F4 FREEWAY
MAYS HILL - PROSPECT

WORKING PAPER 1 - TRAFFIC PATTERN

PREPARED FOR

THE DEPARTMENT OF MAIN ROADS

BY

OVE ARUP TRANSPORTATION PLANNING
41 McLAREN STREET
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4161

C O N T E N T S

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1.0 INTRODUCTION

In March 1986 Ove Arup Transportation Planning was commissioned by the Department of Main Roads (DMR) to collect, assemble and collate traffic information to assist the DMR to analyse and make decisions regarding the completion of the missing link on the Western Freeway F4.

This section is between Mays Hill and Prospect, 25 to 35 kilometres to the west of Sydney. Of particular importance is the section between 30 and 35 km where several alternative solutions are to be assessed.

The study area and its regional context are shown in Figure 1.

Information held by the DMR was reviewed and surveys undertaken by the consultants and contractors in March and April 1986.

This Working Paper presents a summary of the traffic pattern within the study area and is based on traffic data surveyed between 1980 and 1986.

2.0 ROAD HIERARCHY

In addition to the F4 - Freeway and the Great Western Highway (SH5), the study area includes another State Highway (SH13 via Pennant Hills Road/Woodville Road) and a number of Main and Secondary roads. All these routes are part of the arterial roads system in the Short Term Road Hierarchy Plan which was developed by the Western Sydney Region Organisation of Councils (WSROC) in 1985 and is shown in Figure 2A. Figure 2B shows the WSROC Long Term Road Hierarchy Plan which only differs from that in Figure 2A where new arterial roads are planned. These are:

- Phillip Parkway at Eastern Creek
- Greystanes/Prospect Arterial
- Victoria Street at Wetherill Park

It should be noted that the Road Hierarchy Plan developed by the Traffic Authority of NSW is basically the same as the WSROC Short Term Road Hierarchy Plan. The Road Hierarchy Plans developed for Holroyd and Blacktown Councils are also basically the same as the WSROC Short Term Plan with only some minor discrepancies.

3.0 TRAFFIC FLOWS

A large amount of traffic information has been collected both from DMR sources and traffic counts undertaken by the Consultant it is presented under the following headings.

3.1 Annual and Seasonal Traffic Patterns

The AADT on the Great Western Highway increased by an average of 2.7 percent per annum in the 8 years from 1975 to 1983 at Eastern Creek Bridge and by an average of 1.0 percent in the 14 years from 1969 to 1983 at the Clyde railway crossing.

Seasonal traffic levels in the study area appear to be typical of metropolitan patterns, with summer lows and pre Christmas highs. The month of April when most of the 1986 turning, mid block and O - D surveys were undertaken appears close to average, in terms of weekly total traffic.

3.2 Weekly and Daily Traffic Patterns

The weekly traffic variation in the area appears typical of metropolitan traffic, with approximately equal flows on week days (15% of a weeks total on each week day) and with lower volumes on Saturdays (13%) and Sundays (12%) on the Great Western Highway.

The graphs in Appendix 1 show the daily traffic variations on the Great Western Highway and it is evident that there is a strong tidal flow, with an east bound peak between 06.30 and 09.30 hours and a west bound peak between 16.00 and 19.00 hours.

3.3 Hourly Traffic Patterns

The hourly traffic patterns have been studied on the basis of morning and evening peak traffic flows in the period 1983 - 1985, and these are shown in Figures 3A and 3B respectively.

Within the study area the Great Western Highway forms the main east-west connection and there are no major alternatives.

The Highway volumes vary slightly between morning and evening peak with some 2500 vehicles per hour east of the Freeway at Mays Hill and 5500 vehicles per hour between Greystanes and Blacktown Roads. Intermediate sections vary between these volumes but the average is approximately 4500 vehicles per hour.

3.4 Turning Counts

Analysis of morning and evening peak turning counts is shown in Figures 4A and 4B and indicates that:

- The western section of the Great Western Highway at Prospect carries more traffic than does the F4 Western Freeway.

- Flows from Reservoir Road, Flushcombe Road and Ponds Road are relatively minor in the morning peak.

- The major east bound inflow occurs at Blacktown Road.

- Turning counts indicate that the diagonal link between Toongabbie Road and Greystanes Road is relatively minor. Major turning movements are comprised of traffic turning on and off the Great Western Highway.

- Major crossing movements of the Great Western Highway occur at the next 3 intersections to the east : Pendle Way, Jones Street and Station Street.

- As with the western end, the old Great Western Highway at Mays Hill carries more traffic than does the new Freeway section. This may, of course change when the flyover section further east is completed.

4.0 ACCIDENT STATISTICS

Accident statistics provided by the DMR were analysed in terms of:

. accident blackspots at intersections 1982-83 and 1983-84

. individual crash investigation reports along the section of the Great Western Highway (between Greystanes Road and Eastern Creek) 1982 to 1985

. mid-block (non-intersection) crash rates per kilometre.

The statistics indicate that:

- a concentration of crashes occurs along the Great Western Highway at the major intersections, and in the local busy centres of Blacktown and Parramatta.

- the section of highway between Mays Hill and Prospect contains eight intersections amongst the worst 1,000 blackspot locations within the State.

- there is a particularly high number of smashes recorded at the Great Western Highway/Station Street/Centenary Road intersection, and at the Great Western Highway/Toongabbie Road intersection (although the latter intersection vicinity has recently been modified to provide sheltered turning lanes on the Great Western Highway)

The accident blackspots at intersections for the period 1983-84 are shown in Figure 5. Appendix B shows an analysis by section along the Great Western Highway between the two sections of existing Freeway, over the 3½ years from 1982 to mid 1985.

This analysis shows that the section of Highway between Station Road and Greystanes Road has a particularly high accident rate.

5.0 JOURNEY TIMES AND TRAVEL SPEEDS

Journey times and travel speeds have been investigated for peak hour traffic on a number of routes as shown on Figures 6A and 6B. A more detailed survey was carried out for the Great Western Highway between Eastern Creek and Parramatta which is presented on Figure 6C. The statistical data were partly provided by the DMR and partly collected by the consultants (Blacktown Road data only).

It is evident that there are some bottlenecks at town centres such as Parramatta, Blacktown and Wentworthville.

Along the Great Western Highway traffic speeds are somewhat higher than on the other routes investigated, but they are still well below those on the F4 Freeway.

It takes approximately 11 minutes at an average speed of 44 km/h to travel the 8.37 km of highway between Mays Hill and Prospect, going east in the morning peak. Westbound evening peak traffic travels this distance somewhat faster and at an average of 54 km/h it takes around 9 minutes. However, in comparison, average speeds on the freeway generally exceed 80 km/h.

There are a number of sections of highway where the average travel speed is considerably less than average. These are:

- Toongabbie Road to Greystanes Road (for traffic in both directions)
- Ettalong Road to Berith Road (for traffic in both directions)
- F4 - exit to Reservoir Road (for east bound traffic)
- Blacktown Road to Toongabbie Road (for east bound traffic)
- Greystanes Road to Ettalong Road (for east bound traffic).

The low average speeds of eastbound traffic on the freeway at Mays Hill can be readily explained by the temporary termination of the Freeway at Church Street.

6.0 LEVELS OF SERVICE AND DELAYS

6.1 Intersection Operating Conditions

The level of service has been investigated for a number of signalised intersections along the Great Western Highway. The statistical data was collected in April 1986 and was analysed with the aid of the consultants SIDRA 2 micro-computer package. The results of the analysis are summarised in terms of X and Y values in Table 6.1 below.

TABLE 6.1 EXISTING HIGHWAY INTERSECTION OPERATING CONDITIONS

INTERSECTION	Y Value*	X Value*	LEVEL OF SERVICE**	INTERPRETATION
Morning Peak Hour:				
F4 (Prospect)	0.83	0.99	D	manageable operation
Reservoir Road	0.80	0.98	D	manageable operation
Flushcombe Road	0.68	0.77	B	good operation
Blacktown Road	0.60	0.70	A	very good operation
Toongabbie Road	0.78	0.87	C	satisfactory operation
Greystanes Road	0.64	0.80	A	very good operation
Ettalong Rd/Pendle Way	> 1.00	> 1.00	F	very bad operation
Berith Rd/Jones St	0.97	> 1.00	F	very bad operation
Centenary Rd/Station St	> 1.00	> 1.00	F	very bad operation
F4 (Mays Hill)	0.61	0.65	A	very good operation
Evening Peak Hour:				
F4 (Prospect)	0.65	0.76	B	good operation
Toongabbie Road	0.91	> 1.00	F	very bad operation
Greystanes Road	0.74	0.92	C	satisfactory operation
F4 (Mays Hill)	0.65	0.69	B	good operation

* Cycle times set at 120 seconds

** Source: Traffic Authority of NSW (1984-85): Policies, Guidelines and Procedures for Traffic Generating Developments.

It can be seen that most intersections with the Great Western Highway operate within manageable limits during both morning and evening peak hours. However, the intersections at Pendle Way, Jones Street, Station Street and, to a lesser extent, also Reservoir Road are approaching or at their capacities.

It should be noted that recently the capacity of the highway at Toongabbie and Greystanes Roads has been increased and dual protected right turning bays for both directions now allow the two intersections to operate at a good level of service in the morning peak period, but in the evening peak there are still capacity problems.

6.2 Mid-Block Operating Conditions

Volume to capacity ratios can also be used to assess the mid-block or route operating conditions. Alternatively, average overall travel speeds can be used. Table 6.2 equates levels of service with both these parameters for urban road conditions.

TABLE 6.2 VOLUME/CAPACITY RATIO ON URBAN ROADS (Interrupted Flow Conditions)*

Level of Service	Description	Average Overall Travel Speed (km/h)	Volume/ Capacity Ratio (Q/C)
A	Free Flow (almost no delay)	$\geq$ 50	0 - 0.60
B	Stable Flow (slight delay)	$\geq$ 40	0.60 - 0.70
C	Stable Flow (acceptable delay)	$\geq$ 30	0.70 - 0.80
D	Approaching Unstable Flow (tolerable delay)	$\geq$ 25	0.80 - 0.90
E	Unstable flow Congestion (intolerable delay)	25	0.90 - 1.00
F	Forced Flow (jammed)	< 25	not meaningful

* Source: NAASRA (1979) Interim Guide for the Design of Intersections at Grade.

Table 6.3 presents the current levels of service for several sections of the Great Western Highway.

TABLE 6.3 MID-BLOCK LEVEL OF SERVICE*

ROAD SECTION	EASTBOUND			WESTBOUND		
	AM Peak	PM Peak	Off-Peak	AM Peak	PM Peak	Off-Peak
F4-Reservoir Rd	F	C	D	B	B	C
Reservoir-Blacktown Rds	A	A	A	A	A	A
Blacktown-Toongabbie Rds	A	D	B	A	B	C
Toongabbie-Greystanes Rds	F	F	F	E	F	F
Greystanes-Ettalong Rds	C	A	A	A	A	A
Ettalong-Berith Rds	D	D	C	E	D	B
Berith-Centenary Rds	B	C	A	A	B	A
Centenary Rd-F4	A	B	A	A	C	B

* Refer to Figure 6C for travel speeds

It can be seen that generally the levels of service provided by the Great Western Highway are satisfactory. There are a few bottlenecks, which are directly related to sections with considerably low average travel speeds, as discussed in Section 5.0.

6.3 Existing Intersection Delay

The average delay per vehicle for the eastbound movement along the Great Western Highway is shown in Table 6.4 below. These delays are based on ARR123* formulae for co-ordinated signals using the appropriate parameters derived from SIDRA-2. Average delays per vehicle for some other cross movements are also shown. The cycle time adopted was 120 seconds.

* Australian Road Research Report 123

TABLE 6.4 : EXISTING SIGNALISED INTERSECTION DELAY

SIGNALISED INTERSECTION WITH GWH	MOVEMENT	AVERAGE DELAY (SEC)
Toongabbie Rd	Eastbound along GWH	20
	Left turn from Toongabbie	45
Greystanes Rd	Eastbound along GWH	10
	Right turn from Greystanes	60
Pendle Way	Eastbound along GWH	oversaturated*
Jones St	Eastbound along GWH	oversaturated*
Station St	Eastbound along GWH	oversaturated*
F4 (Mays Hill)	Right turn from GWH to the F4	40

* Delays incalculable

7.0 ORIGINS AND DESTINATIONS

A number plate survey was undertaken by the consultants on Wednesday April 16, 1986, for the morning and evening peak periods.

The data was analysed using the consultant's in house computer and software, to match number plates of vehicles travelling into and out of 7 survey stations. A summary of the analysis is shown in Table 7.1 and the major movements are set out in Appendix C.

