Accommodating North Canberra's Transport Needs.

Steven Walker,
Associate Director,
Ove Arup & Partners

Peter Dunn,
Senior Engineer,
Ove Arup & Partners

bstract:

study is currently under way to develop a Traffic Management Strategy for Northbourne Avenue in anberra. Northbourne Avenue is the major north-south arterial road which bisects North Canberra. part from its function as access to the city centre, about 50% of its traffic volume is through traffic to her locations in Canberra. In urban design terms, it is the gateway to Canberra from the north, from hich the majority of interstate visitors approach Canberra. The development of the new town, ungahlin, ultimately to a population of over 100,000, will increase pressure on an already congested ansport corridor along Northbourne Avenue. There are many implications on the staging of this velopment, and the road and transport infrastructure required to service the new town. In fact, ere are currently only two major arterial connections to Gungahlin, and previous studies have dicated the need for up to 10 lanes of traffic in either direction.

hile the objective of the Northbourne Avenue Study is to provide an integrated traffic management ategy for all intersections along Northbourne Avenue, it soon became apparent that the study had ajor area wide implication. It therefore needed to consider the overall transport network operations oth the short and medium term. The study develops and assesses alternative road strategies, and l address the outcomes of the full social audit approach to evaluating the strategy; when this stage the project is undertaken. An important feature of the project is the development and use of a orid TRIPS and TRANSTEP model for Canberra, which allowed intersections to be accurately resented. The implications of urban design, public transport provision, air quality and noise have, l will influence the outcome of this traffic study. This paper describes a study which illustrates the nplex relationship between, land use planning, and the transport system (including both public and vate modes) in Canberra.

ntact Author:

r Dunn
Arup & Partners
ills Court
KIN ACT 2600

hone: (06) 281-1711
(06) 282-5333

1. INTRODUCTION

This paper will address the processes employed in undertaking the study into the management of traffic in the Northbourne Avenue corridor, as its primary objective. The findings of the study to date will be discussed, and their resultant impact on transport planning in Canberra. It is important to note that the study is yet to be completed, having been delayed by inter-government negotiations, and by the need to consider a range of other relevant external issues as part of the process.

2. CANBERRA CONTEXT

As the Nation's Capital, Canberra is viewed as a showplace for urban planning and design. It is in this context, that the City's original architect and planner, Walter Burley Griffin, is still seen as setting the fundamental framework for Canberra's urban fabric. This continuing pursuit of the Griffin plan is rarely questioned despite the growth of Canberra to a city many times the size envisioned by it's original planner.

Canberra has also inherited an overall metropolitan urban form which owes nothing to Griffin. Based as it is on the American model of dispersed dormitory suburbs supported by car based mobility, perhaps as a result of the imported expertise of consultants employed by the National Capital Development Commission (NCDC) in the 1960's which gave Canberra a transport driven planning agenda. This is still very much the planning agenda, but as with most Australian cities the policy emphasis is now very much about changing travel behaviour to alternative modes. Notwithstanding this change of policy, the private vehicle will predominate as a means of personal mobility, and it currently accounts for about 80% of the journey to work throughout Canberra. The resultant levels of traffic movement have been kept at manageable levels by the dispersal of employment and retail activities to the three town centres in addition to the central area (Civic and the Parliamentary triangle). This polycentric approach to urban development has proven quite successful in containing the overall growth in car travel in this car based city.

3. KEY ISSUES

Northbourne Avenue

Northbourne Avenue is one of Griffin's key avenues, and it is the City's principal approach route for visitors from interstate, as it connects the Federal and Barton Highways (both of which link to the Hume Highway and Sydney and Melbourne respectively) to the City centre. The Avenue forms the principal north - south axis of north Canberra, and is one of the principal arterial roads in the City. Providing a progressive sense of arrival along the Avenue and the related urban design issues are major aesthetic considerations in any design for transport solutions in this corridor.

Indeed they are given primacy over transport safety and efficiency considerations by the National Capital Planning Authority (NCPA).

Northbourne Avenue performs an arterial road function and does have safety and capacity problems at many of its principal intersections. The Study was commissioned to address these traffic problems on a network basis rather than looking at each problem along the Avenue in isolation. As congestion increases along this corridor, traffic has begun to infiltrate the surrounding suburban streets, which are included in the Study area, as shown on **Figure 1.**

The purpose of this study was to provide a strategy for Northbourne Avenue, particularly the intersections, for the short term (5 year) and medium term (15 year) scenarios. Therefore upon considering the network effects, the study needed to progress to a micro level of analysis to consider such issues as:

