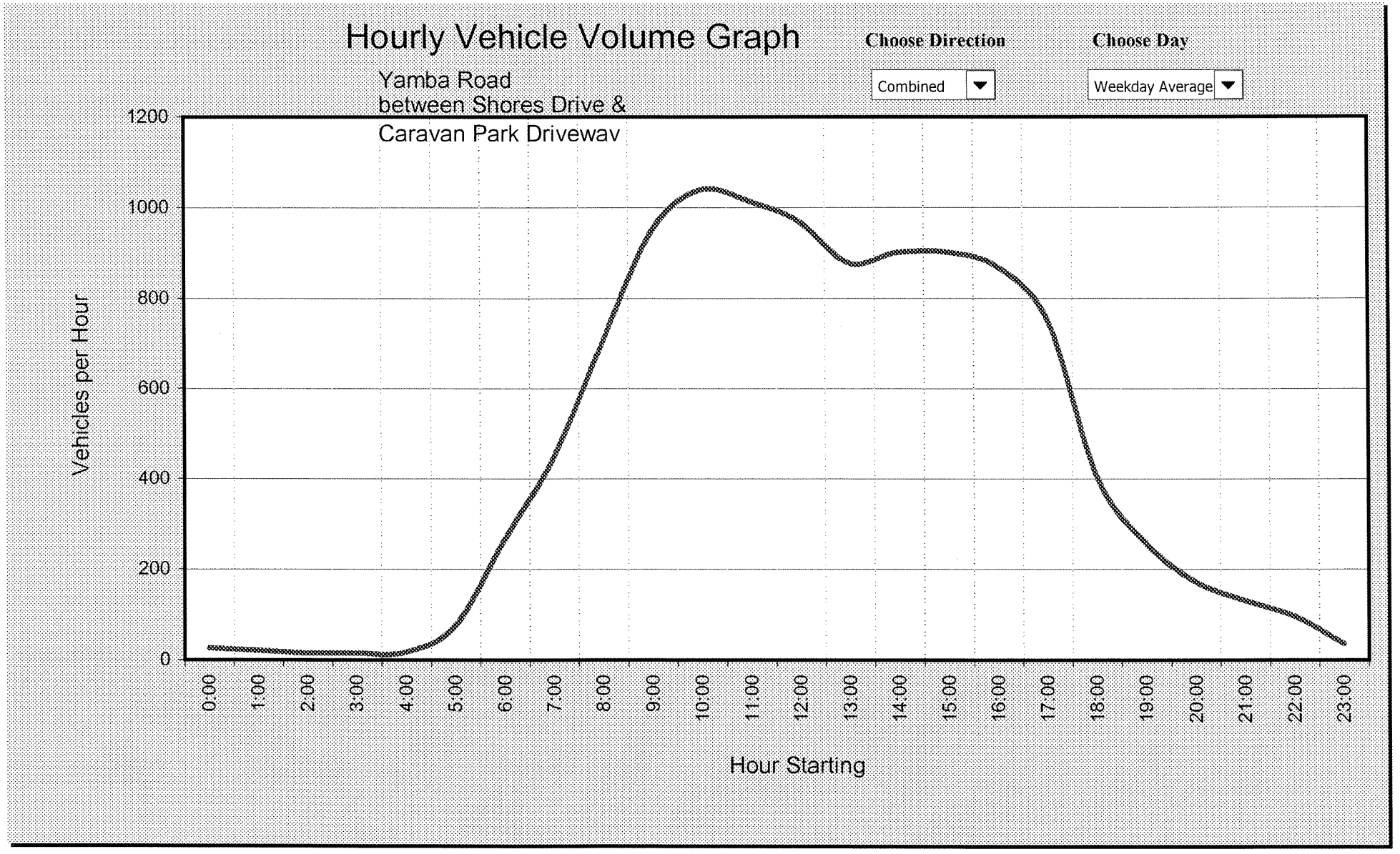
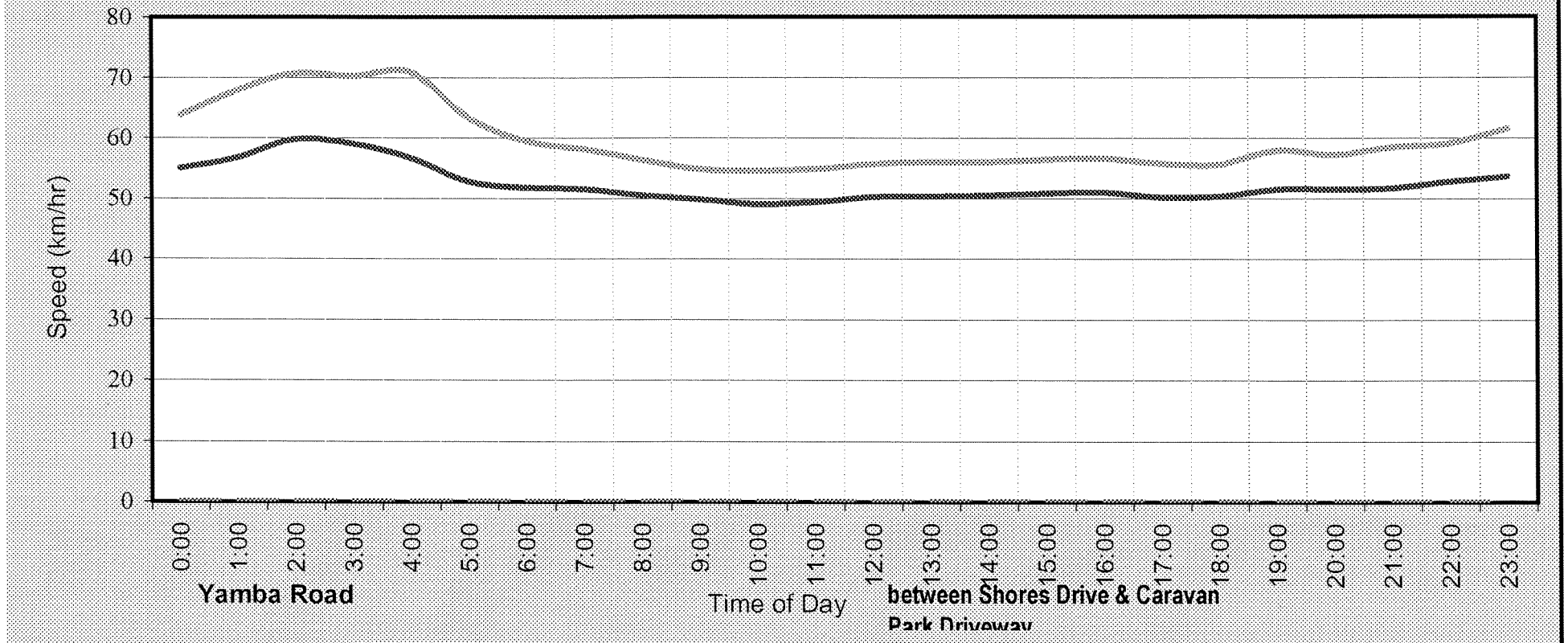

Hourly Vehicle Volume Graph
Choose Direction
Combined
Choose Day
Weekday Average
Yamba Road
between Shores Drive &
Caravan Park Drivewav
Vehicles per Hour
1200
1000
800
600
400
200
0
0:00
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
Hour Starting