TABLE 7.1 TRIP TABLE FOR ALL VEHICLES (Morning Peak Period) (6.45 am - 9.15 am)

	F4 Pros-pect	GWH Pros-pect	F4 Mays Hill	GWH Mays Hill	Dun-more Road	Went-worth Ave	Black-town Road	TOTAL
F4 (Prospect)	215	150	804	771	296	82	177	2495
GWH (Prospect)	142	311	659	744	214	51	107	2228
F4 (Mays Hill)	345	307	275	103	105	30	196	1361
GWH (Mays Hill)	221	254	193	128	40	31	56	923
Dunmore Road	72	45	90	52	89	10	91	449
Wentworth Ave	42	10	50	0	12	72	31	217
Blacktown Rd	86	64	234	77	73	121	424	1079
TOTAL	1123	1141	2305	1875	829	397	1082	8752

The analysis indicates that:

- a strong through traffic movement was evident along the section of the Great Western Highway between the two sections of the recently constructed F4 and significant "weaving" occurs between these two roads between Prospect and Parramatta and vice versa.

- there was a significant movement between the Great Western Highway and F4 at Mays Hill and Main Street in Blacktown
- there is a significant movement between the F4/Great Western Highway at Prospect and Dunmore Street at Wentworthville
- no strong movement was evident between the Wentworth Avenue/ Dunmore Street station and the other stations. No major east-west route parallel to the Great Western Highway between Blacktown and Wentworthville was detected.
- 24% of traffic observed on the F4 and Great Western Highway stations both entered and exited the study area via these roads.

8.0 HEAVY COMMERCIAL TRAFFIC

The travel characteristics of heavy commercial traffic have been studied on the basis of existing land uses, classified turning movement counts and an origin-destination survey. The relevant information is shown in Figure 7 and Table 8.1 with the major through traffic movements shown in Appendix C.

TABLE 8.1 TRIP TABLE FOR HEAVY VEHICLES (Morning Peak Period)

	F4 Prospect	GWH Prospect	F4 Mays Hill	GWH Mays Hill	Dunmore Road	Wentworth Ave	Blacktown Road	TOTAL
F4 (Prospect)	15	10	44	21	6	2	7	105
GWH (Prospect)	2	31	49	14	4	1	7	108
F4 (Mays Hill)	55	57	25	3	5	0	26	171
GWH (Mays Hill)	11	14	3	8	0	1	6	43
Dunmore Road	2	5	0	2	9	0	1	19
Wentworth Ave	2	0	0	0	2	2	1	7
Blacktown Rd	6	4	24	7	3	1	24	69
TOTAL	93	121	145	55	29	7	72	522

The analysis indicates that:

- the travel characteristics of heavy vehicles along the Great Western Highway are reasonably balanced, i.e. as much eastbound traffic as westbound. It should be noted, however, that 'all traffic' is strongly tidal, so that heavy vehicle traffic is relatively heavy in the contra-peak direction
- approximately 2/3 of heavy vehicles on the Great Western Highway in the morning peak period are through traffic
- heavy vehicles at Mays Hill use the freeway rather than the highway, but at Prospect the choice is more balanced
- there is an important link between Blacktown and the freeway at Mays Hill

- Some 15% of heavy vehicles go in and out at the same survey station within the survey period, which means that there is a significant number of return trips
- most intersections investigated perform an important role for heavy vehicles, especially Reservoir Road, Flushcombe Road and Church Street, which are related to the quarries at Prospect. To a lesser extent, Centenary Road, Blacktown Road, Toongabbie Road and Greystanes Road also play a role for heavy vehicle traffic, which is explained by the industrial hinterland of these roads as shown in Figure 8.

9.0 BUS ROUTES

The study area is serviced by a large number of privately operated buses. The services that are affected by the proposed freeway are shown on Figure 8.9. These services run between Parramatta and Blacktown and some other cross-suburban services to and from Blacktown and Merrylands. In total there are four routes that run along the Great Western Highway for some distance, providing services at average combined headways of 20 minutes during weekdays. The other services cross the highway or the freeway reserve and run at less regular intervals.

10.0 CONCLUSIONS

- Traffic volumes along the Great Western Highway have increased by 2.7% per annum at Eastern Creek and by 1.0% per annum at Clyde railway crossing.

- Daily traffic flows along the Great Western Highway are strongly tidal, with an east bound peak between 6.30 and 9.30 am and a west bound peak between 4.00 and 7.00 pm.

- Both morning and evening two way peak hour flows at the Great Western Highway are generally around 4500 vehicles per hour. This varies from 2500 vehicles per hour west of the Freeway at Mays Hill to 5500 vehicles/hour near Blacktown and Greystanes Roads.

- There is a strong through traffic movement (some 24% of all traffic) between the two sections of freeway and there are significant 'weaving' movements from the F4 at Prospect to the highway at Mays Hill and vice versa. Another significant through traffic movement is evident between Blacktown and the F4 at Mays Hill. There are no major alternatives for the Great Western Highway in this area.

- Heavy commercial traffic patterns are similar to those for other traffic, but tidal flows are not as strong and there is a considerable proportion of return trips.

- The average speed along the Great Western Highway between Mays Hill and Prospect is 44 km/h for the east bound morning peak traffic and 54 km/h for west bound evening peak traffic. Average speeds along the Freeway generally exceed 80 km/h.

- The level of service along the Great Western Highway is generally satisfactory, but there are bottlenecks at the intersection with Reservoir Road; Toongabbie and Greystanes Roads; Ettalong, Berith and Centenary Roads, and at the corresponding road sections.

- There are concentrations of accidents along the Great Western Highway and generally in the central business areas of Parramatta and Blacktown. The intersections of the Great Western Highway with Station Street/Centenary Road and Toongabbie Road have experienced particularly high numbers of accidents.

- The study area is served by privately operated public transport, and few of these bus services will be directly affected by the proposed freeway if adequate north/south connections are maintained.

APPENDIX A

AUTOMATIC TRAFFIC COUNT STATIONS

Average Weekday Hourly Flows for
week ending Friday 20th April, 1986.

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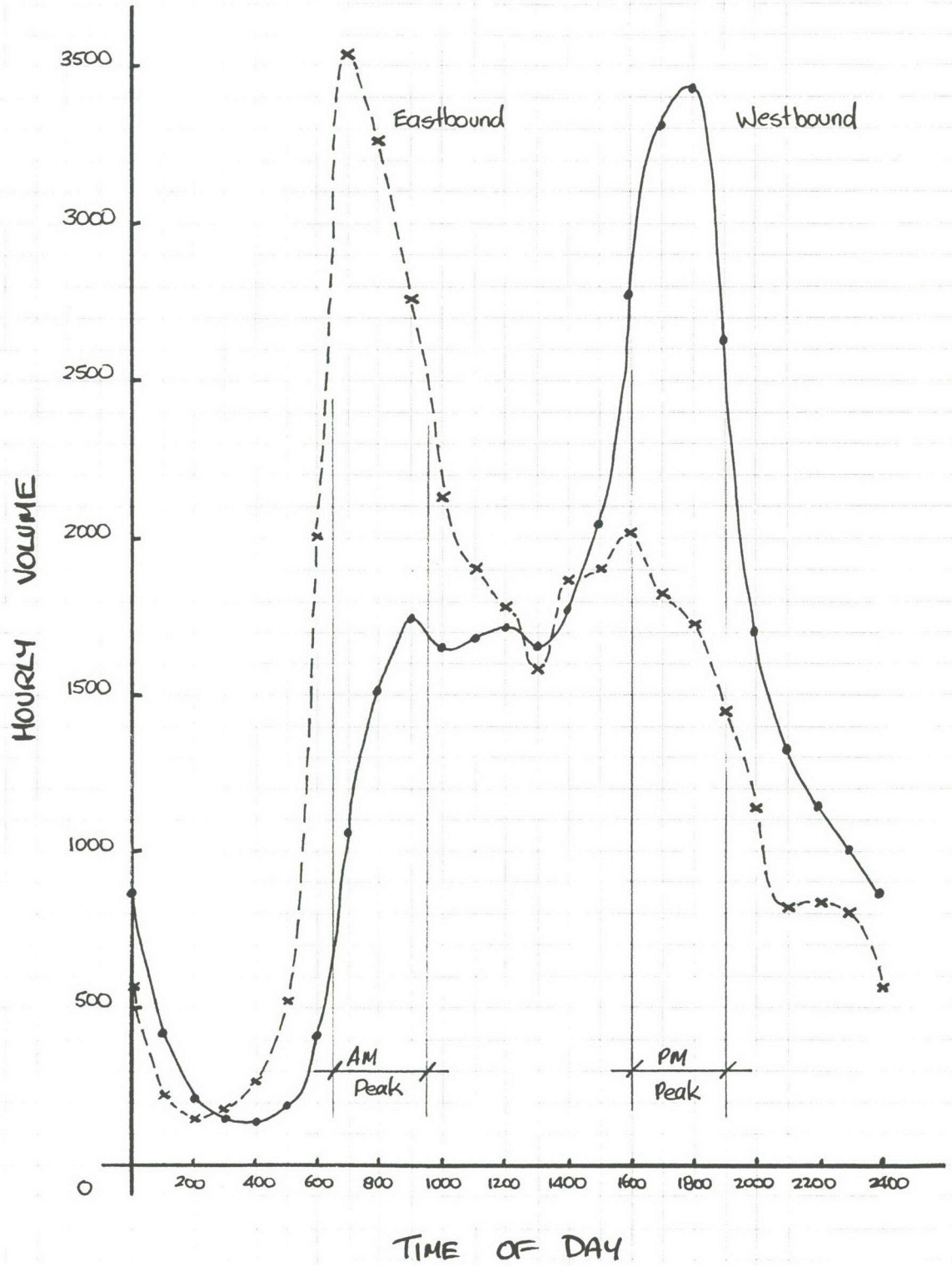
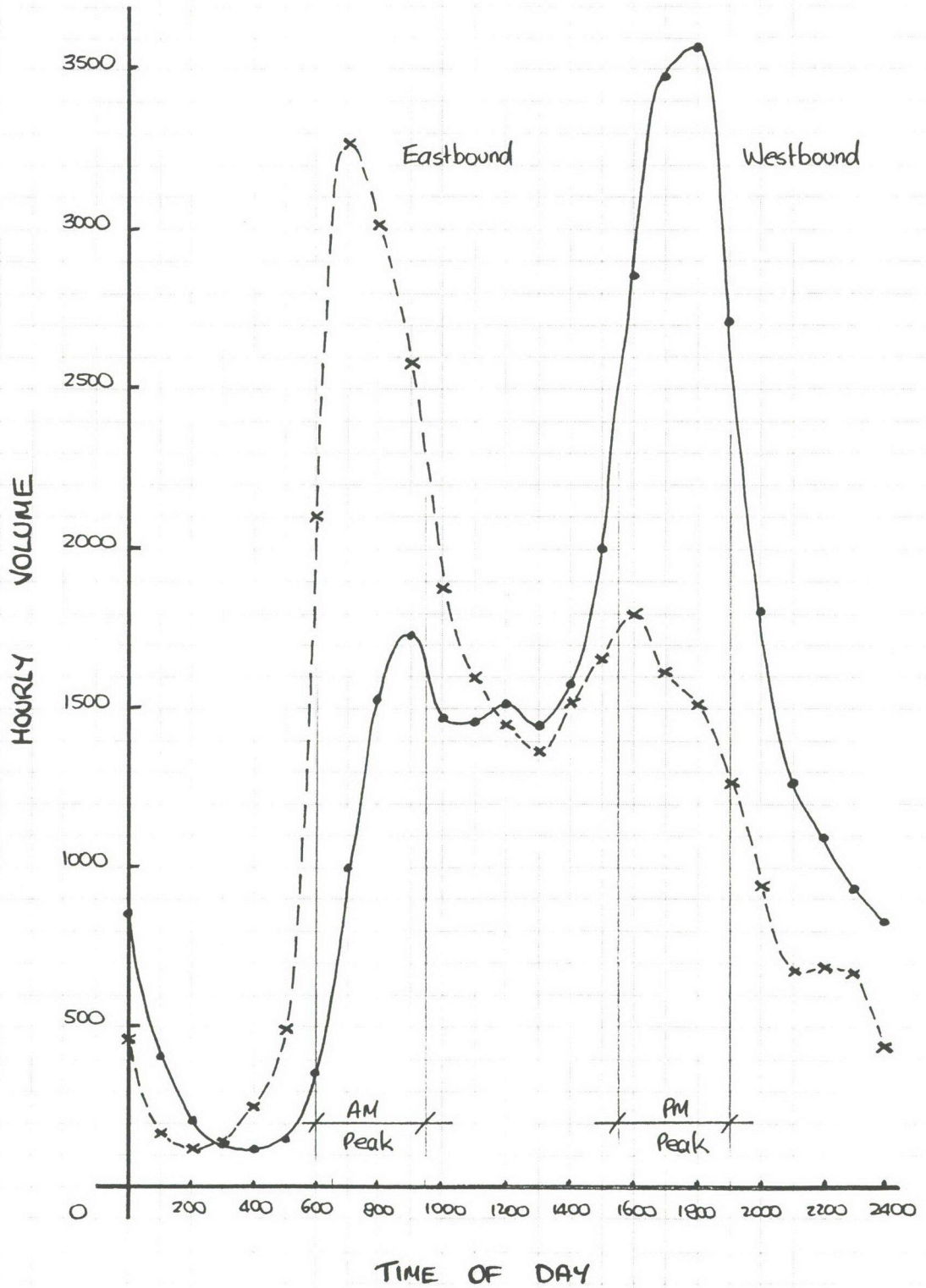
AUTOMATIC TRAFFIC COUNTS

GREAT WESTERN HIGHWAY (Girraween to Greystanes Rd.)