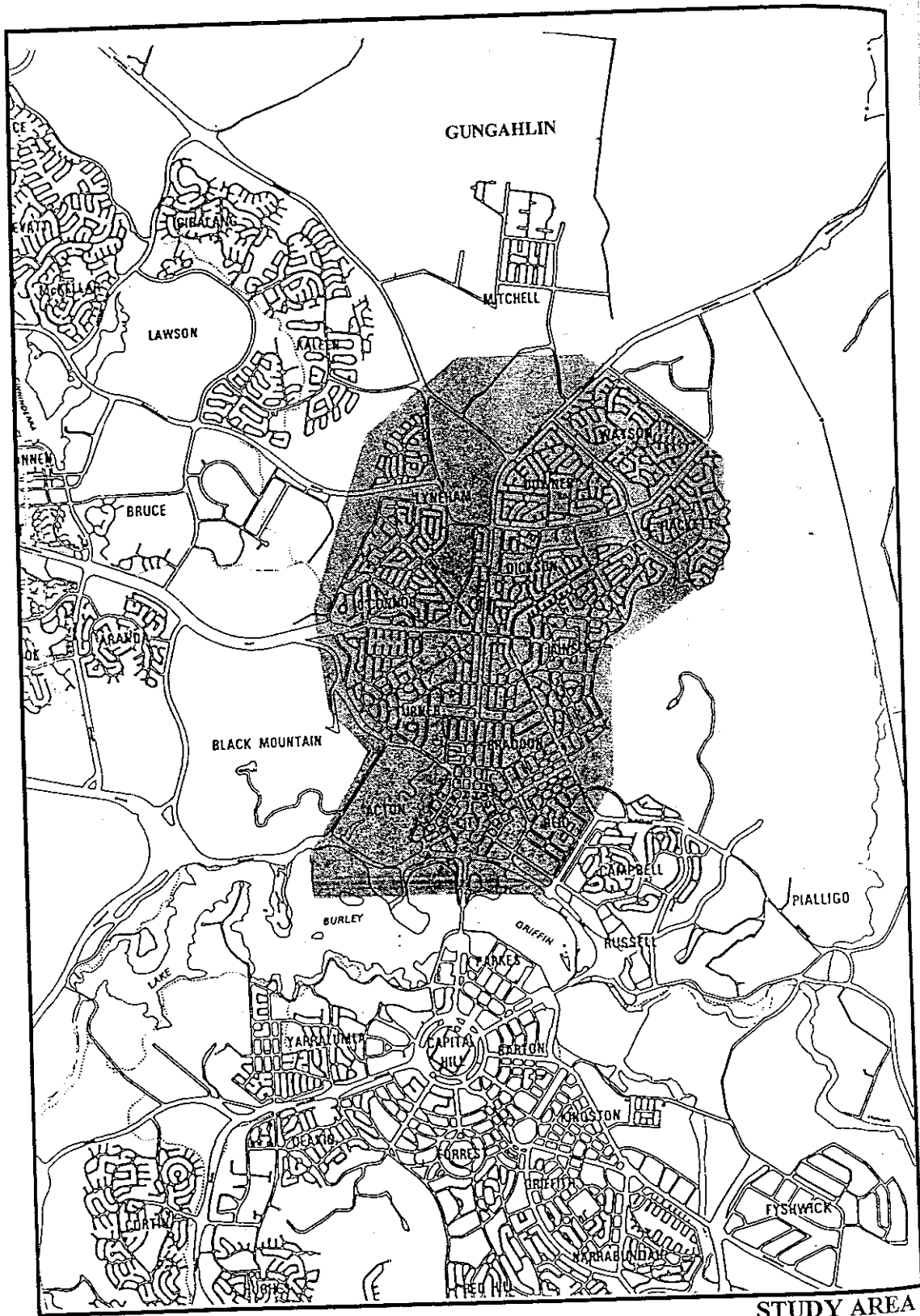
- The "boxed turn" layouts at some of the signalised intersections which restrict traffic capacity along Northbourne Avenue;
- Intersections which have bad accident histories, particularly the Northbourne Avenue/Barry Drive intersection;
- Other road users including public transport passengers, pedestrians and cyclists.

A study which is being undertaken in parallel, the Future Public Transport Options Study (FPTOS) provides input to this study by defining possible public transport scenarios.

Gungahlin

Gungahlin, is Canberra's newest town, located to the north west of existing Canberra lying between the Barton and Federal Highways. Northbourne Avenue currently provides the most direct arterial road link between the new urban area, and Canberra's major employment areas in the City centre. Gungahlin, (which was originally planned for a population 85,000) is currently expected to have a peak population of at least 100,000 within 25 years. It will have it's own town centre, but it is likely that generating significant levels of employment in this centre will prove more difficult than in the past when the former NCDC had policies which were able to control the location of Commonwealth office space.

The ACT Planning Authority's (ACTPA) policy objective is to provide 35% of the total employment, for people living in Gungahlin. Even if this is achieved, the traffic demand between Gungahlin and North Canberra will be high, requiring additional road capacity. By way of comparison Tuggeranong (which currently has a similar population to the ultimate population of Gungahlin) has four major road connections to the rest of Canberra, whereas Gungahlin effectively has two (Northbourne Ave and William Slim Drive). It is also pertinent to note that the Gungahlin External Transport Study



STUDY AREA
FIGURE 1

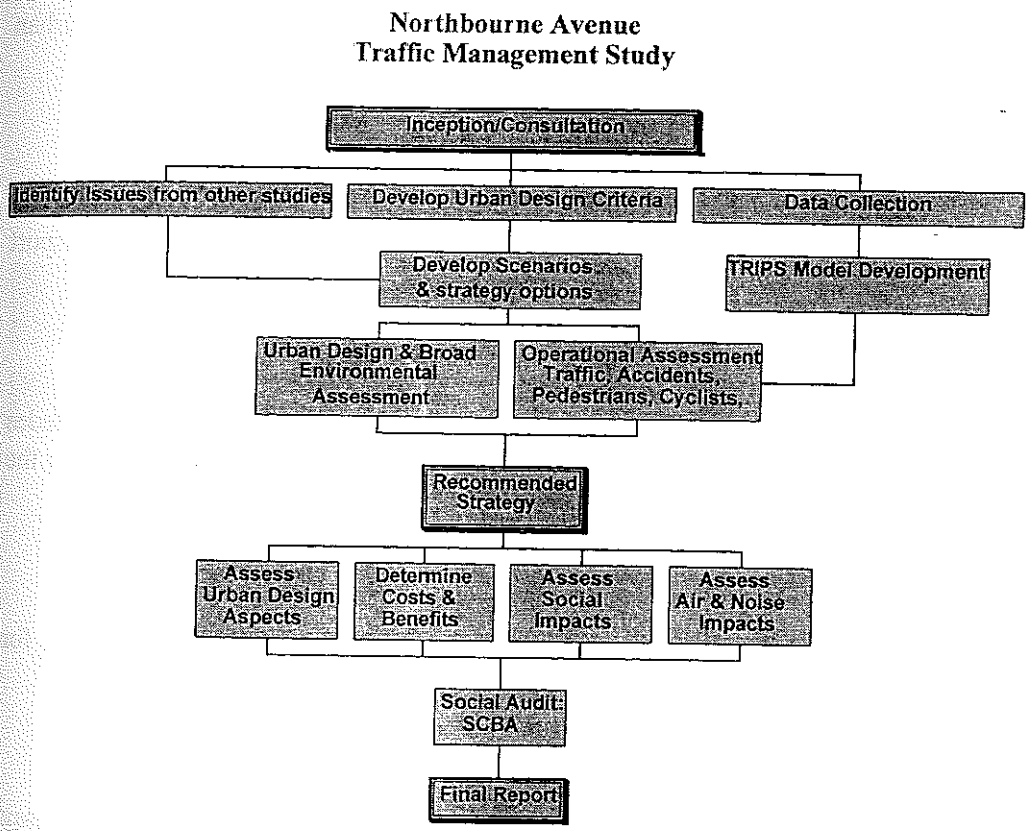
identified the need to have 10 lanes of arterial roads serving Gungahlin in each direction, for a population of 85,000 [1]

4. STUDY APPROACH

Overview

The approach we have developed is based on a Social Audit evaluation process as described in the ACT Government's Guidelines for the Assessment of Needs - Appendix B [2]. This in turn was based on the "ACT Transport Capital Works Programme User Guide to the Social Audit of Transport Projects", (ATP) [3].