Hourly Speed Data

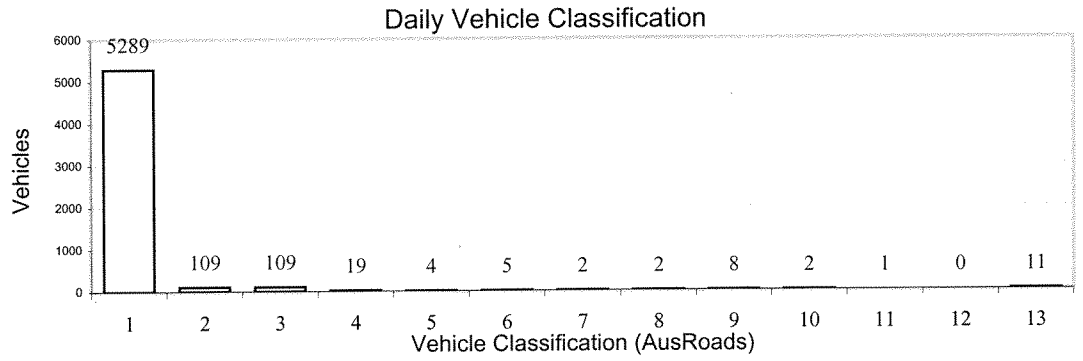
Free Speed		All Vehicles	
Ave. Speed	0.0	Ave. Speed	50.4
85%ile	0	85%ile	56
Vehicles/Day		Vehicles/Day	5534

Direction: Eastbound

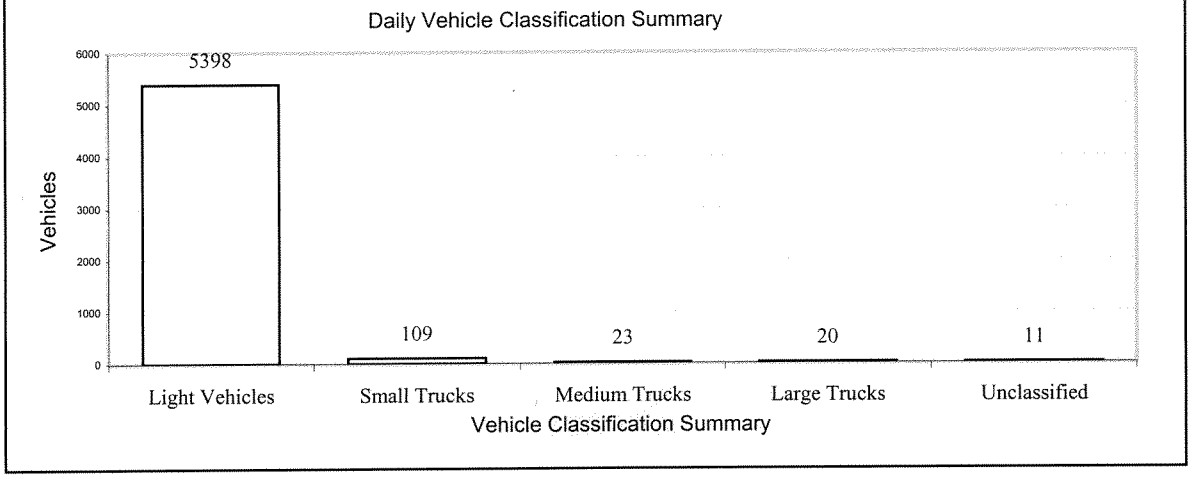
Day: 7-Day Average



Classified Graph



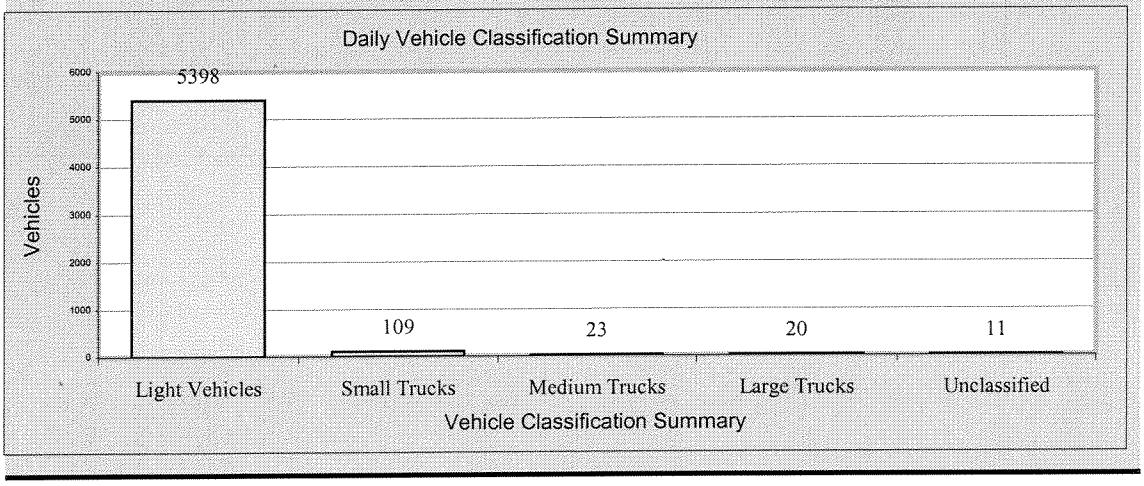
Summarised Classified Data



AUSTRALASIAN TRAFFIC SURVEYS

Road	Yamba Road	Light Vehicles		97.1%
Location	between Shores Drive & Caravan Park Driveway	Small Trucks		2.0%
Site No.	1	Medium Trucks		0.4%
Direction	Eastbound	Large Trucks		0.4%
Day	Friday	Unclassified		0.2%
Start Date	Friday	AM Peak	10:00	527
Date	14-Apr-06	PM Peak	12:00	464

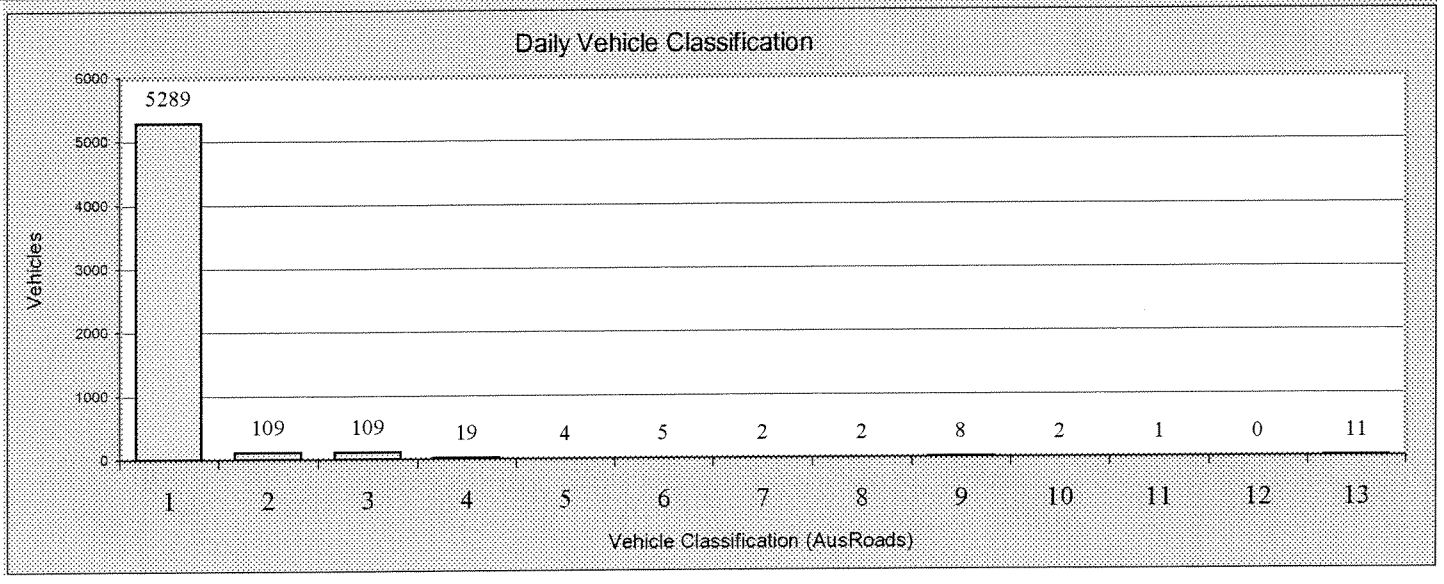
Time Starting	Vehicle Classification					Hour Total
	Light Vehicles	Small Trucks	Medium Trucks	Large Trucks	Unclassified	
0:00	8	0	0	0	0	8
1:00	8	0	0	0	0	8
2:00	5	0	0	0	0	5
3:00	2	0	0	1	0	3
4:00	12	0	0	0	0	12
5:00	49	4	0	0	0	53
6:00	178	5	1	1	0	185
7:00	281	11	2	2	0	296
8:00	406	10	7	2	1	426
9:00	485	12	4	3	0	504
10:00	515	9	2	1	0	527
11:00	452	5	2	0	2	461
12:00	449	8	3	2	2	464
13:00	390	7	0	1	2	400
14:00	423	10	0	1	3	437
15:00	437	4	1	1	0	443
16:00	440	8	0	1	1	450
17:00	375	5	0	1	0	381
18:00	222	5	0	0	0	227
19:00	108	1	1	0	0	110
20:00	66	1	0	2	0	69
21:00	46	0	0	1	0	47
22:00	30	4	0	0	0	34
23:00	11	0	0	0	0	11
Total	5398	109	23	20	11	5561