GREAT WESTERN HIGHWAY
(Church to Flushcombe Rd.)



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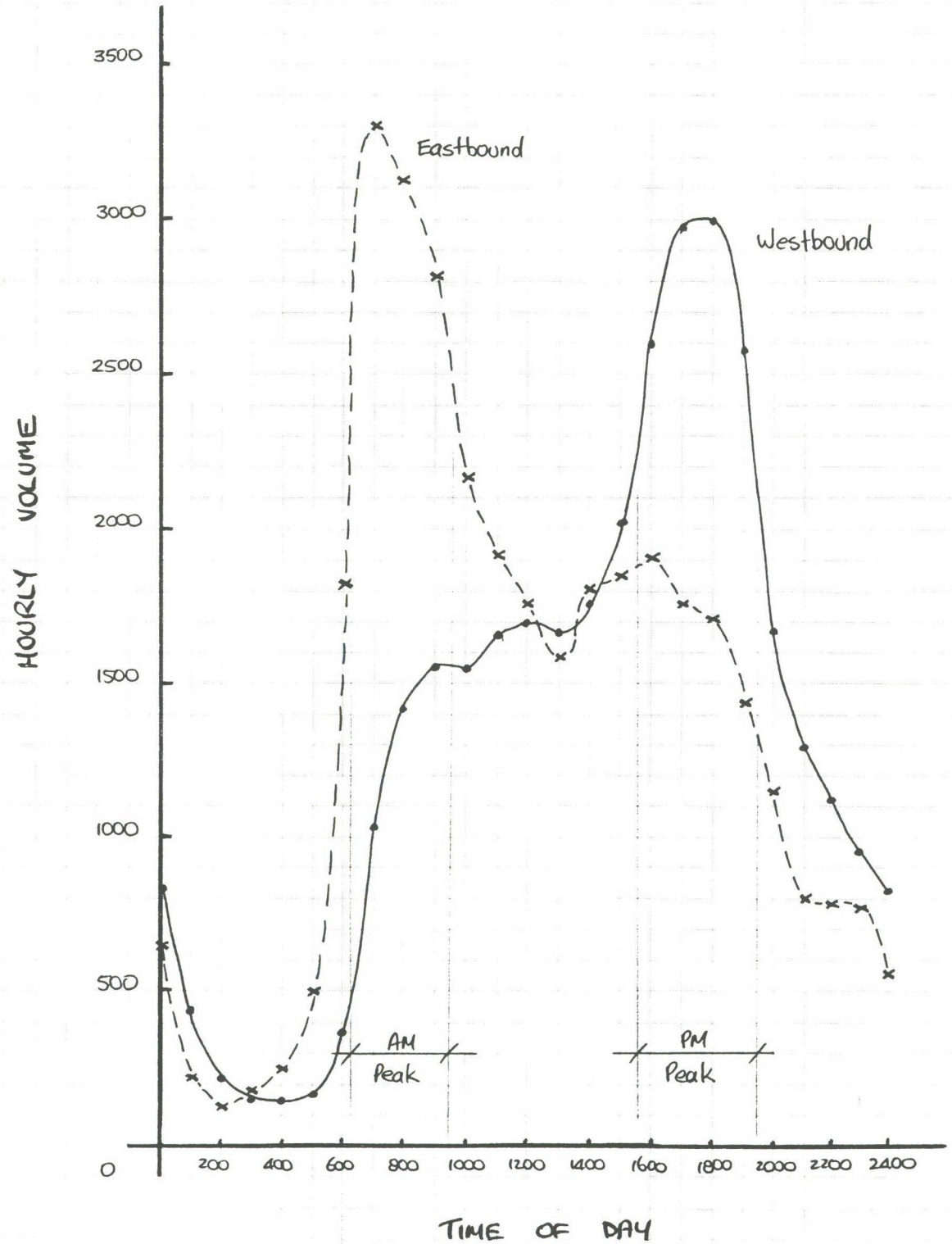
GREAT WESTERN HIGHWAY
(Centenary to Berith Rd.)



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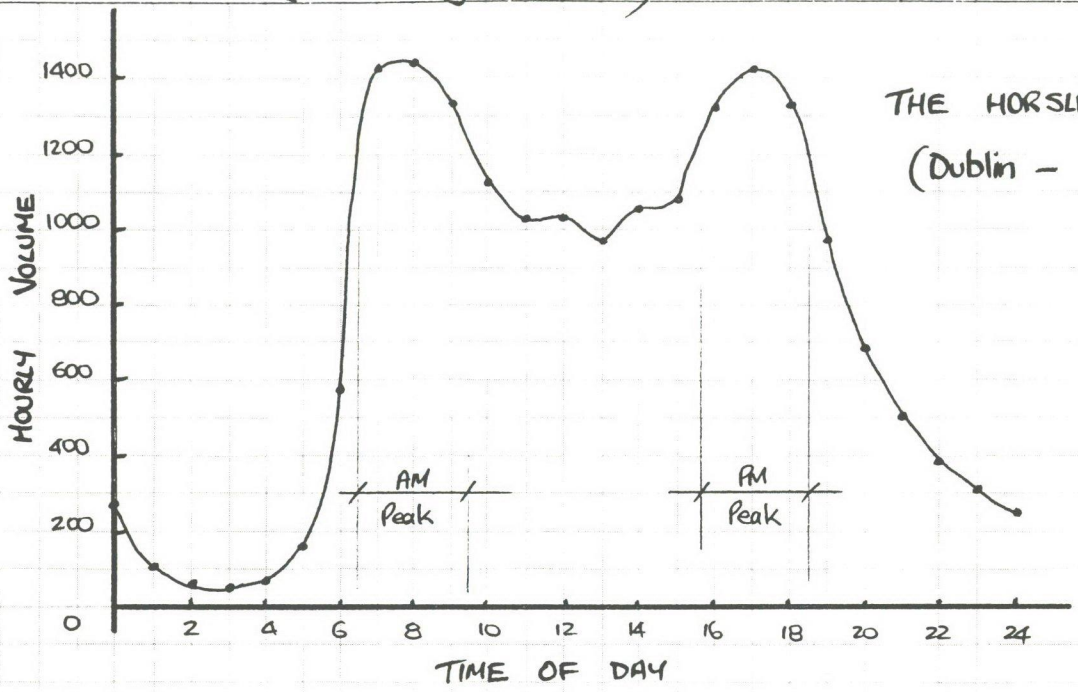
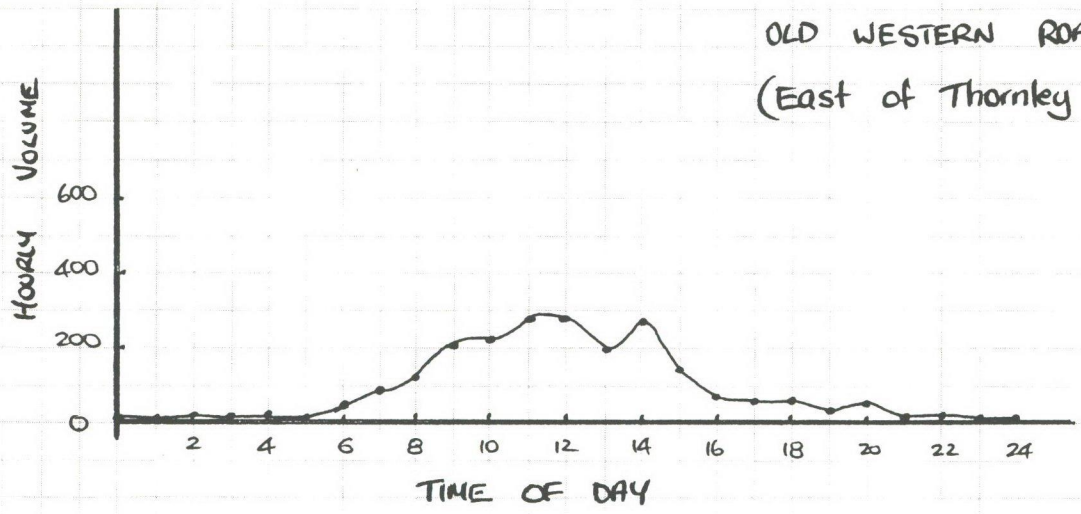
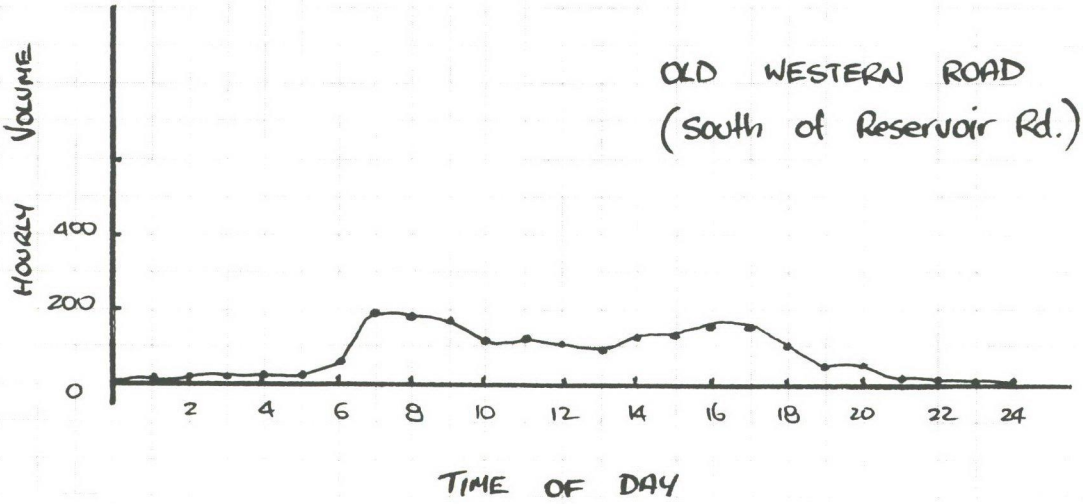
AUTOMATIC TRAFFIC COUNTS
(Two - way volumes)







APPENDIX B

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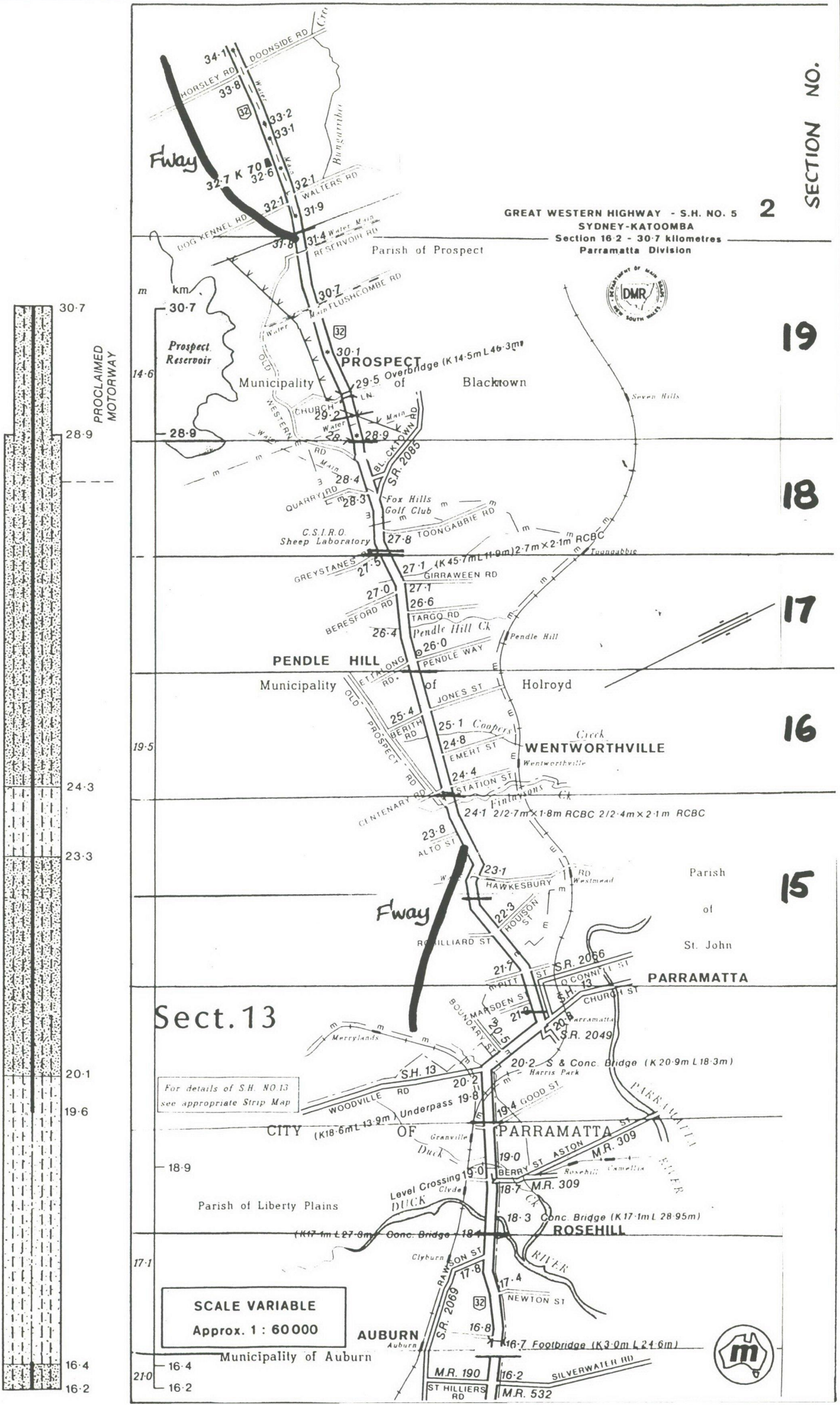
GREAT WESTERN HIGHWAY
Summary of Accidents 1982 - '85.