The overall approach as illustrated diagrammatically in **Figure 2**, is designed to use this evaluation technique to demonstrate the benefits of the Traffic Management Strategy being developed.



STUDY PROCESS
FIGURE 2

This process requires:

(a) An operational transport / traffic analysis at various levels (network/route/intersection)

(b) An environmental assessment of air quality and traffic noise, and a qualitative assessment of any social impacts

(c) Urban design assessments which will be fundamental to the "marketability" of the outcome in the context of the National Capital

(d) An economic evaluation

Using a Social Audit approach allows all of these aspects to be considered in an overall evaluation process using a planning balance sheet. The operational evaluation yields outputs fundamental to the quantitative analysis of Benefits and Costs as well as air quality, and acoustic impacts.

Strategy Option Development

Three broad options were identified, initially, as a basis for developing detailed traffic strategies along Northbourne Avenue, taking into consideration the important urban design and public transport aspects, as detailed below:

- ***Option A: Maximum Traffic Constraint along Northbourne Ave***

  Maximises urban design opportunities along the Avenue by maintaining its formality, while retaining current road layouts. It provides for public transport priority within the existing road reserve where possible.

- ***Option B: Median Traffic Constraint along Northbourne Ave***

  A scenario representing a balance between traffic needs and other demands. Includes some increase in capacity at intersections, and a public transport right of way in the median of the Avenue.

- ***Option C: Least Traffic Constraint along Northbourne Ave***

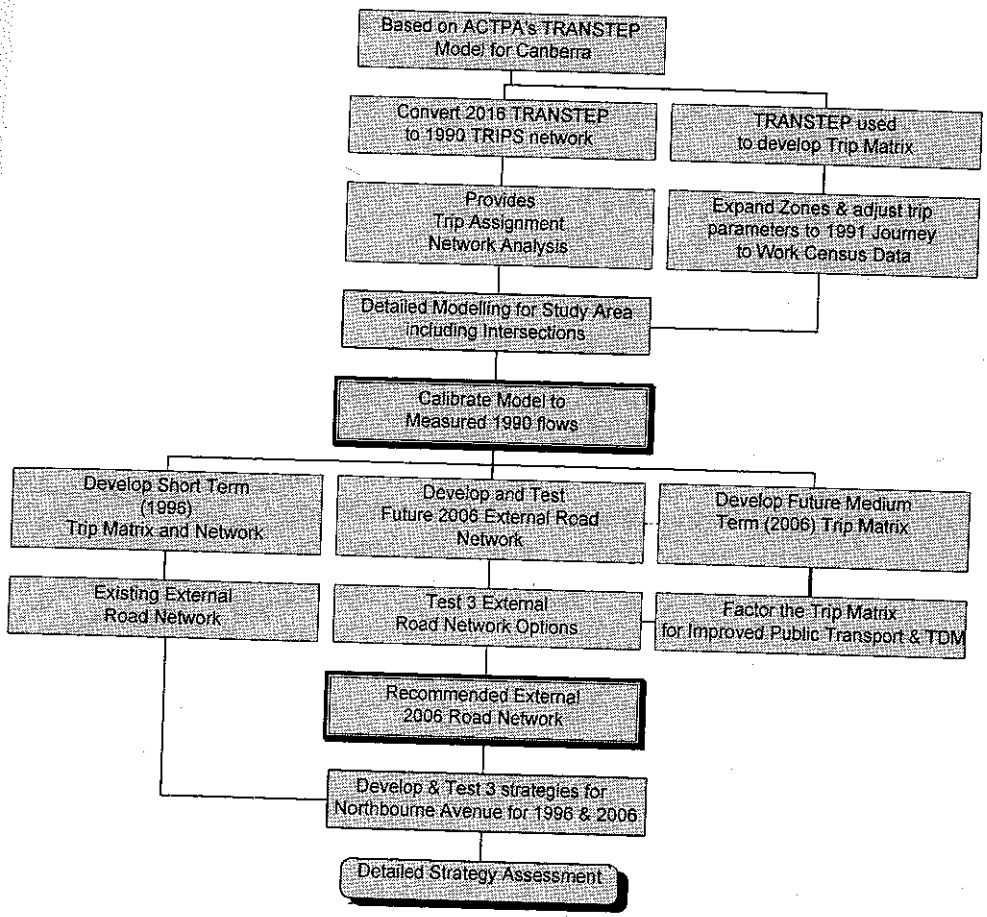
  Represents maximum traffic capacity that can be provided, with no provision for public transport priority along the Avenue

Traffic Modelling

The study is required to establish realistic scenarios at the metropolitan scale as a basis for input into the following levels of analysis:

- network impacts at the study area level
- future traffic operations at a route or sub-system level (Northbourne Avenue)
- detailed assessment of individual site operations along the corridor, including future intersection layouts.

In order that this multi-level analysis could be achieved, a multi stage modelling procedure was devised. The existing ACTPA strategic model of Canberra used TRANSTEP. However, the network model clearly needed to have the capability to model intersection delays, given that intersections are the critical capacity element in congested urban road networks. As TRIPS provides this facility, it was seen as an appropriate tool for this study. The model predicts morning peak hour flows; the critical peak hour in Canberra. **Figure 3** illustrates the modelling approach undertaken for this study, which is described in more detail in the next section.