AUSTRALASIAN TRAFFIC SURVEYS

Road	Yamba Road	AADT	5,561
Location	between Shores Drive & Caravan Park Driveway	Ave Speed	51.2
Site No.	1	85%ile	57
Direction	Eastbound	% Heavy's	2.7%
Day	Friday	AM Peak	10:00 527
Date	14/04/2006	PM Peak	12:00 464
Start Date	Friday 14/04/2006		

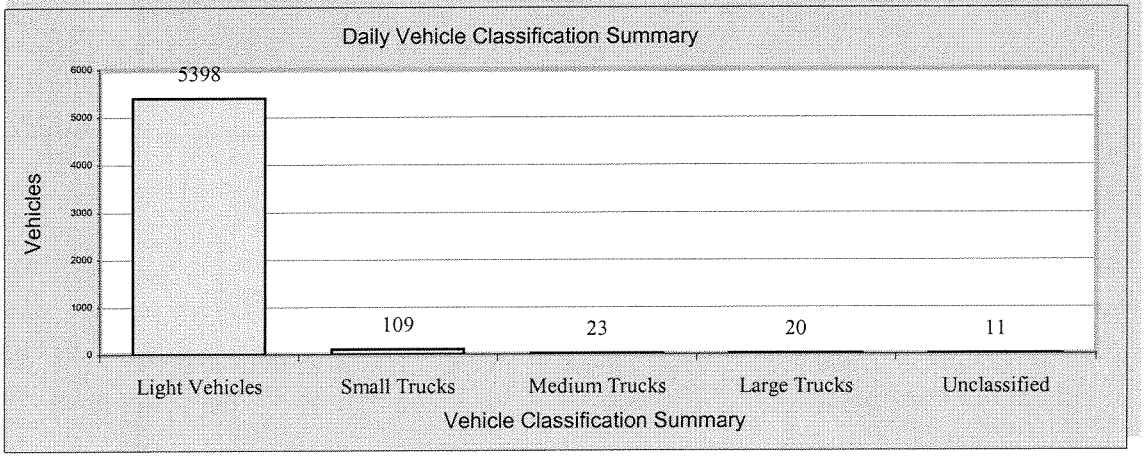
Time Starting	Vehicle Classification													Hour Total	Speed	
	1	2	3	4	5	6	7	8	9	10	11	12	13		Ave.	85%ile
0:00	8	0	0	0	0	0	0	0	0	0	0	0	0	8	55.9	61
1:00	8	0	0	0	0	0	0	0	0	0	0	0	0	8	58.2	67
2:00	5	0	0	0	0	0	0	0	0	0	0	0	0	5	57.1	67
3:00	2	0	0	0	0	0	0	0	0	1	0	0	0	3	63.2	77
4:00	11	1	0	0	0	0	0	0	0	0	0	0	0	12	53.3	67
5:00	43	6	4	0	0	0	0	0	0	0	0	0	0	53	52.7	64
6:00	170	8	5	1	0	0	0	0	1	0	0	0	0	185	52.5	60
7:00	269	12	11	2	0	1	0	0	0	1	0	0	0	296	52.2	59
8:00	394	12	10	5	2	1	0	0	1	0	0	0	1	426	51.0	57
9:00	474	11	12	3	1	0	0	1	1	0	1	0	0	504	50.7	56
10:00	507	8	9	2	0	0	0	0	1	0	0	0	0	527	50.8	56
11:00	445	7	5	2	0	0	0	0	0	0	0	0	2	461	50.8	56
12:00	438	11	8	2	1	0	1	0	1	0	0	0	2	464	50.4	56
13:00	383	7	7	0	0	1	0	0	0	0	0	0	2	400	51.4	57
14:00	419	4	10	0	0	1	0	0	0	0	0	0	3	437	50.7	56
15:00	431	6	4	1	0	0	0	0	1	0	0	0	0	443	51.5	57
16:00	433	7	8	0	0	0	0	0	1	0	0	0	1	450	51.5	57
17:00	371	4	5	0	0	0	0	1	0	0	0	0	0	381	51.0	57
18:00	221	1	5	0	0	0	0	0	0	0	0	0	0	227	50.7	56
19:00	106	2	1	1	0	0	0	0	0	0	0	0	0	110	51.5	58
20:00	65	1	1	0	0	0	1	0	1	0	0	0	0	69	51.8	57
21:00	46	0	0	0	0	1	0	0	0	0	0	0	0	47	54.8	61
22:00	29	1	4	0	0	0	0	0	0	0	0	0	0	34	53.4	59
23:00	11	0	0	0	0	0	0	0	0	0	0	0	0	11	54.2	60
Total	5289	109	109	19	4	5	2	2	8	2	1	0	11	5561	51.2	57
%Class	95	2	2	0	0	0	0	0	0	0	0	0	0			



AUSTRALASIAN TRAFFIC SURVEYS

Road	Yamba Road	Light Vehicles		97.1%
Location	between Shores Drive & Caravan Park Driveway	Small Trucks		2.0%
Site No.	1	Medium Trucks		0.4%
Direction	Eastbound	Large Trucks		0.4%
Day	Friday	Unclassified		0.2%
Start Date	Friday	AM Peak	10:00	527
Date	14-Apr-06	PM Peak	12:00	464

Time Starting	Vehicle Classification					Hour Total
	Light Vehicles	Small Trucks	Medium Trucks	Large Trucks	Unclassified	
0:00	8	0	0	0	0	8
1:00	8	0	0	0	0	8
2:00	5	0	0	0	0	5
3:00	2	0	0	1	0	3
4:00	12	0	0	0	0	12
5:00	49	4	0	0	0	53
6:00	178	5	1	1	0	185
7:00	281	11	2	2	0	296
8:00	406	10	7	2	1	426
9:00	485	12	4	3	0	504
10:00	515	9	2	1	0	527
11:00	452	5	2	0	2	461
12:00	449	8	3	2	2	464
13:00	390	7	0	1	2	400
14:00	423	10	0	1	3	437
15:00	437	4	1	1	0	443
16:00	440	8	0	1	1	450
17:00	375	5	0	1	0	381
18:00	222	5	0	0	0	227
19:00	108	1	1	0	0	110
20:00	66	1	0	2	0	69
21:00	46	0	0	1	0	47
22:00	30	4	0	0	0	34
23:00	11	0	0	0	0	11
Total	5398	109	23	20	11	5561