YEAR	VEHICLE TYPE	ACCIDENT TYPE	SECTION No. (refer attached) 15	16	17	18	19	TOTAL
1982	CARS	Fatal	–	–	1	2	1	4
		Injury	2	14	16	10	17	59
		Towaway	11	30	46	30	31	148
		Sub-total	13	44	63	42	49	211
	TRUCKS	Fatal	–	1	–	–	–	1
		Injury	1	6	1	2	3	13
		Towaway	1	9	1	7	2	20
		Sub-total	2	16	2	9	5	34
		Total	**15**	**60**	**65**	**51**	**54**	**245**
1983	CARS	Fatal	–	–	–	–	2	2
		Injury	8	22	12	13	17	72
		Towaway	13	44	29	26	42	154
		Sub-total	21	66	41	39	61	228
	TRUCKS	Fatal	–	–	–	–	–	–
		Injury	3	3	4	4	1	15
		Towaway	11	12	7	5	3	38
		Sub-total	14	15	11	9	4	53
		Total	**35**	**81**	**52**	**48**	**65**	**281**
1984	CARS	Fatal	1	1	1	–	1	4
		Injury	4	12	19	22	17	74
		Towaway	20	44	44	28	21	157
		Sub-total	25	57	64	50	39	235
	TRUCKS	Fatal	–	–	–	–	–	–
		Injury	–	3	2	1	3	9
		Towaway	–	13	9	12	1	35
		Sub-total	–	16	11	13	4	44
		Total	**25**	**73**	**75**	**63**	**43**	**279**
1985 (half year)	CARS	Fatal	1	2	–	–	–	3
		Injury	8	5	6	11	4	34
		Towaway	19	20	18	23	15	95
		Sub-total	28	27	24	34	19	132
	TRUCKS	Fatal	–	–	–	–	–	–
		Injury	1	1	3	2	–	7
		Towaway	2	7	–	2	4	15
		Sub-total	3	8	3	4	4	22
		Total	**31**	**35**	**27**	**38**	**23**	**154**


SECTION NO. 2
GREAT WESTERN HIGHWAY - S.H. NO. 5
SYDNEY-KATOOMBA
Section 16·2 - 30·7 kilometres
Parramatta Division
DMR
Parish of Prospect
PROSPECT
Municipality of Blacktown
PENDLE HILL
Municipality of Holroyd
WENTWORTHVILLE
PARRAMATTA
CITY OF PARRAMATTA
ROSEHILL
AUBURN
Municipality of Auburn
Parish of Liberty Plains
Parish of St. John
Fway
Sect.13
For details of S.H. NO.13 see appropriate Strip Map
SCALE VARIABLE
Approx. 1 : 60000
PROCLAIMED MOTORWAY
Prospect Reservoir
Overbridge (K 14·5m L 46·3m)
RCBC
Underpass 19·8
Conc. Bridge (K 17·1m L 28·95m)
Footbridge (K 3·0m L 24·6m)
Level Crossing
S.H. 13
S.R. 2085
S.R. 2066
S.R. 2049
S.R. 2063
M.R. 309
M.R. 190
M.R. 532
19
18
17
16
15

APPENDIX C

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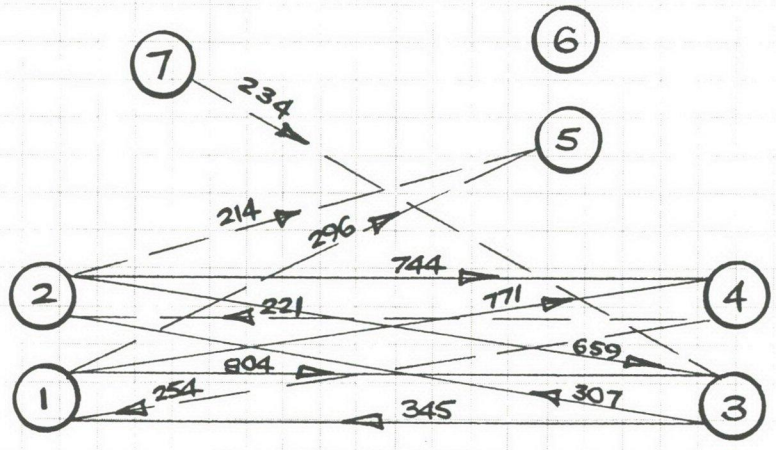
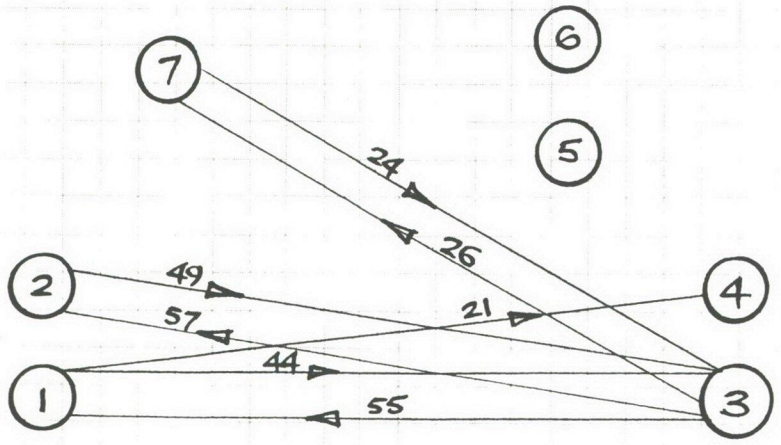
ORIGIN / DESTINATION SURVEY
Graphical presentation of Table 7.1

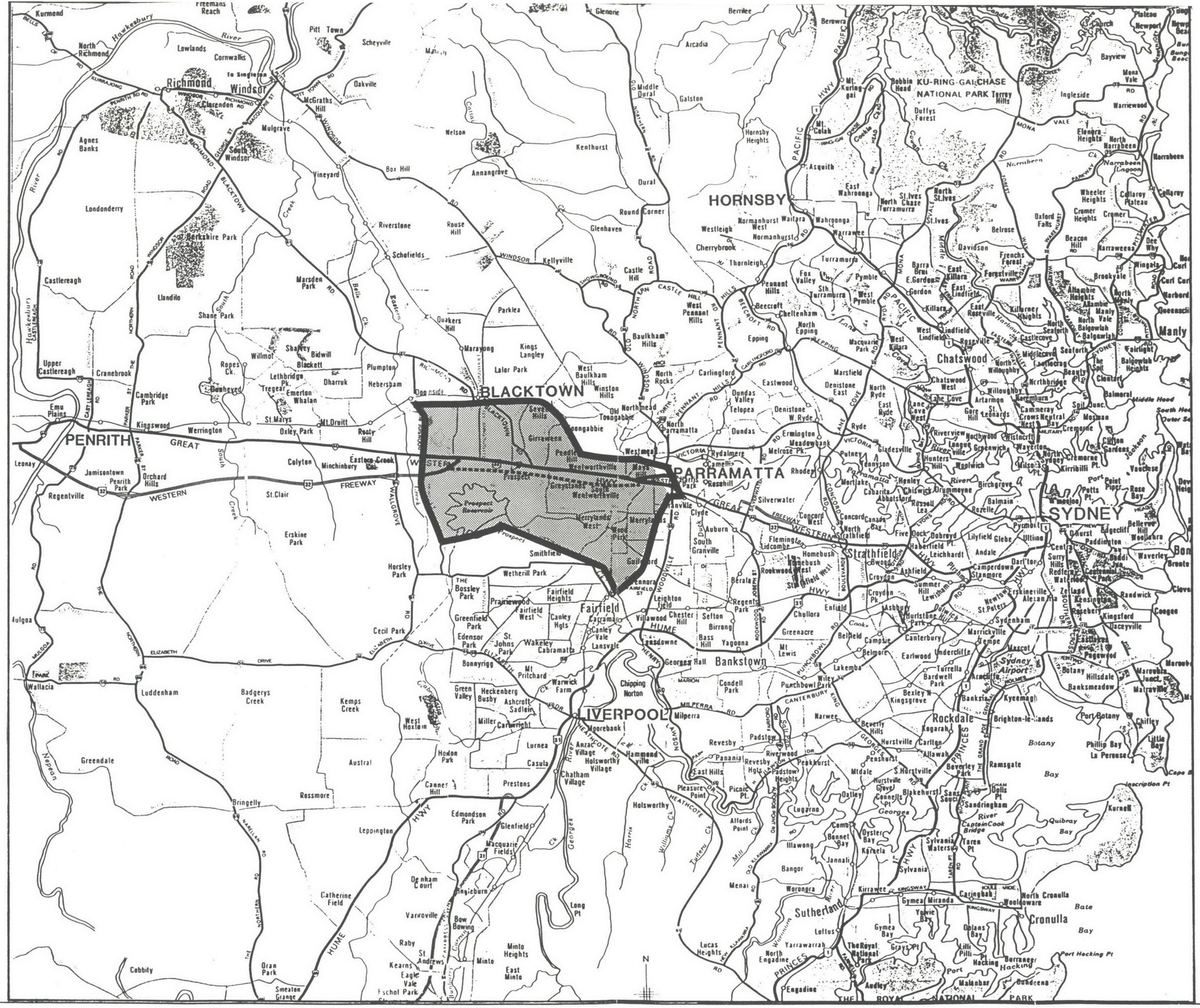
Node	Location
1	F4 (Prospect)
2	GWH (Prospect)
3	F4 (Mays Hill)
4	GWH (Mays Hill)
5	Dunmore Rd
6	Wentworth Ave
7	Blacktown Rd.