MODELLING PROCEDURE
FIGURE 3

Traffic Assessment Issues

The traffic assessment of the strategy, originally intended to test three Northbourne Avenue Strategy options for the short term (1996) and medium term (2006) development scenarios, based on an agreed realistic external road network. However a further stage in the process soon evolved. Given the current road funding levels, and a political climate which dictated a reluctance to build new roads, a realistic future road network external to the study area had not been determined. In order for the study to

yield meaningful results, a realistic medium term road network needed to be established, and agreed. Other assumptions needed to be made with respect to future mode splits, incorporating where possible results from FPTOS [5]

Preferred Strategy

The development of the preferred strategy takes into consideration the traffic and urban design impacts, and the environmental aspects in a broad sense. The agreed strategy will then be assessed using the Social Audit procedures discussed above. (*at the time of writing this has yet to be undertaken, and is awaiting final comments on the strategy from various Government stakeholders*)

5. MODEL DEVELOPMENT

General

The Northbourne Avenue Study Model is a hybrid model which uses features of the TRIPS and TRANSTEP network modelling programs. It was derived from the ACTPA TRANSTEP regional model for Canberra with major enhancements to meet the needs of this study.

The model is used in the following manner:

- The road network is represented by a TRIPS network model and includes modelling of junction delays in the study area, and on some external road corridors. This model is used to undertake traffic assignments, providing traffic volume forecasts and also travel time skims for input to the traffic distribution process;

- Traffic generation and distribution are undertaken using the TRANSTEP Activity Patterns module. This process produces trip matrices for assignment to the TRIPS network model.

- SIDRA and TRANSYT are used to provide a more detailed analysis of intersections. They can provide saturation flows, and signal timings which can be input to the model. This is an iterative process which allows the impact of intersection works to be represented on a metropolitan scale

The land use data supplied by ACTPA for 1990, 1996, 2006, was used as a basis for traffic generation and distribution.

Calibration

The ACTPA had expanded their future year TRANSTEP models, but had not adjusted their calibrated 1990 model. Their 2016 and 1996 model incorporated 523 zones whereas the 1990 model incorporated 190 zones. The needs of this study required that

our model should be based on the level of detail present in their future year models. It was therefore necessary to convert the 1996 TRANSTEP network to a 1990 TRIPS base network.

The model was then enhanced to incorporate the following features:

- The addition of 4 basic link types to allow separate representation of multi lane divided roads
- Inclusion of all roads with a significant through traffic function
- Over 180 junctions within the study area; and major signalised intersections in eastern Belconnen (outside the study area);
- Disaggregation of zones within the study area to more finely represent the location of traffic generation sources. This has increased the overall number of zones in the model from 523 to 573. In the Civic area, the adopted zone system basically represents all blocks individually;
- An analysis approach which distributes the Civic area trip demand to the carpark areas that attract the vehicle trips, rather than the landuse / employment zones;

The calibration of the model was then undertaken by comparing model outputs to recorded traffic volumes for 1990, concentrating on comparing volumes at key screenlines on the regional road network. The study area itself was calibrated in more detail, particularly along Northbourne Avenue (including turning movements). [6]

Future Year Models

Using the calibrated TRIPS network model, base 1996 and 2006 networks were developed. The 1996 model was established using the road network extant in 1993, and existing (calibrated) trip parameters.

In order to build the 2006 model a base external road network needed to be established, from which the trip matrix could be calculated. The initial trip matrix was developed assuming the maximum external roads provision scenario, and 1990 travel parameters (ie assuming minimal shift to public transport). Not surprisingly (given that the medium term scenario includes an additional 60,000 population in Gungahlin), this resulted in a severely congested road network, with average speeds in the study area in the order of 6 kph. So that a realistic trip matrix could be established the matrix was factored using the available results of FPTOS, to account for the following:

- peak spreading occurring as a result of increased congestion throughout the Canberra road network
- shift to other modes due to increased traffic congestion

- improved public transport services to employment nodes
- strategies for increasing vehicle occupancy at employment nodes

This trip matrix would be used to test all medium term options, as the overall level of service of public transport was assumed to remain constant across the options Understandably, any additional capacity provided in the external road network, swamped the impact of different traffic management strategies along Northbourne Avenue It was therefore necessary to develop an external road network as a basis for the assessment Three options were tested from minimum road provision through to maximum road provision

6. EXTERNAL ROAD NETWORK STRATEGIES

The assessment of these external road network strategies concluded that significant new road capacity was necessary to maintain current levels of service. In addition, a major road link between John Dedman Parkway, and Barry Drive was recommended, due to the need to have additional road capacity between Civic and Gungahlin. [7] **Figure 4** shows the impact of this link on the network