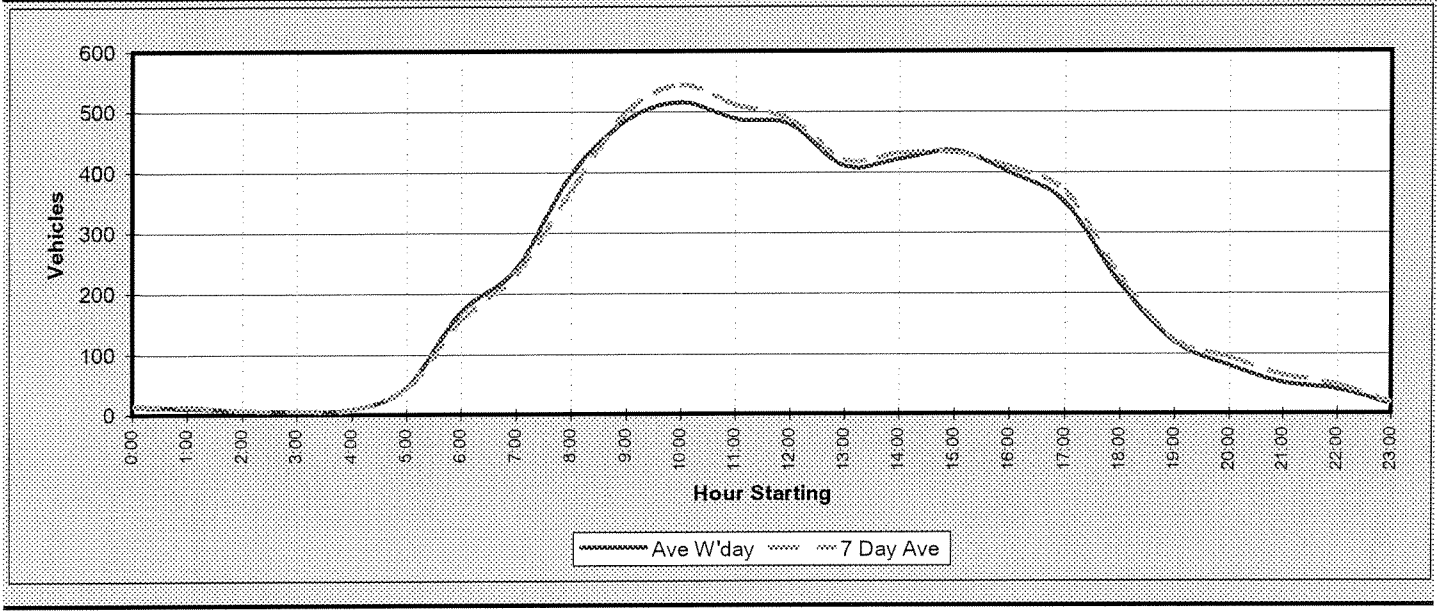


AUSTRALASIAN TRAFFIC SURVEYS

Road	Yamba Road
Location	between Shores Drive & Caravan Park Driveway
Site No.	1
Start Date	Friday 14-Apr-06
Direction	Eastbound

Average Weekday	5390
7 Day Average	5534
Weekday Heavy's	2.4%
7 Day Heavy's	2.1%

	Day of Week							Ave	7 Day
	Mon	Tue	Wed	Thu	Fri	Sat	Sun	W'day	Ave
Time	17-Apr	18-Apr	19-Apr	20-Apr	14-Apr	15-Apr	16-Apr		
AM Peak	525	512	564	535	527	527	713		
PM Peak	524	405	490	517	464	448	572		
0:00	22	15	8	9	8	19	30	12	16
1:00	22	8	7	7	8	17	24	10	13
2:00	15	2	3	9	5	10	10	7	8
3:00	13	5	2	4	3	11	6	5	6
4:00	5	8	10	6	12	10	9	8	9
5:00	35	38	42	52	53	46	47	44	45
6:00	174	116	182	191	185	115	128	170	156
7:00	149	158	306	294	296	194	242	241	234
8:00	275	273	496	506	426	265	346	395	370
9:00	408	418	564	535	504	477	590	486	499
10:00	525	496	520	506	527	527	713	515	545
11:00	514	512	479	474	461	503	640	488	512
12:00	524	405	482	517	464	448	572	478	487
13:00	416	354	444	430	400	413	483	409	420
14:00	407	350	438	470	437	420	496	420	431
15:00	398	395	490	446	443	399	453	434	432
16:00	332	361	434	417	450	419	449	399	409
17:00	258	293	401	409	381	433	390	348	366
18:00	211	160	232	245	227	209	297	215	226
19:00	123	79	117	167	110	123	142	119	123
20:00	98	58	82	92	69	129	129	80	94
21:00	55	40	51	62	47	110	87	51	65
22:00	32	35	17	84	34	64	77	40	49
23:00	18	6	10	28	11	33	30	15	19
Total	5029	4585	5817	5960	5561	5394	6390	5390	5534
% Heavies	1.8%	1.7%	2.7%	2.8%	2.7%	1.6%	1.6%	2.4%	2.1%



To	Colin Henson	Reference number	85502/TPB
cc		File reference	
From	Tim Bryant x 449 (Syd/Mel)	Date	19 June 2006
Subject	Yamba Sidra Results		

Movement Summary

Western Access

AM, no use of shoulder lanes

Give-way

Vehicle Movements

Mov No	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
East Approach										
5	T	505	0.0	0.259	0.0	LOS A	0	0.00	0.00	50.0
Approach		**505**	**0.0**	**0.259**	**0.0**	**LOS A**		**0.00**	**0.00**	**50.0**
North Approach										
7	L	74	0.0	0.115	10.0	LOS A	4	0.52	0.78	40.3
Approach		**74**	**0.0**	**0.115**	**10.0**	**LOS A**	**4**	**0.52**	**0.78**	**40.3**
West Approach										
10	L	8	0.0	0.267	6.4	LOS A	0	0.00	0.61	43.3
11	T	505	0.0	0.263	0.0	LOS A	0	0.00	0.00	50.0
Approach		**513**	**0.0**	**0.263**	**0.1**	**LOS A**		**0.00**	**0.01**	**49.9**
All Vehicles		**1092**	**0.0**	**0.267**	**0.7**	**Not Applicable**	**4**	**0.04**	**0.06**	**49.1**

Movement Summary

Western Access

PM, no use of shoulder lanes

Give-way

Vehicle Movements

Mov No	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
East Approach										
5	T	505	0.0	0.259	0.0	LOS A	0	0.00	0.00	50.0
Approach		**505**	**0.0**	**0.259**	**0.0**	**LOS A**		**0.00**	**0.00**	**50.0**
North Approach										
7	L	8	0.0	0.013	9.9	LOS A	0	0.51	0.70	40.3
Approach		**8**	**0.0**	**0.013**	**9.9**	**LOS A**	**0**	**0.51**	**0.70**	**40.3**
West Approach										
10	L	74	0.0	0.298	6.4	LOS A	0	0.00	0.61	43.3
11	T	505	0.0	0.299	0.0	LOS A	0	0.00	0.00	50.0
Approach		**579**	**0.0**	**0.299**	**0.8**	**LOS A**		**0.00**	**0.08**	**49.0**
All Vehicles		**1092**	**0.0**	**0.299**	**0.5**	**Not Applicable**	**0**	**0.00**	**0.05**	**49.4**