MAJOR MOVEMENTS (TRUCKS & CARS) am. peak



MAJOR MOVEMENTS (HEAVY VEHICLES ONLY) am. peak

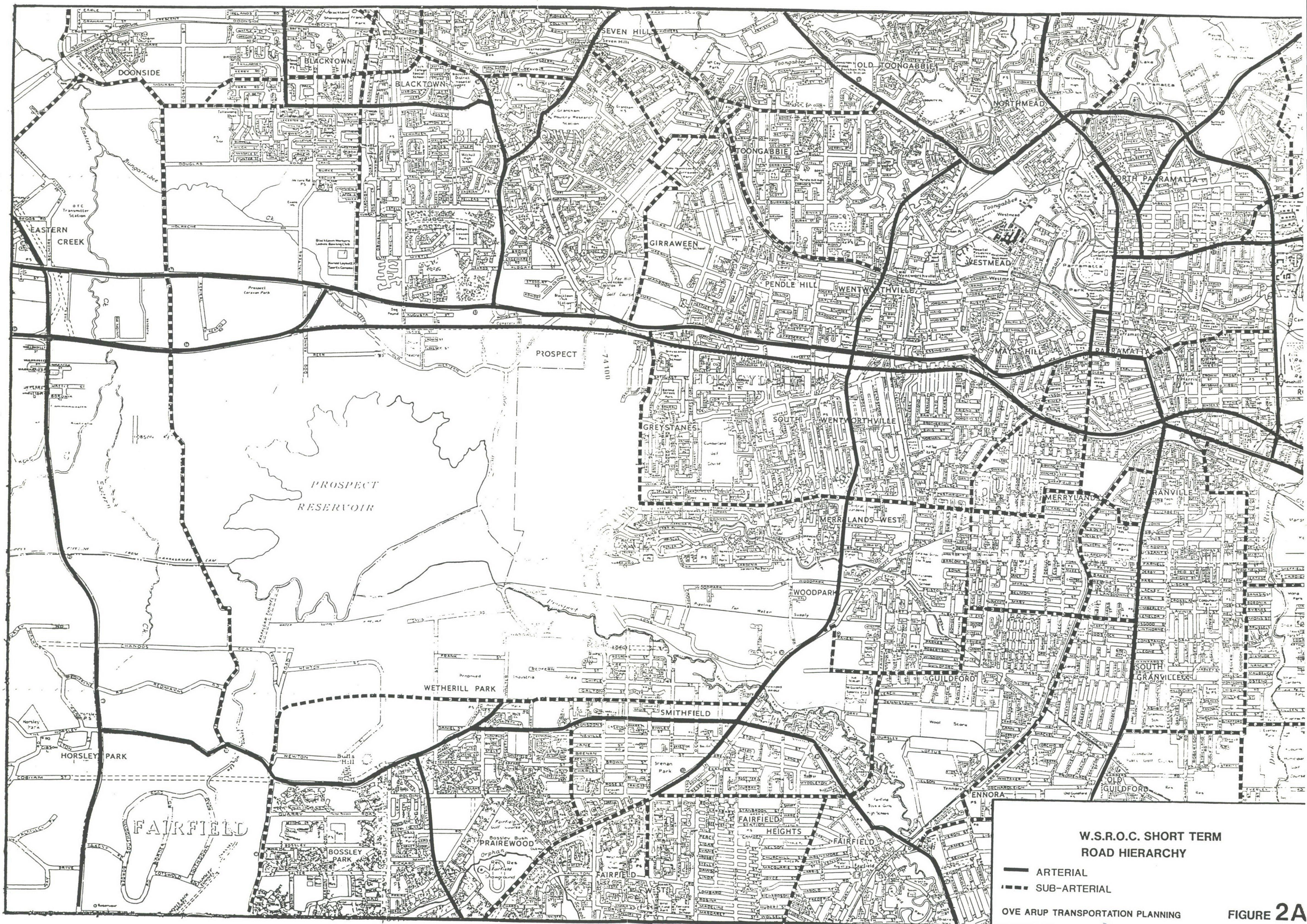


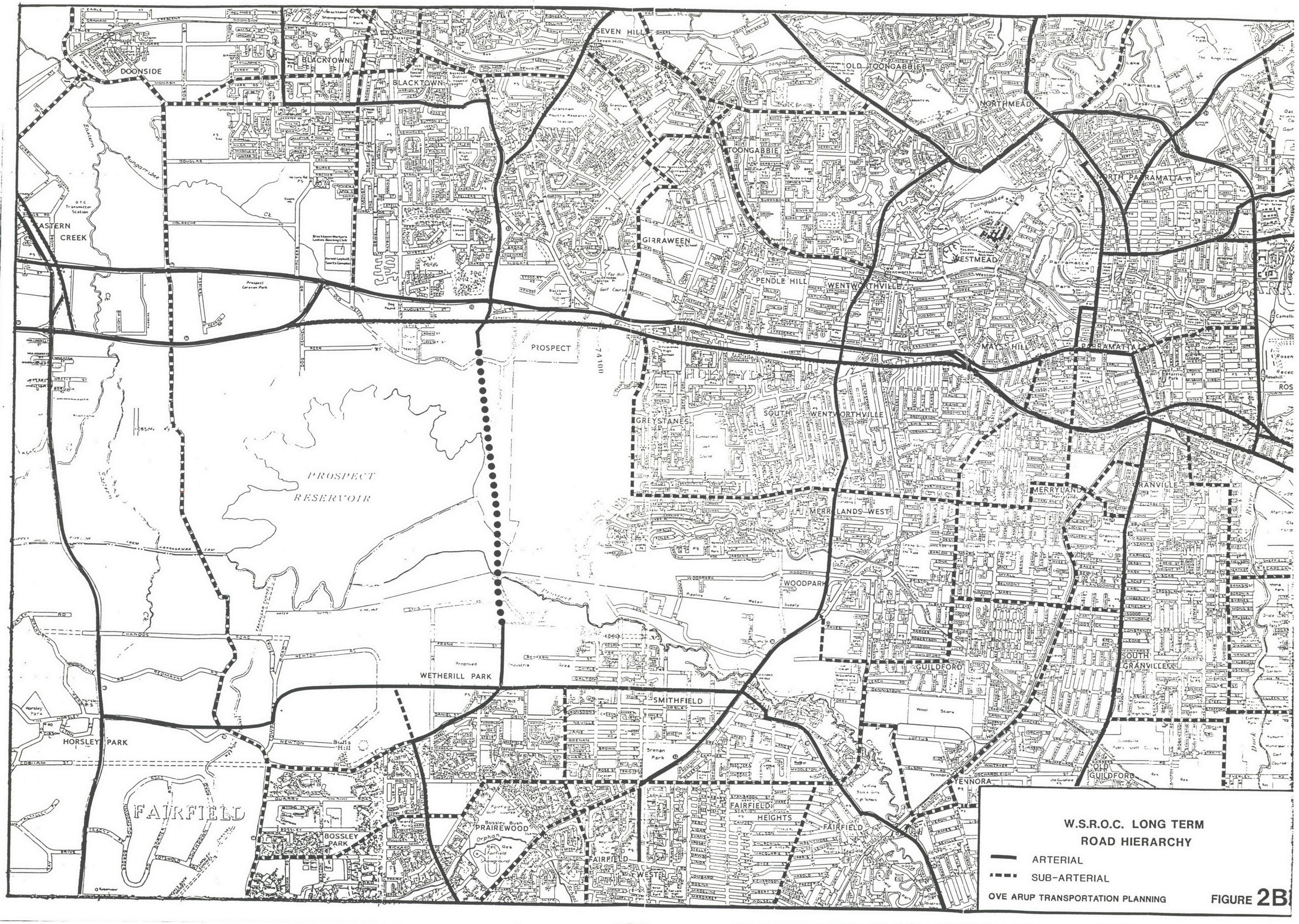


STUDY AREA

OVE ARUP TRANSPORTATION PLANNING

FIGURE 1


DOONSIDE
BLACKTOWN
SEVEN HILLS
OLD TOONGABBIE
NORTHMEAD
NORTH PARRAMATTA
EASTERN CREEK
GIRRAWEEN
TOONGABBIE
WESTMEAD
PENDLE HILL
WENTWORTHVILLE
MAYS HILL
PARRAMATTA
PROSPECT
PROSPECT RESERVOIR
GREYSTANES
SOUTH WENTWORTHVILLE
MERRYLANDS
MERRYLANDS WEST
GRANVILLE
WOODPARK
GUILDFORD
SOUTH GRANVILLE
WETHERILL PARK
SMITHFIELD
HORSLEY PARK
FAIRFIELD
BOSSLEY PARK
PRAIRIEWOOD
FAIRFIELD HEIGHTS
ENNORA
OLD GUILDFORD
W.S.R.O.C. SHORT TERM
ROAD HIERARCHY
ARTERIAL
SUB-ARTERIAL
OVE ARUP TRANSPORTATION PLANNING
FIGURE 2A



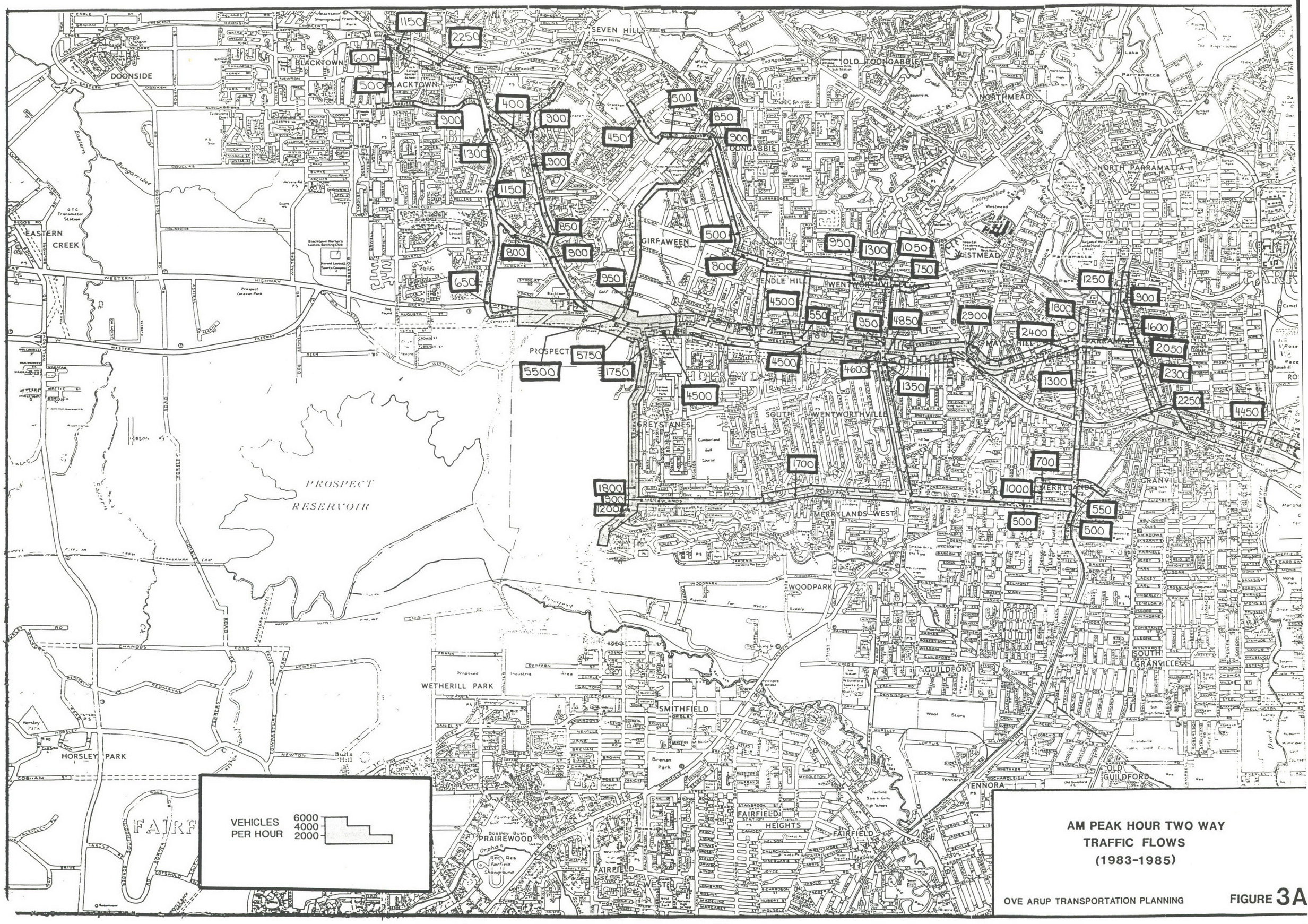
W.S.R.O.C. LONG TERM ROAD HIERARCHY

ARTERIAL

SUB-ARTERIAL

OVE ARUP TRANSPORTATION PLANNING

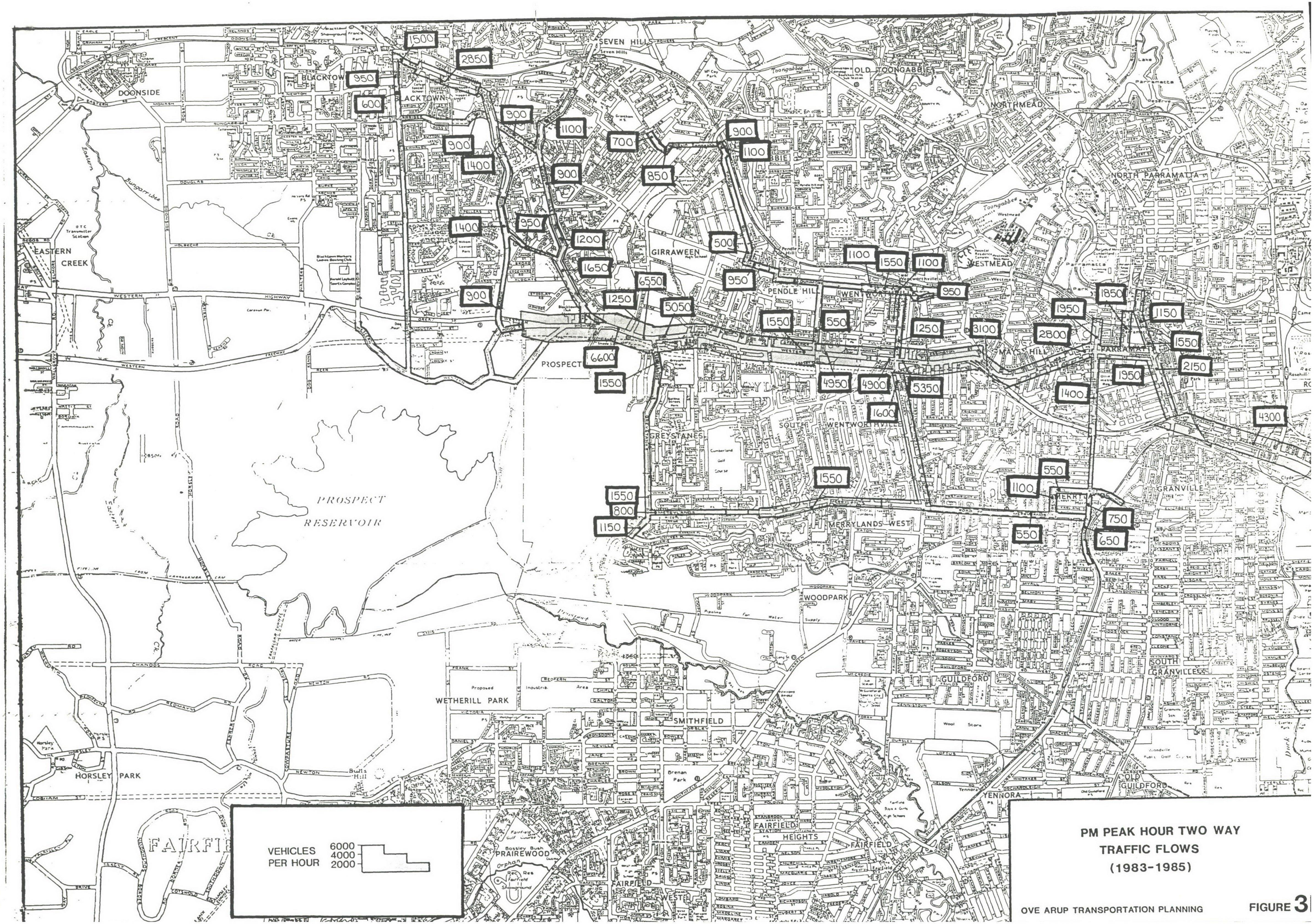
FIGURE 2B



AM PEAK HOUR TWO WAY TRAFFIC FLOWS (1983-1985)