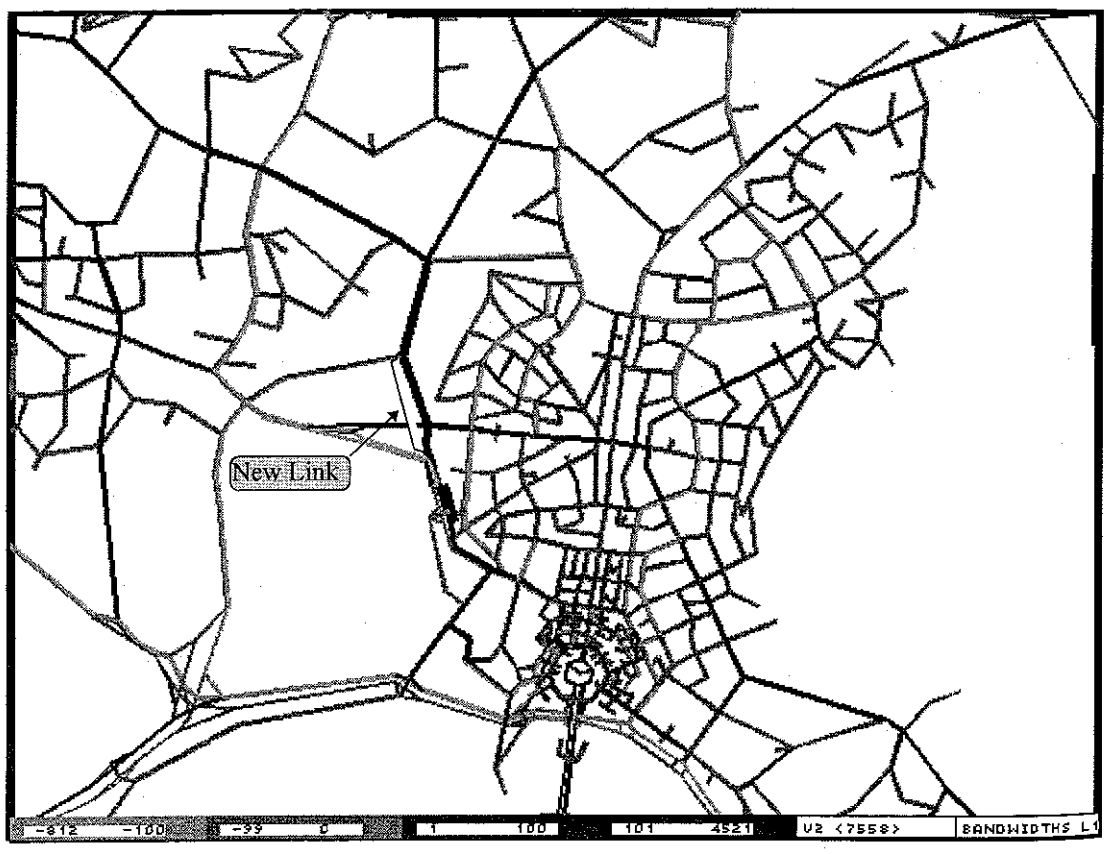


FIGURE 4

It is also apparent that traffic levels on Northbourne Avenue will increase to its available capacity because it is the most direct link to Civic, North Canberra and South Canberra. A further road connection, as shown above, results in minor reductions of traffic on Northbourne Avenue, ***but significantly reduces traffic on local North Canberra streets***. This strategy now forms the basis for the medium term road network strategy in the ACT's Capital Works program. This external network was then fixed as a constant, and used as a basis for testing the three alternative strategies along Northbourne Avenue.

7. STRATEGY OPTIONS

Figure 5 shows diagrammatically the current intersection controls along Northbourne Avenue.

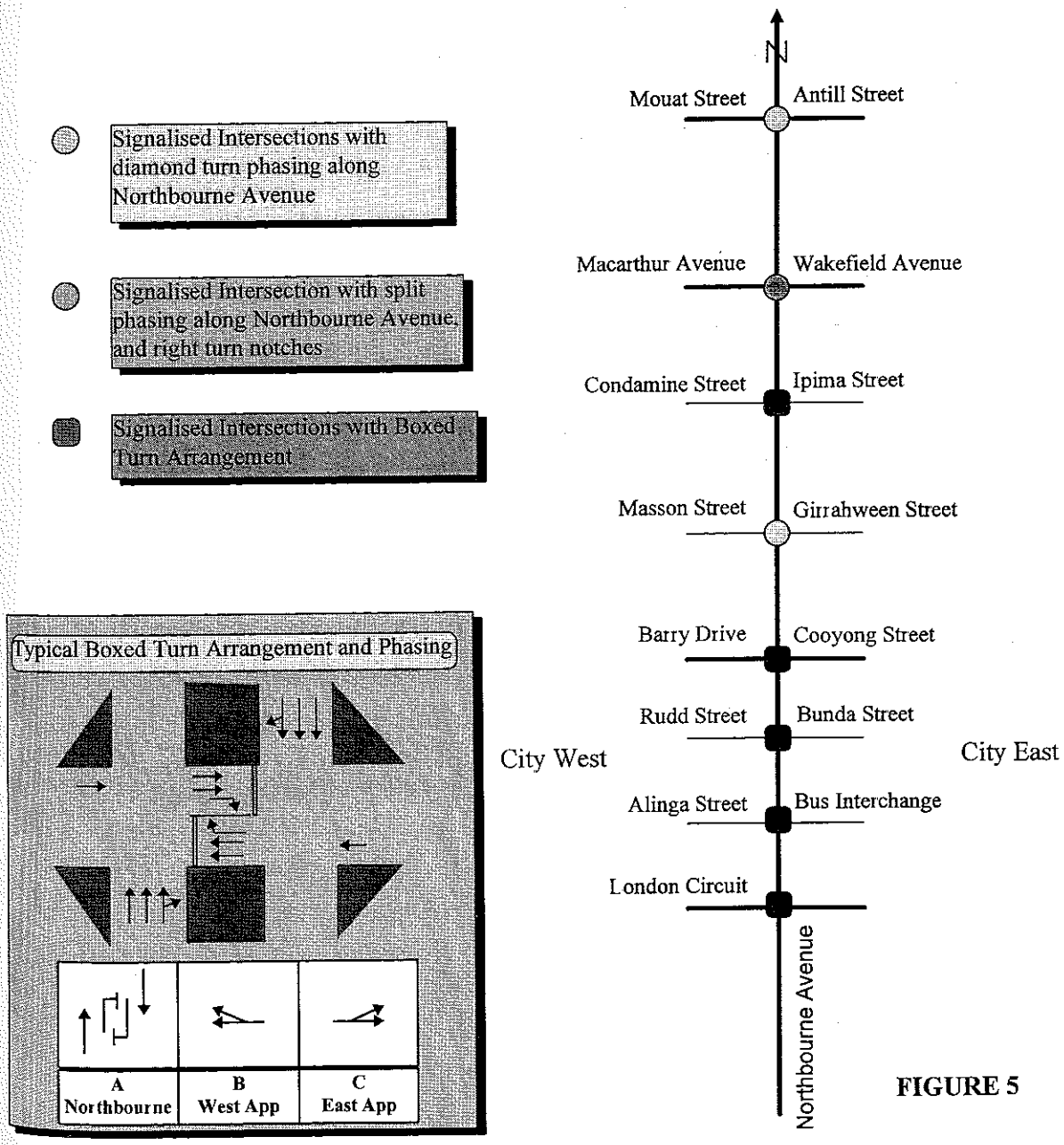


FIGURE 5

The "Boxed Turn" arrangement is a critical capacity constraint in the corridor particularly where right turn demand is high. This is because traffic turning right from Northbourne Avenue has to store in the median until the green phase on the cross street The median has a fixed capacity, and as cycle time is increased in the peak period, the right turn capacity decreases due to a smaller number of cycles. The alternative arrangement of diamond turn phasing, requires exclusive right turn lanes cutting into the median, and this has been seen by some in the past as an unacceptable impact on the formality of the Avenue. Hence the visual and physical design treatments are important.