Movement Summary

Eastern Access

AM, no use of shoulder lanes

Give-way

Vehicle Movements

Mov No	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
East Approach										
5	T	505	0.0	0.259	0.0	LOS A	0	0.00	0.00	50.0
Approach		**505**	**0.0**	**0.259**	**0.0**	**LOS A**		**0.00**	**0.00**	**50.0**
North Approach										
7	L	135	0.0	0.212	10.3	LOS B	7	0.55	0.82	40.1
Approach		**135**	**0.0**	**0.211**	**10.3**	**LOS B**	**7**	**0.55**	**0.82**	**40.1**
West Approach										
10	L	15	0.0	0.268	6.4	LOS A	0	0.00	0.61	43.3
11	T	505	0.0	0.267	0.0	LOS A	0	0.00	0.00	50.0
Approach		**520**	**0.0**	**0.267**	**0.2**	**LOS A**		**0.00**	**0.02**	**49.8**
All Vehicles		**1160**	**0.0**	**0.268**	**1.3**	**Not Applicable**	**7**	**0.06**	**0.10**	**48.5**

Movement Summary

Eastern Access

PM, no use of shoulder lanes

Give-way

Vehicle Movements

Mov No	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
East Approach										
5	T	505	0.0	0.259	0.0	LOS A	0	0.00	0.00	50.0
Approach		**505**	**0.0**	**0.259**	**0.0**	**LOS A**		**0.00**	**0.00**	**50.0**
North Approach										
7	L	15	0.0	0.026	10.3	LOS B	1	0.53	0.74	40.0
Approach		**15**	**0.0**	**0.026**	**10.3**	**LOS B**	**1**	**0.53**	**0.74**	**40.0**
West Approach										
10	L	135	0.0	0.332	6.4	LOS A	0	0.00	0.61	43.3
11	T	505	0.0	0.332	0.0	LOS A	0	0.00	0.00	50.0
Approach		**640**	**0.0**	**0.332**	**1.4**	**LOS A**		**0.00**	**0.13**	**48.4**
All Vehicles		**1160**	**0.0**	**0.332**	**0.9**	**Not Applicable**	**1**	**0.01**	**0.08**	**49.0**

Movement Summary

Western Access

AM, occasional use of shoulder

Give-way

Vehicle Movements

Mov No	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
East Approach										
5	T	505	0.0	0.259	0.0	LOS A	0	0.00	0.00	50.0
Approach		**505**	**0.0**	**0.259**	**0.0**	**LOS A**		**0.00**	**0.00**	**50.0**
North Approach										
7	L	74	0.0	0.109	9.6	LOS A	4	0.51	0.76	40.6
Approach		**74**	**0.0**	**0.109**	**9.6**	**LOS A**	**4**	**0.51**	**0.76**	**40.6**
West Approach										
10	L	8	0.0	0.131	6.4	LOS A	0	0.00	0.61	43.3
11	T	505	0.0	0.132	0.0	LOS A	0	0.00	0.00	50.0
Approach		**513**	**0.0**	**0.132**	**0.1**	**LOS A**		**0.00**	**0.01**	**49.9**
All Vehicles		**1092**	**0.0**	**0.259**	**0.7**	**Not Applicable**	**4**	**0.03**	**0.06**	**49.2**

Movement Summary

Western Access

PM, occasional use of shoulder

Give-way

Vehicle Movements

Mov No	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
East Approach										
5	T	505	0.0	0.259	0.0	LOS A	0	0.00	0.00	50.0
Approach		**505**	**0.0**	**0.259**	**0.0**	**LOS A**		**0.00**	**0.00**	**50.0**
North Approach										
7	L	8	0.0	0.012	9.5	LOS A	0	0.50	0.67	40.6
Approach		**8**	**0.0**	**0.012**	**9.5**	**LOS A**	**0**	**0.50**	**0.67**	**40.6**
West Approach										
10	L	74	0.0	0.149	6.4	LOS A	0	0.00	0.61	43.3
11	T	505	0.0	0.149	0.0	LOS A	0	0.00	0.00	50.0
Approach		**579**	**0.0**	**0.149**	**0.8**	**LOS A**		**0.00**	**0.08**	**49.0**
All Vehicles		**1092**	**0.0**	**0.259**	**0.5**	**Not Applicable**	**0**	**0.00**	**0.05**	**49.4**

Movement Summary

Eastern Access

AM, occasional use of shoulder

Give-way

Vehicle Movements

Mov No	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
East Approach										
5	T	505	0.0	0.259	0.0	LOS A	0	0.00	0.00	50.0
Approach		**505**	**0.0**	**0.259**	**0.0**	**LOS A**		**0.00**	**0.00**	**50.0**
North Approach										
7	L	135	0.0	0.200	9.9	LOS A	7	0.53	0.80	40.4
Approach		**135**	**0.0**	**0.200**	**9.9**	**LOS A**	**7**	**0.53**	**0.80**	**40.4**
West Approach										
10	L	15	0.0	0.134	6.4	LOS A	0	0.00	0.61	43.3
11	T	505	0.0	0.134	0.0	LOS A	0	0.00	0.00	50.0
Approach		**520**	**0.0**	**0.134**	**0.2**	**LOS A**		**0.00**	**0.02**	**49.8**
All Vehicles		**1160**	**0.0**	**0.259**	**1.2**	**Not Applicable**	**7**	**0.06**	**0.10**	**48.5**

Movement Summary

Eastern Access

PM, occasional use of shoulder

Give-way

Vehicle Movements

Mov No	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
East Approach										
5	T	505	0.0	0.259	0.0	LOS A	0	0.00	0.00	50.0
Approach		**505**	**0.0**	**0.259**	**0.0**	**LOS A**		**0.00**	**0.00**	**50.0**
North Approach										
7	L	15	0.0	0.024	9.9	LOS A	1	0.51	0.71	40.4
Approach		**15**	**0.0**	**0.024**	**9.9**	**LOS A**	**1**	**0.51**	**0.71**	**40.4**
West Approach										
10	L	135	0.0	0.166	6.4	LOS A	0	0.00	0.61	43.3
11	T	505	0.0	0.166	0.0	LOS A	0	0.00	0.00	50.0
Approach		**640**	**0.0**	**0.166**	**1.4**	**LOS A**		**0.00**	**0.13**	**48.4**
All Vehicles		**1160**	**0.0**	**0.259**	**0.9**	**Not Applicable**	**1**	**0.01**	**0.08**	**49.0**

Appendix B

Green Travel Plan , and Glossary of Transport Terms

1 Green Travel Plan (Outline)

1.1 Introduction

A Green Travel Plan is a means for a business, government body, resident group or other organisation to demonstrate a commitment and take a pro-active step towards improving the environmental sustainability of its activities.

In most developed countries, the transport or travel demand for the movement of goods and people is a major contributor towards overall energy consumption and is also a source of the exhaust emissions which lead to environmental pollution in urban areas and greenhouse gas build up which contributes to global warming.

The control and minimisation of these two factors is consequently highly important for persons in all countries in adopting more sustainable future lifestyles. For the common vehicular travel modes which rely on the consumption of fossil fuels ie oil and electricity produced from coal, the long term energy reserves of the earth and the corresponding sustainable consumption levels for these fuels are not yet precisely known. New fuel reserves and deposits are continually being discovered. Market forces will also inevitably play a role in limiting future growth in per capita demand and consumption for these energy sources as demand increases in countries such as India and China, and the pressure on the world's known reserves increases.

A cautious approach (the precautionary principle) to both energy consumption and the production of greenhouse gas emissions is warranted by governments, businesses and private individuals until such time as the planet's sustainable energy reserves and the likely adverse effects of greenhouse gas build up are more precisely known.

1.2 Objectives

A Green Travel Plan can be prepared by any of the following groups or organisations:

- An Individual government or business office
- A government or business organisation
- A campus or group or worksites containing a mix of employers and visitors
- Residential site developments or precincts

For any of these groups or organisations, the objectives of a Green Travel Plan are normally defined and met in either of two ways

1/ Travel Demand Management which reduces the need for energy intensive car, taxi or air travel by combining journeys for different purposes, travelling to alternative closer locations, or using other means of communications eg audio conferencing, video conferencing and working at home or other off-site locations using email or wireless telecommunications.