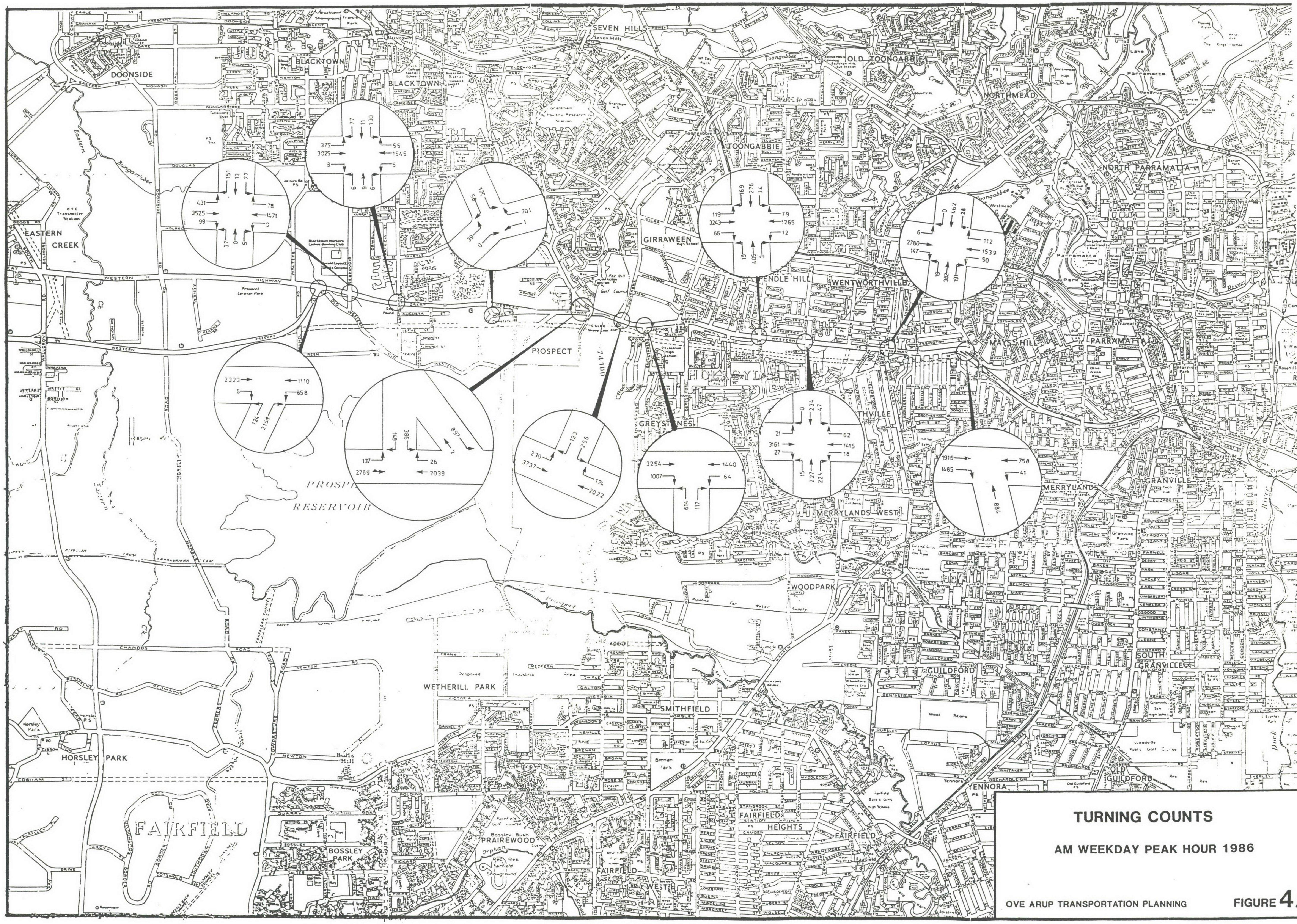
OVE ARUP TRANSPORTATION PLANNING

FIGURE 3A



PM PEAK HOUR TWO WAY TRAFFIC FLOWS (1983-1985)