The major components of the three strategies that were tested are outlined in **Table 1,** as they relate to the intersections along Northbourne Avenue (referring to **Figure 5**).

Table 1: Northbourne Avenue Strategies

Element	Option A *Most Constrained*	Option B *Median Constrained*	Option C *Least Constrained*
Public Transport	No Public Transport priority along Northbourne Avenue	Public Transport Corridor along Median	No Public Transport along Northbourne Avenue Corridor
Northbourne Ave/Mouat St/Antill St	- as per existing	Northern and Southern Approaches with a third through lane	As per Option B, with an additional left turn lane from the north
Northbourne Ave/ Wakefield Ave/ Macarthur Ave	- as per existing	- diamond turn phasing	As per Option B with free flow left turn lane from north and additional right turn lane from west
Northbourne Ave/ Ipima St/Condamine St	- as per existing	- diamond turn phasing for Northbourne Ave	As per Option B
Northbourne Ave / Girrahween St / Masson St	- as per existing	- as per existing	- as per existing
Northbourne Ave/ Elouera St/Gould St	- as per existing	- close median	- signals
Northbourne Ave/Barry Dr/Cooyong St	- as per existing	- diamond turn phasing and right turn lanes for Northbourne Ave - additional right turn lane on Barry Dr	As per Option B - short left turn lane on Northern Approach - left turn slip lane on Southern Approach
Northbourne Ave/Rudd St/Bunda St	- as per existing	- ban right turns from Northbourne Avenue	- diamond turn phasing and right turn lanes for Northbourne Ave
Northbourne Ave/Alinga St	- ban right turns from Northbourne Avenue	as per Option A	as per Option A
Northbourne Ave/London Cirt	- as per existing	- diamond turn phasing and right turn lanes for Northbourne Ave	As per Option B - short left turn lane from Northern Approach

8. URBAN DESIGN OBJECTIVES

In addressing the Urban Design Context for Northbourne Avenue the study team identified a broad set of criteria for Northbourne Avenue which were considered when developing the three options. The criteria developed is listed below.

Criterion 1 - Elements: it is important to recognise that Northbourne Avenue consists of three clear elements. Consideration has been given only to the straight section of the Avenue from Mouat Street to London Circuit, which forms one element.

Criterion 2 - Precincts: the precincts and realms along the Avenue should be reinforced as elements of a progressive experience. This is most commonly seen as a journey southwards, with City Hill as the point of arrival. However, the process should also apply for travel in the opposite direction.

Criterion 3 - Formality: the formality and urbanity of the precincts develop progressively from north to south. This is an inevitable concomitant of all major city entry roads. Nevertheless, traffic proposals should recognise the increases and decreases in population density and land use, particularly at intersections where the road pavements become an integral part of the urban open space patterns.

Criterion 4 - Continuity: a clear theme treatment of soft landscape and hard pavement surfaces is essential to establish continuity along the avenue. In this regard, attempts should be made to indicate the pre-eminence of the Avenue at intersections.

Criterion 5 - Rhythm: the treatment of intersections should recognise the increasing frequency of side street activity as traffic nears the centre of the city. It is expected that this will be reflected by increases in the intensity of signage and lighting and inevitably in the quality of street furniture and paving.

The length of the Avenue was broken down into six separate precincts each of which has different quality which can be expressed in terms of the above criteria.

9. OPERATIONAL ASSESSMENT

The results of the traffic modelling for the three alternative strategies have been summarised at a macro level in **Table 2**. Predictably, it clearly shows that **Option C** results in the minimum network travel times.

TABLE 2: Northbourne Avenue Traffic Management Study
Strategy Option Assessment - Macro Level

	Year	1990	1996			2006		
	Scenario	Existing	Short Term			Medium Term		
			Existing External Network			**Recommended External Network**		
Northbourne Avenue Traffic Management Strategy			Most Constrained	Median Constrained	Least Constrained	Most Constrained	Median Constrained	Least Constrained
Measurement	Unit		A	B	C	A	B	C
Study Area								
Average Speed	kph	23	20	22	21	25	29	28
Travel Time	veh-hrs	4590	6264	5760	5952	4658	4107	4293
Distance Travelled	veh-km (000's)	110	123	124	124	119	120	120
Arterial Road Usage	veh-km (000's)	83	91	95	95	96	96	93
Local Road Usage	veh-km (000's)	23	27	24	23	21	20	19
North/South Screenline	vph (2 way)	8339	9473	9894	9812	8966	9288	9404
East/West Screenline	vph (2 way)	9304	9693	9591	9254	9847	9490	9477
Civic Cordon	vph (2 way)	20188	22544	23034	23190	21042	21155	21120
Rest of Canberra								
Average Speed	kph	34	27	27	27	32	32	32
Travel Time	veh-hrs	20620	31030	30700	30440	26450	26270	26060
Distance Travelled	veh-km (000's)	697	827	824	824	849	846	846
Belconnen Screenline	vph (2 way)	14676	15052	15105	15075	10868	11000	11086
Civic - Woden Screenline	vph (2 way)	19747	22641	22711	22721	21731	21729	21725
Tuggeranong Screenline	vph (2 way)	13968	16527	16524	16526	14765	14769	14770
Queanbeyan Screenline	vph (2 way)	6898	8331	8333	8329	8282	8279	8279
Weston Creek Screenline	vph (2 way)	7146	7573	7522	7550	6392	6375	6376
Canberra Network								
Number of Trips	vph	81000	91000			92000		
Average Speed	kph	32	25	26	26	31	32	32
Trip Time	veh - hr	25210	37300	36454	36390	31110	30380	30360
Trip Distance	veh-km (000's)	807	950	948	948	968	966	966

On an area wide basis, the strategy shows a reduction of traffic on local roads in North Canberra, and a corresponding increase on arterial roads. **Figure 6** demonstrates this.