2/ The use of more sustainable transport modes ie walk, cycle, bus, motorcycle, car sharing, tram, bus and rail in place of the higher energy consumption travel modes such as single occupant car travel, taxi and air travel. This generally requires improving people's travel choices by making more travel modes available, ie to improve mobility for non car-drivers. The alternative measures of reducing mobility for car drivers by increased road usage and parking charges or restricting road and parking capacity are also an option, particularly in congested locations.

1.3 Sustainable Transport Modes

The relative energy consumption and emissions performance or the normal range of vehicular travel modes have been widely researched and are now well known. The general relativities between the energy consumption and consequently the emissions performance of the common vehicular travel modes are as follows(source Lenzen M 1999, Total Requirements of Energy and Greenhouse Gases for Australian Transport , Transportation Research D4, 1999).

Energy Use for Urban Travel (MJ per passenger kilometre), including vehicle manufacture, is estimated as:

Bicycle 0.8

Light Rail 2.1

Bus 2.8

Heavy Rail 2.8

Car(Petrol) 4.4

1.4 Travel Demand Management

Travel Demand Management Techniques in Australia are best characterised by the TravelSmart initiatives which operate in most states in Australia.

The individual state TravelSmart programs are focussed on either workplaces or residential localities and are based around personalised marketing and journey planning techniques which aim to minimise unnecessary car driver travel, encourage ridesharing and the use of travel modes other than the car wherever possible.

These programs, which are supported by the Commonwealth Government's National Greenhouse Strategy, are now set up in such a way that the reductions in car travel and corresponding greenhouse gas emission savings can be calculated directly as key outputs from the programs

Minimising air travel is also important in particular where regional/national office level meetings can be undertaken by telephone or video conferencing and the use of internet based data exchange systems can be used to greatly facilitate remote working by employees.

In many cities bicycles and cycle couriers can be used as alternatives to motor vehicle based couriers for local journeys to and from work and the delivery of documents over shorter distances eg 2-5km typically.

Currently, many aspects of Australian state and commonwealth government legislation for the taxation, registration charges, insurance and general use of motor vehicles include features that actively discriminate in favour of car travellers using company vehicles and larger vehicles (eg 4WD vehicles), encourage travelling longer distances and discriminate against the use of more sustainable travel modes (eg GST on public transport fares). Taxation incentives are required to encourage smaller and more energy efficient vehicles being used for shorter journeys.

In the longer term, sustained lobbying would likely be required by both businesses and the community to bring about legislative change to address the less energy efficient aspects of current legislation.

In contrast, employee provided workplace parking in the major commercial centres is now significantly taxed at both Federal and State government levels (eg FBT Charges). These now provide a clear incentive for employers and employees to minimise commuter car travel and support alternative travel modes.

1.5 Promoting Sustainable Travel Alternatives

More sustainable alternatives to conventional car travel normally involve the use of other travel modes which are identified as having lower energy consumption and better emissions performance than conventional cars, ie train, tram, bus, travel as a car passenger, cycling and walking.

The use of these more sustainable travel modes by employees when travelling to or from work needs to be assisted by cultural changes by both the employees and the employers in particular to support public transport users who typically have less freedom to choose their times of travel than car users. Where return travel is required outside the established commuter peak periods and in the evenings where public transport services to and from many areas are either infrequent or non existent , the costs of more expensive alternatives such as taxi travel should be met by employers.

In the major cities and other areas where good daytime public transport services are available, the use of public transport eg bus and rail services should be given preference over taxis for business travel during work hours. Employers should make the relevant bus and rail timetable information and multi trip discounted tickets available for use by employees and prominently displayed within the office,

Employers can make cycling to and from work substantially easier and more secure by providing a secure place at work to store bicycles, shower and change facilities and essential safety equipment ie reflective clothing, lights and cycle helmets

Office based campaigns and incentives (eg Walk to Work Day) to improve the proportion of employees travelling to work by either walking and cycling are recommended as the health benefits of regular walking are becoming increasingly recognised for both avoiding obesity and other illnesses related to sedentary lifestyle habits which include commuting by driving a car .

Where car travel is unavoidable, the use of LPG powered vehicles or smaller and more modern hybrid petrol/electric or other energy efficient vehicles including the Toyota Prius, the Honda Insight, the Mercedes Smart and the Lupo 3L should be considered.

1.6 Monitoring Performance Indicators

The primary monitoring measures for sustainable transport should be the overall energy consumption and emissions performance related to the transport task which may include the transport of goods and people.

For personal travel in office based green travel plans, the simplest measurement is often the travel mode share (either simply as a percentage of journeys or as a percentage of the total travel distance) that is travelled by the identified more sustainable transport modes (walk, cycle, bus, tram, rail and car passenger) in comparison to that travelled as a car driver.

Another significant measure is the total energy consumption of the travel task which is determined by the total travel distance by each mode factored by the energy consumption for that mode. This measure can be as significantly influenced by where people live in relation to their workplace as much as how they actually travel to and from work.

The total sum of commuter and business travel and the energy expended should be monitored and reported on a monthly, quarterly or annual basis depending on the resources of the organisation. Since all travel generally has an associated travel cost which is in some way related to its energy consumption, the minimisation of the total travel task will also potentially generate significant cost savings either for a company or its employees.

Measurable savings in greenhouse gas emissions are a highly desirable outcome of any Green Travel Plan, if they can be calculated with sufficient precision. These will ultimately provide

important supporting evidence to be used in the assessment of meeting future national targets for greenhouse emissions reductions

1.7 Transport Design and Management Plan

Objective	Initiative	Descriptor	Arup Verification criteria
Non-motorised transport through **"inviting"quality of public domain** to encourage interaction of site and surrounding areas	Maximise area of public realm	Square metres	Review
	Maximise connectivity of public realm	5 minute "ped-shed" walking distances	Review
	Maximise active frontage	Lineal metres	Review
	Increase landscaping to pedestrian areas	Square metres	Review design and maintenance program
	Adequate lighting	Lighting an accordance with relevant standards	Review
Universal Access	Independent Access Audit	Access for people with disabilities, and benefits to all	AS1428.2,AS2890.6,BCA,AS1735
		Parking bays for persons with disabilities	Review number and convenient location
Permeability	Maximum gateways	Number of gateways consistent with privacy and security concerns	Consider undertaking a PAMP (Pedestrian Access and Mobility Plan)
Car Parking which minimises adverse impacts	Reduced energy for lighting and ventilation	Natural lighting and ventilation	Review
	Reduced area and size of vehicles	Minimise dimensions	Design to AS2890, rather than larger Council requirements
	Maximise use of parking by shared uses	Reciprocal parking such as staff parking during the weekday and visitor parking after hours	Review

Objective	Initiative	Descriptor	Arup Verification criteria
Mode shift to more sustainable modes	Provide “after trip” facilities for cyclists,joggers etc	Secure bike parking, Showers/change rooms	
	Secure Bike parking	U Rails generally Lockers or racks in car parks	Review in accordance with AS
	High quality bus service	Services per hour	
	High quality identifiable bus stops	Weather protection Seating All-weather paving Bike parking Road crossing Lighting Timetables/routes	Review
	Security of bus and walking and cycling	Encourage activities with extended trading hours and toilets close to bus stop	
	Mini bus	services per hour Timetables and information distribution	
	Information	Local map and brochures showing destinations and routes	Review
	Local services such as shops	Basic services within walking or cycling distance	Review
Safe Environment	Low speed environment	Pavement materials to emphasis safe and shared use	
	Clear road hierarchy	Adequate service truck areas Clear signage	Review
	Minimum traffic volumes	Vehicles per hour	Multiple access points to dissipate traffic within the site and at access to the site
	Clear priority at intersections	Give way to the right or Give Way signs	Median in Yamba Road Review of sign inventory
	Footpath width and condition	Widths and condition and maintenance Crossings	
	Safe Crossings	Median Refuges	

Objective	Initiative	Descriptor	Arup Verification criteria
Construction Phase	Form good sustainable travel patterns early before second cars are purchased etc		TravelSmart program (travel diaries and behavioural programs)
	Minimise traffic		

Description and Classification Methods

Glossary and descriptions are generally in accordance with the recommendations of Australian Standards AS 1348-1986.