FIGURE 3

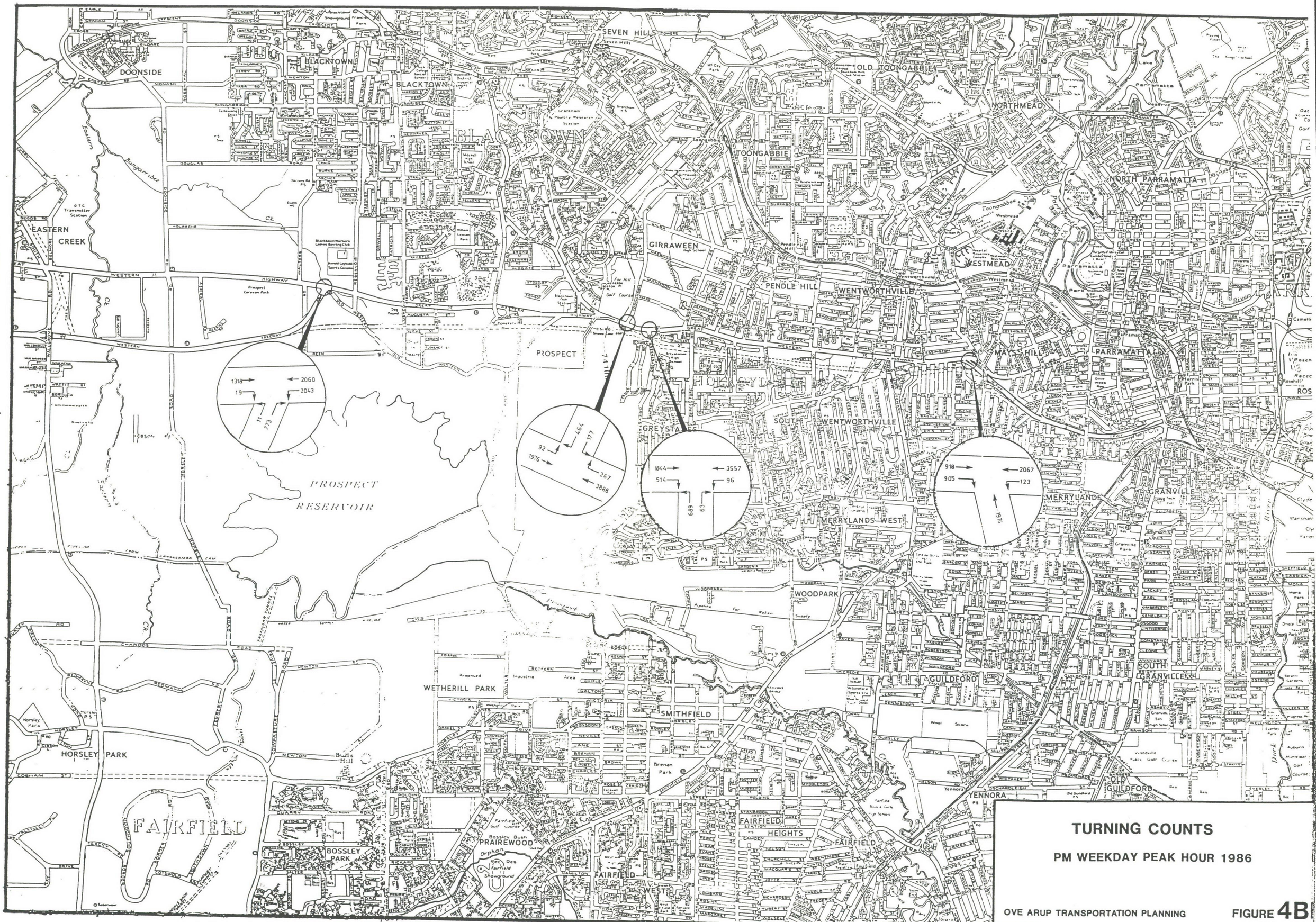


TURNING COUNTS

AM WEEKDAY PEAK HOUR 1986

OVE ARUP TRANSPORTATION PLANNING

FIGURE 4A

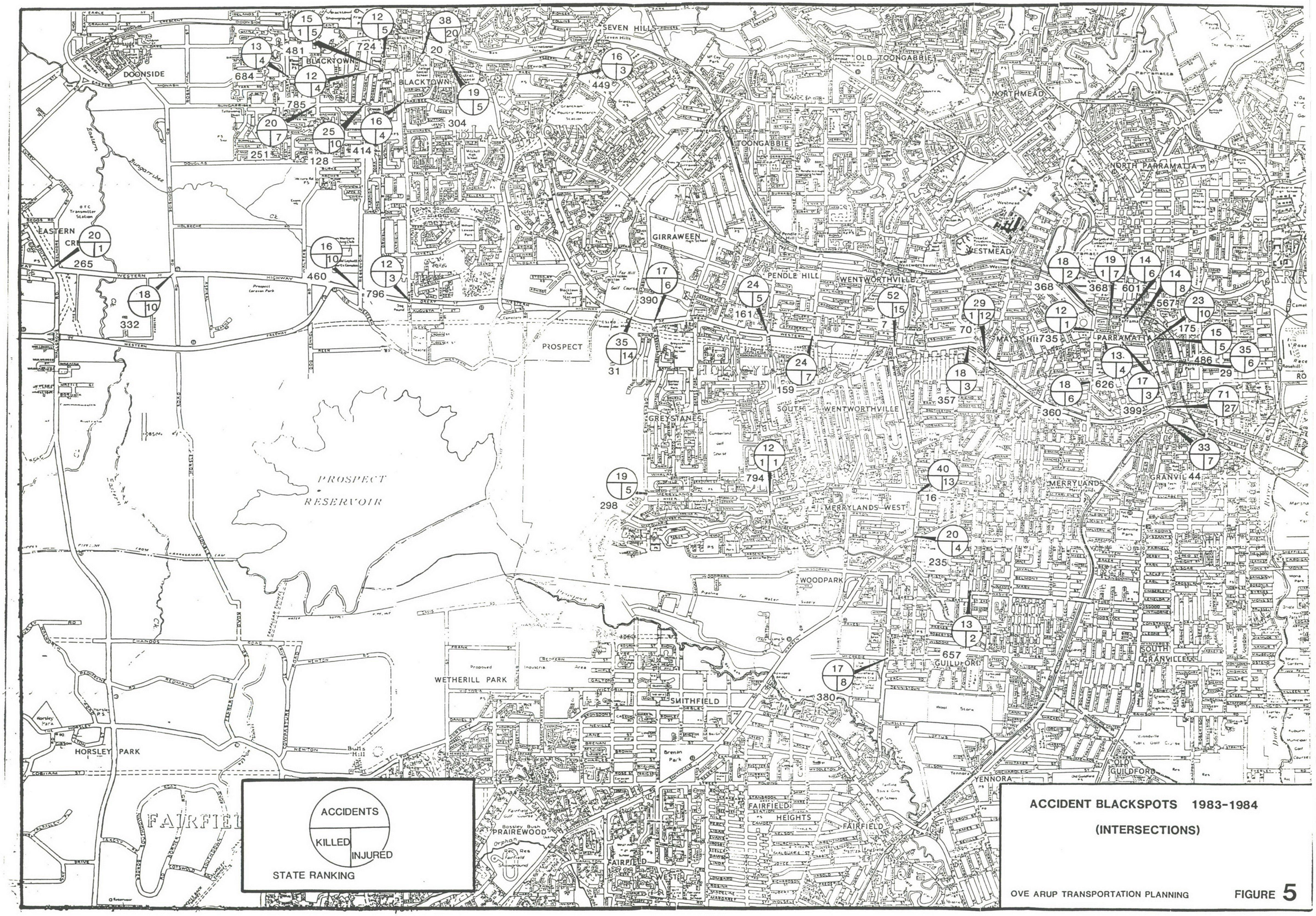


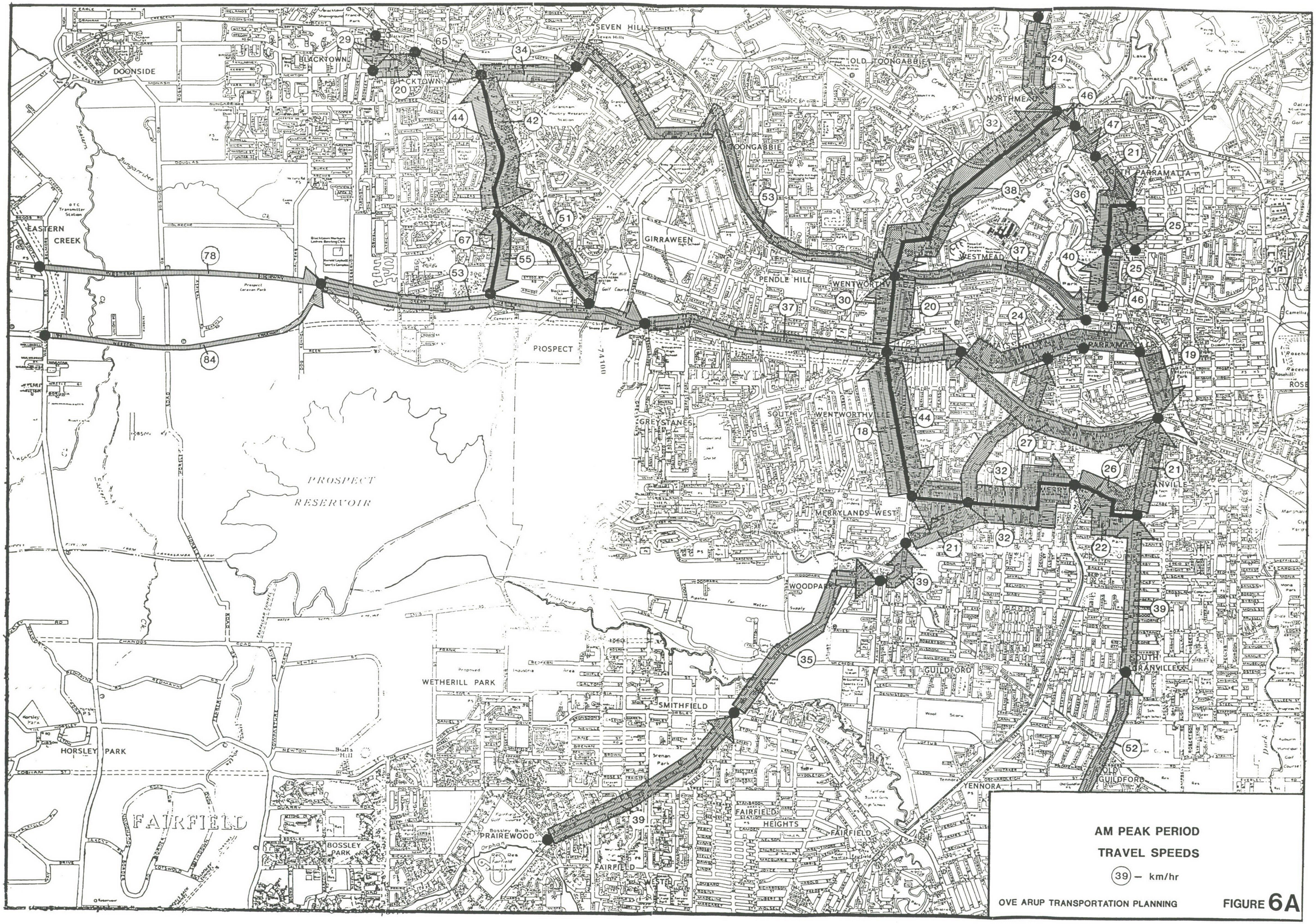
TURNING COUNTS

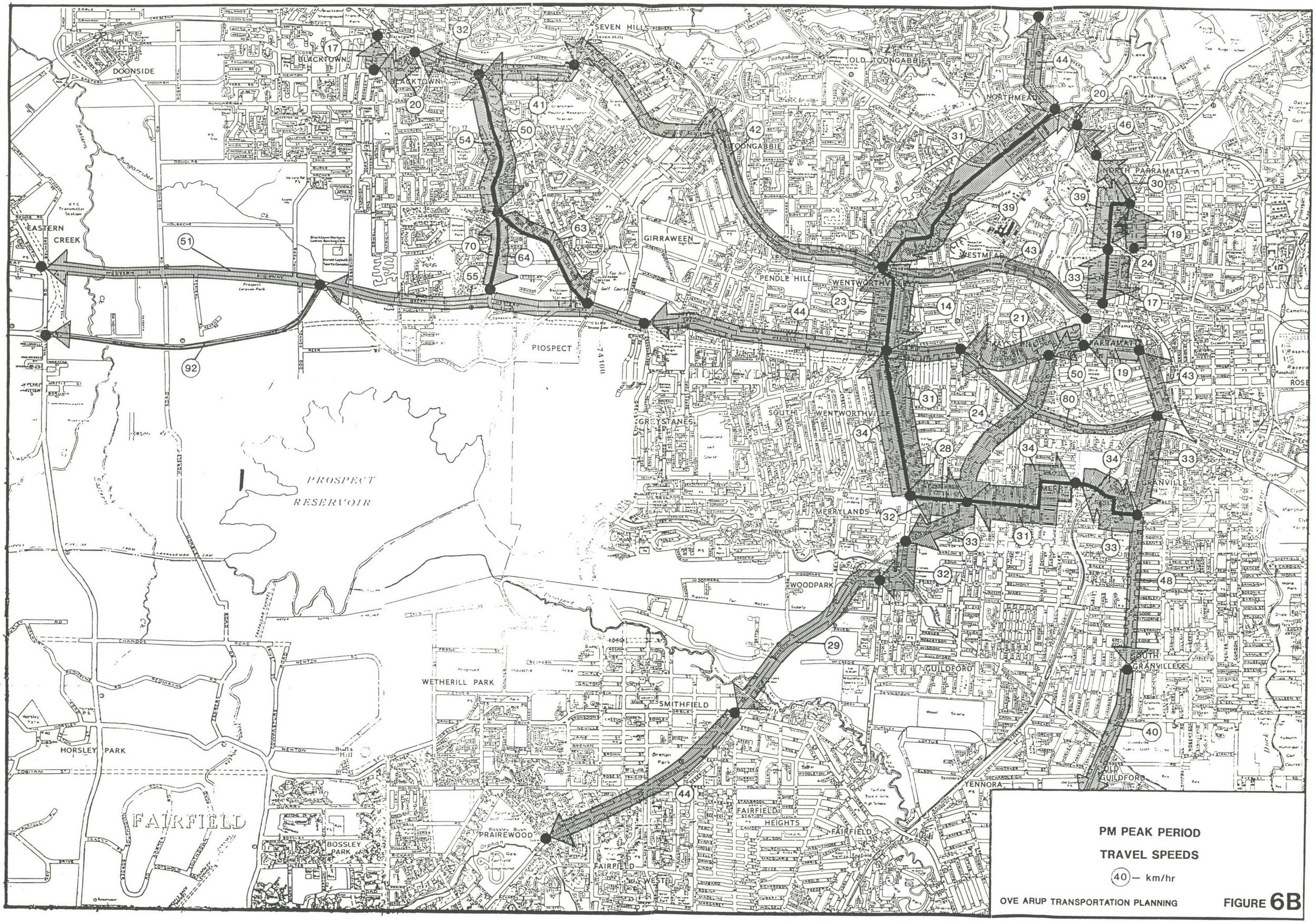
PM WEEKDAY PEAK HOUR 1986

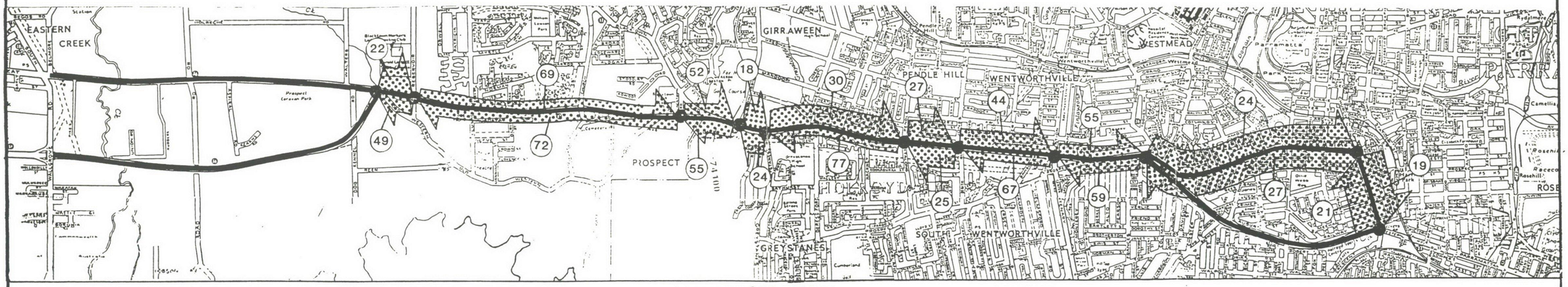
OVE ARUP TRANSPORTATION PLANNING

FIGURE 4B

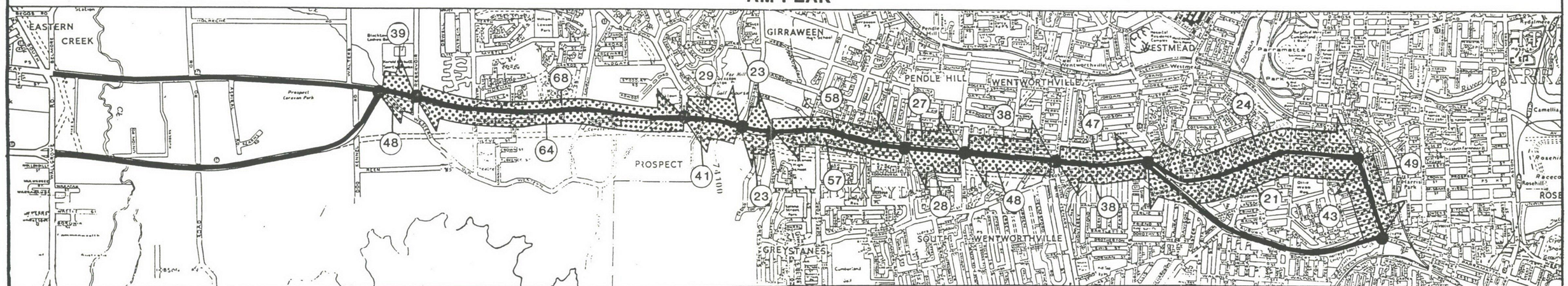

ACCIDENTS
KILLED
INJURED
STATE RANKING
ACCIDENT BLACKSPOTS 1983-1984
(INTERSECTIONS)
OVE ARUP TRANSPORTATION PLANNING
FIGURE 5
DOONSIDE
BLACKTOWN
SEVEN HILLS
OLD TOONGABBIE
TOONGABBIE
NORTHMEAD
NORTH PARRAMATTA
WESTMEAD
PARRAMATTA
EASTERN CREEK
GIRRAWEEN
PENDLE HILL
WENTWORTHVILLE
PROSPECT
PROSPECT RESERVOIR
GREYSTANES
SOUTH WENTWORTHVILLE
MAYS HILL
MERRYLANDS
MERRYLANDS WEST
GRANVILLE
WOODPARK
SOUTH GRANVILLE
GUILDFORD
OLD GUILDFORD
YENNORA
WETHERILL PARK
SMITHFIELD
FAIRFIELD
FAIRFIELD HEIGHTS
FAIRFIELD WEST
PRAIRIEWOOD
HORSLEY PARK


DOONSIDE
BLACKTOWN
SEVEN HILLS
OLD TOONGABBIE
NORTHMEAD
TOONGABBIE
NORTH PARRAMATTA
EASTERN CREEK
GIRRAWEEN
WESTMEAD
PENDLE HILL
WENTWORTHY
PROSPECT
PROSPECT RESERVOIR
GREYSTANES
SOUTH WENTWORTHY
MERRYLANDS WEST
WOODPARK
GUILDFORD
SOUTH GRANVILLE
OLD GUILDFORD
YENNORA
WETHERILL PARK
SMITHFIELD
HORSLEY PARK
FAIRFIELD
BOSSLEY PARK
PRAIRIEWOOD
FAIRFIELD HEIGHTS
FAIRFIELD WEST
AM PEAK PERIOD
TRAVEL SPEEDS
(39) – km/hr
OVE ARUP TRANSPORTATION PLANNING
FIGURE 6A