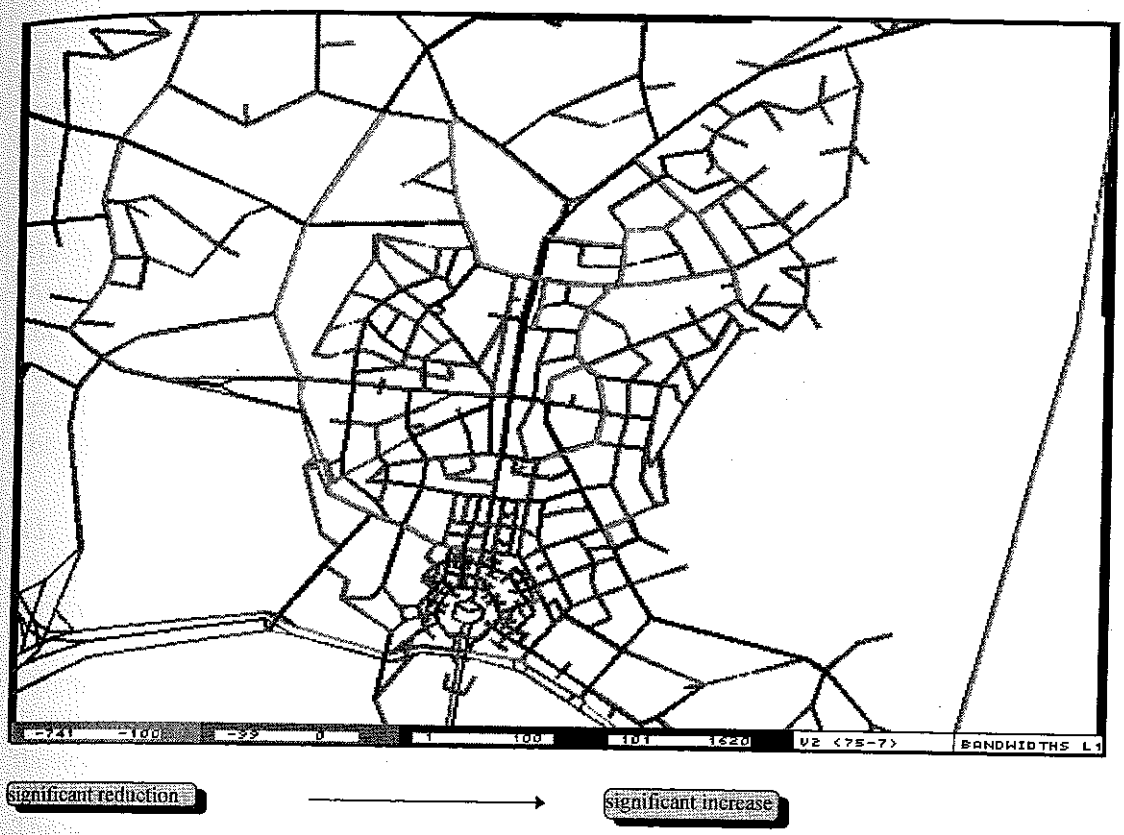


FIGURE 6

The impacts on Northbourne Avenue were examine in detail, with analysis undertaken for each intersection along Northbourne Avenue using TRANSYT and SIDRA, based on the predicted morning peak hour flows from TRIPS. The results of the intersection analysis are illustrated graphically for the medium term in **Figure 7**.

The intersection analysis clearly shows that the Northbourne Avenue/Mouat Street intersection which is located at the top of the formal avenue, is critical to the overall strategy. Without the improvements incorporated in Options B and C, significant delays will occur. These outputs also clearly indicate a declining level of service associated with the current low level of investment in road capacity.

It is important to note that the assessment not only considered traffic capacity at intersections, but also took safety, cyclist, pedestrian, public transport and urban design issues into account. The findings included recommendations on lane widths, pavement treatment, speed limits, and linemarking.