Term	Definition
access control control of access	1. Preventing vehicles and people crossing property lines by means of barriers or regulations. 2. Arranging matters so that vehicles and people have access at predetermined locations.
amenity	That element in the layout and operation of town and country which makes for a comfortable and pleasant life rather than a mere existence. It relates also to the preservation of such characteristics of a neighbourhood as make it pleasing in appearance to both the passer-by as well as to the resident and those across the road.
assignment traffic assignment	Process of allocating trips onto existing or planned routes available on the road or public transport network. Assignment may be based on one or more factors known to influence route selection, eg travel time, distance, cost.
at-grade crossing level crossing	Crossing at the same level, such as a railway crossing which is at the same level as a road, or a normal road intersection.
base case	System that would exist without the introduction of the changes proposed in the project being analysed.
calibration	Process of determining the parameters of the mathematical travel models so that these models simulate observed travel patterns as accurately as possible.
capacity	Maximum flow of trains, vehicles, passengers or goods that can be accommodated in a transport system in a specified period.
road capacity	Maximum number of vehicles or pedestrians that can pass over a given section of a lane, road or footpath in one direction (or in both directions for a two-lane or three-lane road) during a given time period under prevailing road and traffic conditions. It is the maximum rate of flow that has a reasonable expectation of occurring. In the absence of a time modifier, capacity is an hourly volume. The capacity would not normally be exceeded without changing one or more of the conditions that prevail. In expressing capacity, it is essential to state the prevailing road and traffic conditions under which the capacity is applicable.
census collector's district (abbreviation **CCD**)	Unit of area for which each census collector is responsible for collecting information. CCDs are the smallest individual areas for which basic land use and population data are available in Australia.
central business district (abbreviation **CBD**)	Dominant area of business and commercial activity within a given area. CBDs are characterised by high density office and retail development, large numbers of pedestrians and vehicles, and a heavy demand for parking. Also known as central activities district (CAD).
centroid	Assumed point in a traffic zone that represents the origin or destination of all trips to or from the zone. Generally, the weighted centre of trip ends rather than a geometric centre of the zonal area.
commercial vehicle	Road vehicle constructed specifically to convey goods, passengers or burden in the course of trade or business.
cordon	Imaginary line drawn around a given study area at which traffic counts and interviews may be taken.
desire line	Straight line joining two centroids and showing the desired direction of travel.
distribution	Process by which the number of trips between zones is estimated. The distribution may be measured or be estimated by a growth factor process or by a synthetic model such as a gravity model.
85th Percentile	Value of variable characteristic of individuals in a population, possessed by at or below 85 per cent of that population.
elasticity	Ratio of the change in demand for a commodity to the change in price of that commodity. In transport, a high ratio is termed elastic while a low ratio is termed inelastic.
grade separation	The separation of road, rail or other traffic so that crossing movements which would otherwise conflict are effected at different elevations.
journey	Movement involving one or more trips, eg: (a) a 'journey-to-work', which could involve a direct trip to work or an intermediate stop for some other but secondary purpose; (b) an 'origin-to-origin' journey, which could involve several trips, each for a particular purpose. Home-to-home journeys have also been termed 'tours'.
model	Mathematical description of a situation which uses data on past and present conditions to make predictions about the effects of changes.
passenger car unit equivalent car unit	Measure involving the conversion of different types of vehicles into their equivalent passenger cars in terms of operating characteristics.
public transport	Service by bus, rail, taxi or other means which provides transport to the public on a regular basis for payment of a prescribed fare.
road hierarchy	Grading of roads according to increasing or decreasing importance of their traffic carrying or other function.
screenline	Imaginary line which splits a study area into two parts. Usually located along railway lines or rivers to minimise the number of crossing points.
sight distance	The distance measured along the carriageway over which objects of defined height are visible to a driver.

Term	Definition
traffic	movement between locations of persons, goods and information by means of mechanical, electrical or personal methods.
base traffic	That traffic already present on a facility, or that traffic unlikely to be affected by design changes.
by-passable traffic	That traffic which can be diverted from a particular road or area because drivers do not wish to stop on that road or in that area.
local by-passable traffic	Term normally used to refer to short distance traffic that can be diverted, usually at the expense of increased distance, not increased time.
through by-passable traffic	Term normally used to refer to longer distance traffic that can be diverted without significant time or distance penalties.
converted traffic	Component of traffic which has changed its mode of travel, eg from train to car.
diverted traffic	Component of traffic which has changed its route but not its origin, destination, or mode of travel.
generated traffic	1. Traffic created by a new or improved facility as distinct from traffic which is diverted to a facility and normal traffic increase. 2. Traffic created by changes in land use.
induced traffic	Additional traffic resulting from some improvement in a road or in traffic arrangements.
potential traffic	Total volume which would move between two terminals assuming ideal travelling conditions.
shifted traffic	Component of traffic whose desire lines have been shifted because of change of origin or destination.
suppressed traffic	Reduction in traffic volume resulting from a change in traffic arrangements.
trip	1. One-way movement from one place to another for a particular purpose (*see also* **journey**). Note: Care is required in applying this general definition. In particular, the definition of 'purpose' will affect the way in which person, vehicle or commodity movements are classified into trips. In travel surveys, the 'purpose' set often includes 'change mode' and 'serve passenger', thus making a trip correspond to a movement by only one mode. Movements for these purposes have been varyingly called 'legs', 'segments', or 'unlinked trips', in transport planning practice. For analyses, trips are often 'linked', thus making a trip embrace more than one mode and/or lower order purpose. 2. In public vehicle operations: the movement by one vehicle or unit in one direction from the start of a route to the end of it.
external trip	Trip which starts or ends outside the study area.
through trip	Trip which starts and ends outside the study area, but which passes through the study area.
internal trip`	Trip which starts and ends in the study area.
linked trip	One-way movement from one place to another for a specific purpose, involving more than one mode of travel.
trip distribution	1. The geographical distribution of trips. 2. Process by which the total number of trips is converted to individual zone-to-zone movements.
vehicle hours of travel (abbreviation **VHT**)	Total vehicle hours of travel over a road segment or number of road segments for a certain period, usually a specified year.
vehicle kilometres of travel (abbreviation **VKT**)	Total vehicle kilometres of travel over a road segment or number of road segments for a certain period, usually a specified year.
volume	Number of persons, vehicles or pedestrians passing a given point in a specified period of time.

Field surveys have been used to assess conditions. Unless specifically stated otherwise, these assessments have been transferred directly to the record sheets and not modified. Field descriptions may therefore be used as an independent estimate of conditions which can be correlated with other data.

