SUPERSTORE - WITH GARDEN CENTRE									
Graph	Rank	Copy Data	Print	MM Selection	Modal split	Help	Previous Screen		
MULTI-MODAL TOTAL PEOPLE								<input type="checkbox"/> Estimate TRIP rates	
TRIP RATE VALUE PER 100 SQM	ARRIVALS			DEPARTURES			TOTALS		
	Total rate: 59.154 Peak: 14:00-15:00			Total rate: 60.030 Peak: 15:00-16:00			Total rate: 119.184 Peak: 14:00-15:00		
	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00-01:00	0	0	0.000	0	0	0.000	0	0	0.000
01:00-02:00	0	0	0.000	0	0	0.000	0	0	0.000
02:00-03:00	0	0	0.000	0	0	0.000	0	0	0.000
03:00-04:00	0	0	0.000	0	0	0.000	0	0	0.000
04:00-05:00	0	0	0.000	0	0	0.000	0	0	0.000
05:00-06:00	0	0	0.000	0	0	0.000	0	0	0.000
06:00-07:00	0	0	0.000	0	0	0.000	0	0	0.000
07:00-08:00	4	5598	0.487	4	5598	0.299	4	5598	0.786
08:00-09:00	5	4983	1.489	5	4983	0.951	5	4983	2.440
09:00-10:00	7	4558	2.714	7	4558	1.987	7	4558	4.701
10:00-11:00	8	4588	5.326	8	4588	4.016	8	4588	9.342
11:00-12:00	8	4588	6.912	8	4588	5.915	8	4588	12.827
12:00-13:00	8	4588	6.833	8	4588	6.806	8	4588	13.639
13:00-14:00	8	4588	7.105	8	4588	6.877	8	4588	13.982
14:00-15:00	8	4588	7.827	8	4588	7.795	8	4588	15.622
15:00-16:00	8	4588	7.550	8	4588	7.827	8	4588	15.377
16:00-17:00	8	4588	4.670	8	4588	6.005	8	4588	10.675
17:00-18:00	5	4983	4.162	5	4983	5.422	5	4983	9.584
18:00-19:00	5	4983	2.793	5	4983	3.419	5	4983	6.212
19:00-20:00	4	5598	1.201	4	5598	2.090	4	5598	3.291
20:00-21:00	4	5598	0.085	4	5598	0.621	4	5598	0.706
21:00-22:00	0	0	0.000	0	0	0.000	0	0	0.000
22:00-23:00	0	0	0.000	0	0	0.000	0	0	0.000
23:00-24:00	0	0	0.000	0	0	0.000	0	0	0.000

## Person Trips – DIY without garden Centre – WEEKEND

Land Use

01 - RETAIL E - DIY SUPERSTORE - WITHOUT GARDEN CENT

Graph

Rank

Copy Data

Print

MM Selection

Modal split

Help

Previous Screen

MULTI-MODAL


TOTAL PEOPLE


☐ Estimate TRIP rates


TRIP RATE VALUE PER 100 SQM	ARRIVALS			DEPARTURES			TOTALS		
	Total rate: 181.276 Peak: 15:00-16:00			Total rate: 181.281 Peak: 13:00-14:00			Total rate: 362.557 Peak: 12:00-13:00		
	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00-01:00	0	0	0.000	0	0	0.000	0	0	0.000
01:00-02:00	0	0	0.000	0	0	0.000	0	0	0.000
02:00-03:00	0	0	0.000	0	0	0.000	0	0	0.000
03:00-04:00	0	0	0.000	0	0	0.000	0	0	0.000
04:00-05:00	0	0	0.000	0	0	0.000	0	0	0.000
05:00-06:00	0	0	0.000	0	0	0.000	0	0	0.000
06:00-07:00	0	0	0.000	0	0	0.000	0	0	0.000
07:00-08:00	1	1840	0.870	1	1840	0.380	1	1840	1.250
08:00-09:00	2	970	4.948	2	970	3.608	2	970	8.556
09:00-10:00	2	970	12.835	2	970	10.103	2	970	22.938
10:00-11:00	2	970	16.907	2	970	16.289	2	970	33.196
11:00-12:00	2	970	21.598	2	970	20.825	2	970	42.423
12:00-13:00	2	970	22.784	2	970	21.443	2	970	44.227
13:00-14:00	2	970	19.588	2	970	22.062	2	970	41.650
14:00-15:00	2	970	22.216	2	970	21.856	2	970	44.072
15:00-16:00	2	970	23.918	2	970	18.969	2	970	42.887
16:00-17:00	2	970	19.278	2	970	21.340	2	970	40.618
17:00-18:00	2	970	10.464	2	970	15.928	2	970	26.392
18:00-19:00	1	1840	4.185	1	1840	5.543	1	1840	9.728
19:00-20:00	1	1840	1.685	1	1840	2.935	1	1840	4.620
20:00-21:00	0	0	0.000	0	0	0.000	0	0	0.000
21:00-22:00	0	0	0.000	0	0	0.000	0	0	0.000
22:00-23:00	0	0	0.000	0	0	0.000	0	0	0.000
23:00-24:00	0	0	0.000	0	0	0.000	0	0	0.000