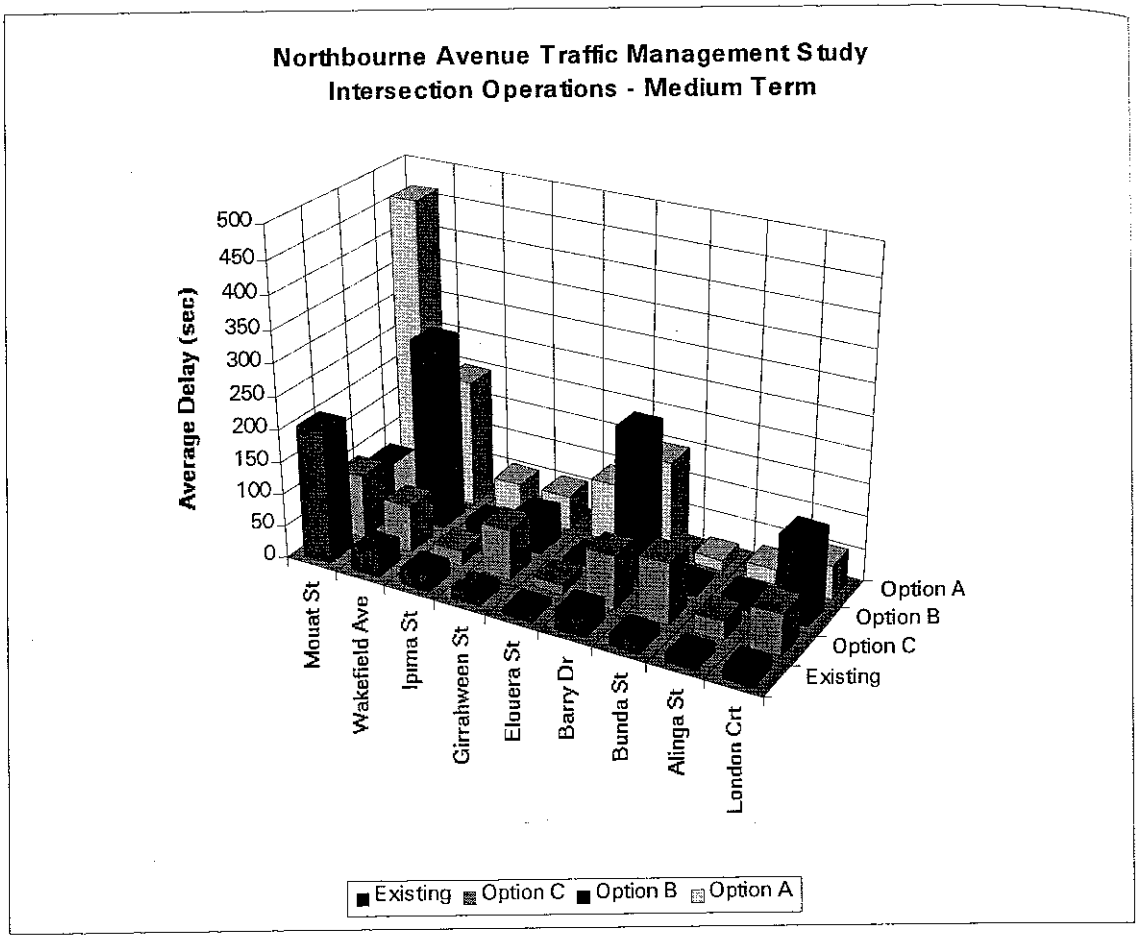


FIGURE 7

10. EVALUATION TECHNIQUES

The analysis of the range of options has been largely based on transport performance measures, which in turn can be directly related to economic performance parameters. That the selection process is based on such analyses is hardly surprising given the inability of the NCPA to define their urban design, and other objectives for Northbourne Avenue. Notwithstanding this, the team has put forward criteria and objectives for the different realms along the Avenue, together with indicative design solutions which express these objectives.

The environmental impacts (air pollution and traffic noise) were also considered in broad terms. Potential social effects were also a consideration in terms of the level of traffic intrusion into the adjacent suburban road network within the study area.

The complex modelling techniques used, as described above, are very powerful in allowing the detailed operational assessment and design of a series of intersection

solutions to be reflected at the metropolitan network level, providing measures of the overall changes, and hence the network benefits.

Equally powerful in terms of comparing the different options and demonstrating the differences in outcomes, were the graphical outputs from TRIPS (eg **Figures 4 & 6**), and to a lesser extent SIDRA, which were produced as colour diagrams. Such outputs allow the senior decision makers to quickly appreciate the differences between alternative solutions without recourse to the technical detail.

Having selected the preferred strategy, it will be subject to a full Social Cost Benefit Analysis, and compared with the Option 1 which has the same external road network as the Strategy, but effectively no change (ie do nothing) on Northbourne Ave. This will include a full evaluation of the changes in the environmental parameters (air quality and traffic noise), aesthetic urban design considerations, and the potential social impact of the alternative in terms of traffic intrusion into the adjacent urban areas.

11. STUDY FINDINGS

An Interim Report [8] was produced which included recommendations for the treatments at each intersection along Northbourne Avenue between Mouat Street and London Circuit. In most cases the least constrained strategy option was recommended (refer to **Table 1**). In some cases, the analysis revealed the need for further works, additional to those included in the Options.

The analysis showed that the most constrained case, the do nothing option, caused a significantly higher level of congestion within the study area and along Northbourne Avenue, compared to the other options. This option could only be considered by providing an alternative arterial route such as Monash Drive, which would reduce traffic infiltration into North Canberra. A negative impact on air quality and noise was also identified.

Both the median and least constrained options (Options B and C) produce significantly improved traffic conditions with reduced delays in comparison to Option A. The median constrained case included right turn bans at two intersections along Northbourne Avenue. This was shown to have a severe impact on the adjacent intersections, as was expected.

Option B (by necessity) and Option C include diamond and right turn phasing at a number of intersections along Northbourne Avenue. Although the construction of right turn lanes along Northbourne Avenue will certainly have some impact on the visual amenity, measures such as special pavement treatments can be implemented to minimise the impact. Indeed, such treatments could be used to define and mark the entry to the precincts. Currently the detailed assessment shows there are significant benefits in implementing works associated with the least constrained option;

- Significant safety benefits, including a reduction in casualty accidents.
- Significant travel time saving throughout the network.
- Allows for the possibility of public transport right of way in the median.
- Some potential environmental benefits.
- Reduction of traffic volumes on local North Canberra roads.

In the final analysis these should outweigh the ideal Urban Design solution. Even though the NCPA has been unable to define it's urban design objectives, the study process has taken into consideration the important urban design issues, and has developed a strategy which incorporates these. Such changes have the capacity to change and arguably improve the urban character of the Avenue by increasing their formality and marking the entry to the various precincts, thus creating an experience of progressive arrival as one moves through the different precincts.

12. CONCLUSIONS

This paper demonstrates that combining a range of traffic models to address a specific range of objectives is an important (albeit complex) approach, which if undertaken successfully can provide a detailed basis for resolving a range of issues. The process of integrating the models, however, needs to be a logically ordered and rigorously disciplined to facilitate the operational and economic analysis.

In the case of the Northbourne Avenue Traffic Management Study, it was necessary that a detailed traffic analysis be carried out at various levels, so that a variety of issues could be examined in the North Canberra area and a traffic management strategy could be developed for Northbourne Avenue, consistent with study objectives for the area and the wider metropolitan network. Further, the graphical output from TRIPS can demonstrate the impacts of the various strategies in a way that is clear to people with non-engineering background, and this is important to the decision makers.

The major achievement for this study to date, is that the process has effectively defined the requirements for augmenting the external road network to 2006. The studies recommendations for the external road network in North Canberra for the medium term have been adopted by the responsible agengies in the ACT Government as a medium term strategy for meeting Gungahlin's transport needs.

The transport modelling / evaluation process has already been employed to determine road strategies in other areas of Canberra, and is expected to prove a useful tool to assist decision makers in making other policy determinations.

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Roger Pegrum, Director of Pegrum Ciolek

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