AUSTROADS Design Vehicle Classification (AUSTROADS/SAA, 1995)

Bicycles		see Austroads Part 13	
Motorcycles		see Austroads Part 13	
Car/van - 85th percentile car,	99th percentile car	5.0 metres long	2 axles
Service vehicle		8.8 metres long	2 axles
Single unit truck/bus		12.5 metres long	3 axles
Long rigid bus		14.5 metres long	3 axles
Articulated bus		19.0 metres long	4 axles
Prime mover and semi-trailer		19.0 metres long	6 axles
Prime mover and long semi-trailer		25.0 metres long	6 axles
B-Double		25.0 metres long	9 axles
Road train		36.0 – 53.0 metres long	11-16 axles

Levels of Service

- **Level of Service A** is a condition of free flow in which individual drivers are virtually unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and to manoeuvre within the traffic stream is extremely high, and the general level of comfort and convenience provided is excellent.
- **Level of Service B** is in the zone of stable flow and drivers still have reasonable freedom to select their desired speed and to manoeuvre within the traffic stream, although the general level of comfort and convenience is a little less than with level of service A.
- **Level of Service C** is also in the zone of stable flow, but most drivers are restricted to some extent in their freedom to select their desired speed and to manoeuvre within the traffic stream. The general level of comfort and convenience declines noticeably at this level.
- **Level of Service D** is close to the limit of stable flow and is approaching unstable flow. All drivers are severely restricted in their freedom to select their desired speed and to manoeuvre within the traffic stream. The general level of comfort and convenience is poor, and small increases in traffic flow will generally cause operational problems.
- **Level of Service E** occurs when traffic volumes are at or close to capacity, and there is virtually no freedom to select desired speeds or to manoeuvre within the traffic stream. Flow is unstable and minor disturbances within the traffic stream will cause break-down.
- **Level of Service F** is the zone of forced flow. With it, the amount of traffic approaching the point under consideration exceeds that which can pass it. Flow break-down occurs, and queuing and delays result.

INTANAL and Levels of Service

The intersections in the immediate vicinity of the site which will experience site generated traffic have been modelled using INTANAL, version 3.13.

Level of Service: The Level of Service (LoS) for the three Control Modes is based on the average delay in seconds per vehicle.

For *Traffic Signals*, the average delay per vehicle is calculated as Delay/(All Vehicles).

0 to 14 = "A"	Good
15 to 28 = "B"	Good with minimal delays and spare capacity.
29 to 42 = "C"	Satisfactory with spare capacity.
43 to 56 = "D"	Satisfactory but operating near capacity.
57 to 70 = "E"	At capacity and incidents will cause excessive delays.
>70 = "F"	Unsatisfactory and requires additional capacity.

For *Give Way and Stop Signs*, the average delay per vehicle is selected from the movement with the highest average delay per vehicle.

0 to 14 = "A"	Good.
15 to 28 = "B"	Acceptable delays and spare capacity.
29 to 42 = "C"	Satisfactory but accident study required.
43 to 56 = "D"	Near capacity and accident study required.
57 to 70 = "E"	At capacity and requires other Control Mode.
>70 = "F"	Unsatisfactory and required other Control Mode.

For *Roundabouts*, the average delay per vehicle is selected from the movement with the highest average delay per vehicle.

0 to 14 = "A"	Good.
15 to 28 = "B"	Acceptable delays and spare capacity.
29 to 42 = "C"	Satisfactory.
43 to 56 = "D"	Near capacity.
57 to 70 = "E"	At capacity and requires other Control Mode.
>70 = "F"	Unsatisfactory and requires other Control Mode.

Degree of Saturation: The DS is another measure of the operational performance of individual intersections. As both queue length and delay increase rapidly as DS approaches 1.0, it is usual to attempt to keep DS to less than 0.9. Values of DS in the order of 0.7 generally represent satisfactory intersection operation. When DS exceeds 0.9 residual queues can be anticipated.

Road Classification

Broad Classification		
Arterial Roads	Freeways	Those roads with full access control and grade separated intersections, whose primary function is to service large traffic movements.
	Primary Arterial Roads	Those arterial roads whose main function is to form the principal avenue of communication for metropolitan traffic movement not catered for by freeways.
	Secondary Arterial Roads	Those roads which supplement the Primary Arterial Roads in providing for through traffic movement, to an individually determined limit that is sensitive to both roadway characteristics and abutting land users.
Local Roads	Collector Roads	Those non arterial or 'intermediate' roads which distribute traffic between the arterial roads and the local street system, which provide local connection between arterial roads and which provide access to abutting property. It is the collector road, which mixes the basic functions of carrying traffic – often at excessive speed – and serving as a local residential street, that is the generator of many of the problems encountered in traffic management in Local Traffic Areas.
	Local Access Streets	Those streets, not being arterials or collectors, whose main (traffic) function is to provide access to abutting property.

Source: Austroads Part 10, 1988

Classification of Residential Streets		
Access Street	Access Place	The lowest order of street providing access to sites without any traffic generated by sites in other streets. Target maximum speed 15 km/h. Indicative traffic volume 300 vpd.
	Local Street	Access streets are generally streets where the residential environment is dominant, traffic is subservient, speed and volume are low and pedestrians and cycle movements are facilitated. Target maximum speed 40 km/h. Indicative traffic volume <200 vpd.
Collector Streets	Minor Collector	The collector street collects traffic from access streets and carries higher volumes of traffic. A reasonable level of residential amenity and safety is maintained by restricting traffic volumes and vehicle speeds. Vehicle speeds are controlled by street alignment, intersection design and, in some cases, by speed control measures. Target maximum speed 50 km/h. Indicative traffic volume <3000 vpd.
	Major Collector	The major collector is generally short and connects the collector street with the road corridor network. Fronting development should still be encouraged, but with siting conditions which ensure acceptable amenity and safety. Target maximum speed 60 km/h. Indicative traffic volume <6000 vpd.

Source: AMCORD 1995, Element 1.3 Street Networks

Road Management and Funding Arrangement in NSW
Road management in NSW provides for three categories of road: State, Regional and Local.

State Roads
- Responsibility of the RTA to fund and determine priorities.
- Includes roads classified under the Roads Act 1993 as Freeways, State Highways and important Main Roads.
- About 3,100 km are designated as National Highways funded by the Federal Government which also funds some specific works on Federally designated Roads of National Importance.
- RTA directly maintains about 50% of State Roads, Councils maintain about 45% and RTA's contractors maintain about 5%.

Regional Roads
- Responsibility of councils to fund, determine priorities and carry out works. These roads have always been under the care, control and management of councils.
- Eligible for funding assistance from the State Government in recognition of their relative importance.

Local Roads
- Responsibility of Councils to fund, determine priorities and carry out works.

The State Government provides additional funding to councils including:
- **Road Safety and Traffic Management** – specific grants for safety and traffic works on Regional and Local Roads. Where projects are initiated by council, including development and implementation of council bicycle plans, funding is available on a dollar for dollar basis. Projects initiated by the State are funded 100%
- **Traffic Route Lighting Subsidy Scheme** – which subsidises councils for providing street lighting to a higher than normal level on important traffic routes.
- **Natural Disasters –** restoration funding for Regional and Local Roads damaged in declared events.

The RTA is also responsible for:

State Roads
- 188 State Asset Bridges and ferries on Regional and Local Roads.
- Unincorporated area of NSW

There are other roads in NSW which are the responsibility of agencies other than councils and the RTA. These include crown roads (responsibility of Minister for Conservation and Land Management), and roads managed by State Forests, National Park and Wildlife Service, Sydney Foreshore Authority, and Federal Airports Corporation.

Standards and References

Austroads, 1988. Guide to Traffic Engineering Practice, Part 5 – Intersections at Grade

Austroads, Standards Australia 1999. Guide to Traffic Engineering Practice, Part 14 – Bicycles

Austroads, Standards Australia 1995. Guide to Traffic Engineering Practice, Part 13 - Pedestrians

RTA, October 2002. Guide to Traffic Generating Development

Standards Australia International Ltd. Australian Standard™ 5th June 2001 Design for access and mobility, Part 1: General requirements for access – New building work

Standards Australia (Standards Association of Australia) 5 February 1999. Australian Standard™, Manual of uniform traffic control devices, Part 4: Speed controls

Standards Australia International Ltd and Standards New Zealand. Australian/New Zealand Standard™ Parking facilities, Part 1: Off-street car parking

Standards Australia International Ltd 10th October 2002. Australian Standard™ Parking facilities, Part 2: Off-street commercial vehicle facilities

Standards Australia (Standards Association of Australia) 18th January 1993. Parking facilities, Part 3: Bicycle parking facilities