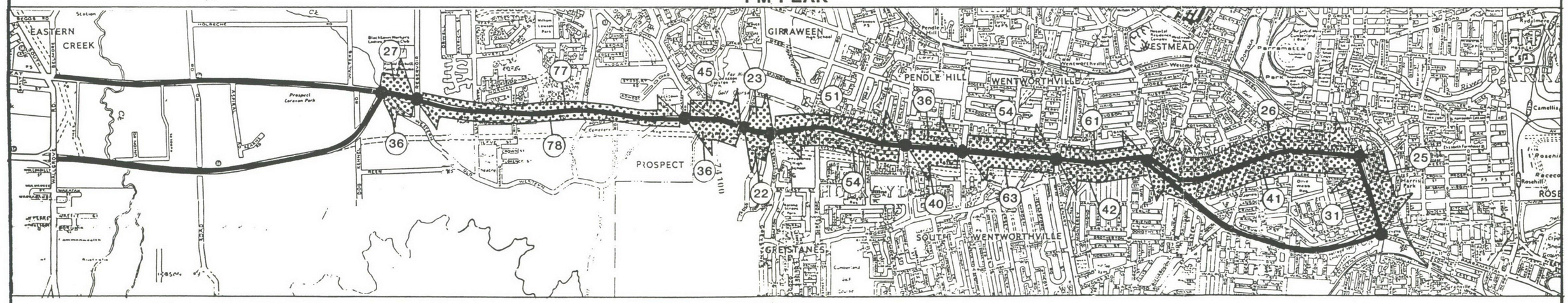

DOONSIDE
BLACKTOWN
SEVEN HILLS
OLD TOONGABBIE
NORTHMEAD
NORTH PARRAMATTA
EASTERN CREEK
GIRRAWEEN
PENDLE HILL
WENTWORTHVILLE
SOUTH WENTWORTHVILLE
MERRYLANDS
WOODPARK
GUILDFORD
SOUTH GRANVILLE
GRANVILLE
OLD GUILDFORD
YENNORA
PROSPECT
PROSPECT RESERVOIR
GREYSTANES
WETHERILL PARK
SMITHFIELD
HORSLEY PARK
FAIRFIELD
BOSSLEY PARK
PRAIRIEWOOD
FAIRFIELD HEIGHTS
FAIRFIELD WEST
PM PEAK PERIOD
TRAVEL SPEEDS
(40) — km/hr
OVE ARUP TRANSPORTATION PLANNING
FIGURE 6B



AM PEAK



PM PEAK



OFF PEAK

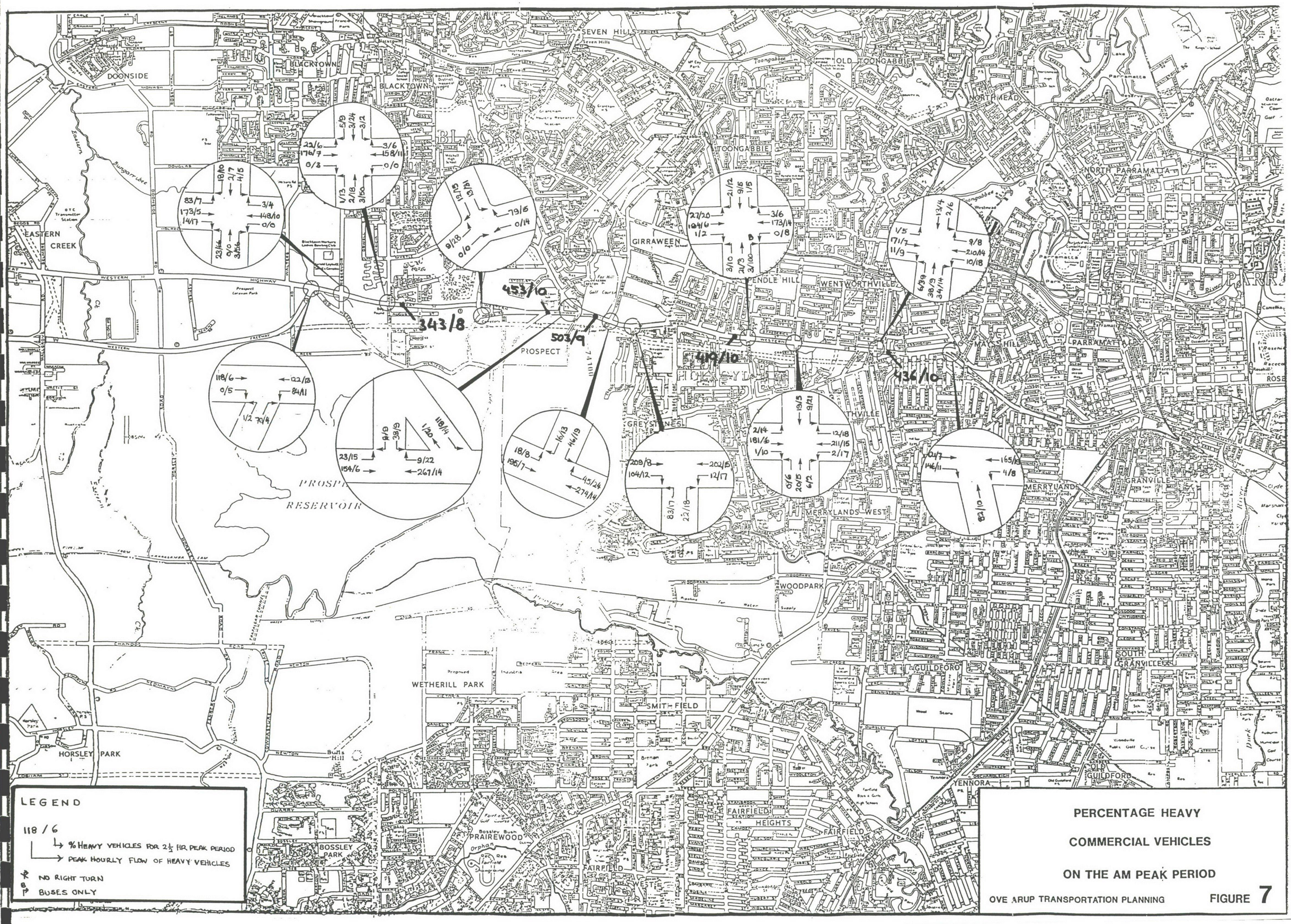
GREAT WESTERN HIGHWAY

DETAILED TRAVEL SPEEDS

(25) — km/hr

OVE ARUP TRANSPORTATION PLANNING

FIGURE 6C

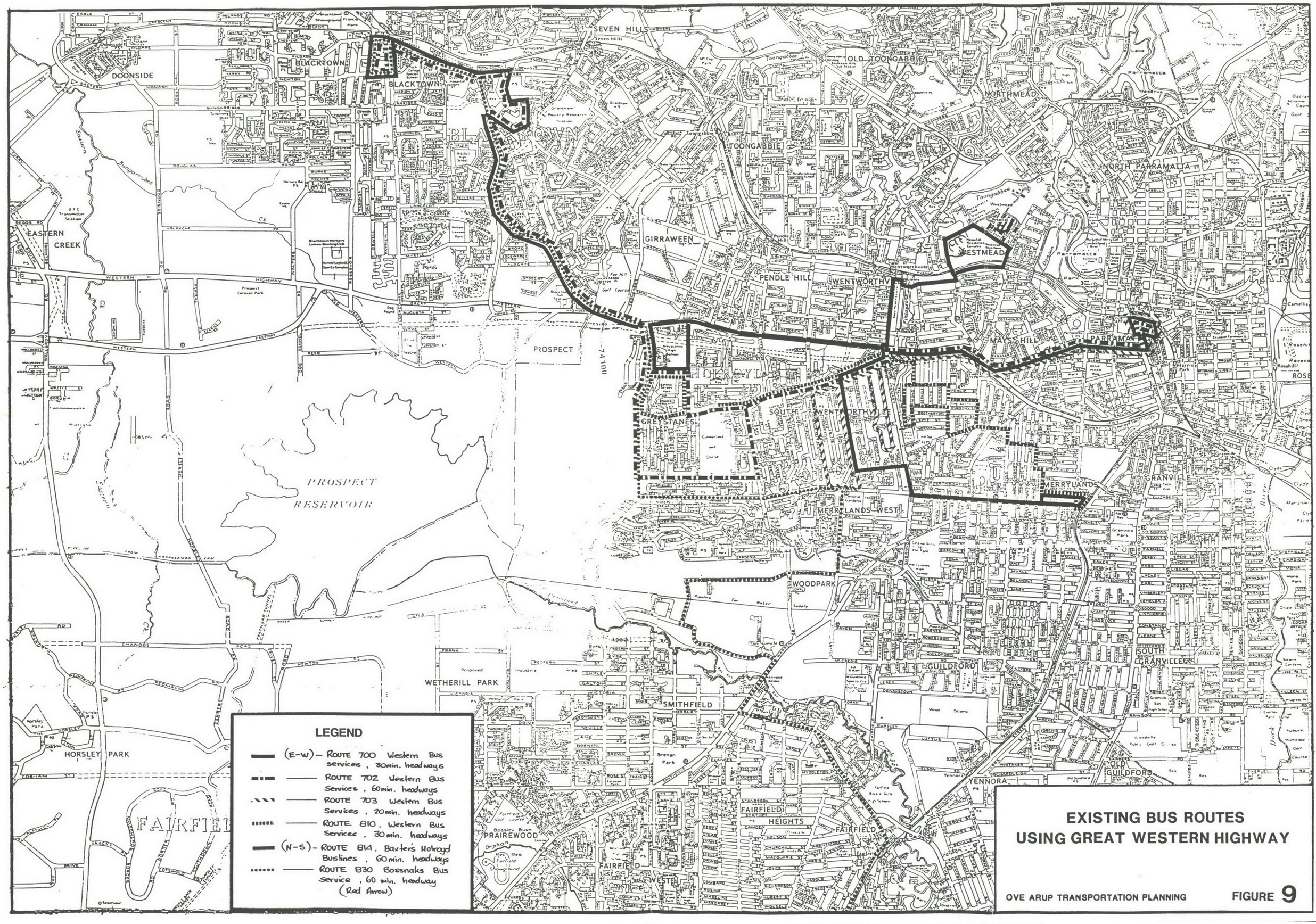

DOONSIDE
BLACKTOWN
SEVEN HILLS
OLD TOONGABBIE
NORTHMEAD
TOONGABBIE
NORTH PARRAMATTA
EASTERN CREEK
GIRRAWEEN
PENDLE HILL
WENTWORTHVILLE
PARRAMATTA
PROSPECT
PROSPECT RESERVOIR
GREYSTANES
MERRYLANDS WEST
MERRYLANDS
GRANVILLE
WOODPARK
SOUTH GRANVILLE
GUILDFORD
WETHERILL PARK
SMITHFIELD
FAIRFIELD HEIGHTS
FAIRFIELD
YENNORA
HORSLEY PARK
BOSSLEY PARK
PRAIRIEWOOD
453/10
343/8
503/9
419/10
436/10
LEGEND
118 / 6
↳ % HEAVY VEHICLES FOR 2½ HR PEAK PERIOD
→ PEAK HOURLY FLOW OF HEAVY VEHICLES
NO RIGHT TURN
BUSES ONLY
PERCENTAGE HEAVY
COMMERCIAL VEHICLES
ON THE AM PEAK PERIOD
OVE ARUP TRANSPORTATION PLANNING
FIGURE 7

SEVEN HILLS INDUSTRIAL ESTATE
DOONSIDE
BLACKTOWN
OLD TOONGABBIE
NORTHMEAD
TOONGABBIE
NORTH PARRAMATTA
EASTERN CREEK
ARNDELL PARK INDUSTRIAL ESTATE
HUNTINGWOOD INDUSTRIAL ESTATE
JOHN PIERCE TRANSPORT
JAX TYRES
P & O COLD STORES
CORDINA CHICKENS
PROSPECT IND. EST.
WESTMEAD
WENTWORTHVILLE
PERMANENT PANTRY
BAIADA CHICKENS
PROSPECT
PARRAMATTA
BLUE METAL INDUSTRIES (QUARRIES)
GREYSTANES
SOUTH WENTWORTHVILLE
PROSPECT RESERVOIR
MERRYLANDS
GRANVILLE
PLANTERS NUTS
WOLSLEYS CASTLE
SUNBURST REGENCIES
MERRYLANDS WEST
NATIONAL ASSOCIATES PLYWOOD
TNT
BLACKWOODS
ECKS SOFT DRINKS
JOHNSTONS TRANSPORT INDUSTRIES
COLES DISTRIBUTION CENTRE
WETHERILL PARK INDUSTRIAL ESTATE
WETHERILL PARK
GUILDFORD
SMITHFIELD
WOOLWORTHS DISTRIBUTION CENTRE
YENNORA WOOL CENTRE
HORSLEY PARK
COMALCO
FAIRFIELD
FAIRFIELD HEIGHTS
BOSSLEY PARK
PRAIRIEWOOD
FAIRFIELD WEST

LOCATION OF MAJOR GENERATORS OF HEAVY TRANSPORT

OVE ARUP TRANSPORTATION PLANNING

FIGURE 8



EXISTING BUS ROUTES USING GREAT WESTERN HIGHWAY

OVE ARUP TRANSPORTATION PLANNING

FIGURE 9