## Other Individual Non Food Superstore Weekday


Land Use 01 - RETAIL G - OTHER INDIVIDUAL NON-FOOD SUPERSTORE


Graph


Rank


Copy Data

Print

MM Selection

Modal split

Help









Previous Screen

MULTI-MODAL TOTAL PEOPLE

☐ Estimate TRIP rates

TRIP RATE VALUE PER 100 SQM	ARRIVALS			DEPARTURES			TOTALS		
	Total rate: 8.832 Peak: 13:00-14:00			Total rate: 8.499 Peak: 12:00-13:00			Total rate: 17.331 Peak: 17:00-18:00		
	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00-01:00	0	0	0.000	0	0	0.000	0	0	0.000
01:00-02:00	0	0	0.000	0	0	0.000	0	0	0.000
02:00-03:00	0	0	0.000	0	0	0.000	0	0	0.000
03:00-04:00	0	0	0.000	0	0	0.000	0	0	0.000
04:00-05:00	0	0	0.000	0	0	0.000	0	0	0.000
05:00-06:00	0	0	0.000	0	0	0.000	0	0	0.000
06:00-07:00	0	0	0.000	0	0	0.000	0	0	0.000
07:00-08:00	0	0	0.000	0	0	0.000	0	0	0.000
08:00-09:00	0	0	0.000	0	0	0.000	0	0	0.000
09:00-10:00	0	0	0.000	0	0	0.000	0	0	0.000
10:00-11:00	1	600	1.000	1	600	1.000	1	600	2.000
11:00-12:00	1	600	1.167	1	600	0.667	1	600	1.834
12:00-13:00	1	600	1.000	1	600	1.333	1	600	2.333
13:00-14:00	1	600	1.333	1	600	1.167	1	600	2.500
14:00-15:00	1	600	0.833	1	600	0.833	1	600	1.666
15:00-16:00	1	600	0.833	1	600	0.833	1	600	1.666
16:00-17:00	1	600	0.333	1	600	0.333	1	600	0.666
17:00-18:00	1	600	1.333	1	600	1.333	1	600	2.666
18:00-19:00	1	600	0.500	1	600	0.667	1	600	1.167
19:00-20:00	1	600	0.500	1	600	0.333	1	600	0.833
20:00-21:00	0	0	0.000	0	0	0.000	0	0	0.000
21:00-22:00	0	0	0.000	0	0	0.000	0	0	0.000
22:00-23:00	0	0	0.000	0	0	0.000	0	0	0.000
23:00-24:00	0	0	0.000	0	0	0.000	0	0	0.000

## Other Individual Non Food Superstore Weekend

Land Use 01 - RETAIL G - OTHER INDIVIDUAL NON-FOOD SUPERSTORE									
									
Graph	Rank	Copy Data	Print	MM Selection	Modal split	Help	Previous Screen		
MULTI-MODAL TOTAL PEOPLE								<input type="checkbox"/> Estimate TRIP rates	
TRIP RATE VALUE PER 100 SQM	ARRIVALS			DEPARTURES			TOTALS		
	Total rate: 45.838 Peak: 14:00-15:00			Total rate: 45.610 Peak: 14:00-15:00			Total rate: 91.448 Peak: 14:00-15:00		
	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00-01:00	0	0	0.000	0	0	0.000	0	0	0.000
01:00-02:00	0	0	0.000	0	0	0.000	0	0	0.000
02:00-03:00	0	0	0.000	0	0	0.000	0	0	0.000
03:00-04:00	0	0	0.000	0	0	0.000	0	0	0.000
04:00-05:00	0	0	0.000	0	0	0.000	0	0	0.000
05:00-06:00	0	0	0.000	0	0	0.000	0	0	0.000
06:00-07:00	0	0	0.000	0	0	0.000	0	0	0.000
07:00-08:00	2	1650	0.000	2	1650	0.000	2	1650	0.000
08:00-09:00	2	1650	0.212	2	1650	0.000	2	1650	0.212
09:00-10:00	4	1275	2.588	4	1275	1.196	4	1275	3.784
10:00-11:00	4	1275	4.647	4	1275	3.216	4	1275	7.863
11:00-12:00	4	1275	6.196	4	1275	5.431	4	1275	11.627
12:00-13:00	4	1275	6.843	4	1275	6.686	4	1275	13.529
13:00-14:00	4	1275	6.902	4	1275	7.157	4	1275	14.059
14:00-15:00	4	1275	7.157	4	1275	7.667	4	1275	14.824
15:00-16:00	4	1275	4.922	4	1275	6.745	4	1275	11.667
16:00-17:00	4	1275	3.980	4	1275	4.275	4	1275	8.255
17:00-18:00	4	1275	2.118	4	1275	3.176	4	1275	5.294
18:00-19:00	2	1650	0.273	2	1650	0.061	2	1650	0.334
19:00-20:00	1	1000	0.000	1	1000	0.000	1	1000	0.000
20:00-21:00	1	1000	0.000	1	1000	0.000	1	1000	0.000
21:00-22:00	1	1000	0.000	1	1000	0.000	1	1000	0.000
22:00-23:00	0	0	0.000	0	0	0.000	0	0	0.000
23:00-24:00	0	0	0.000	0	0	0.000	0	0	0.000