

CONFIDENTIAL

Choosing a Public Transport System For Adelaide's North-East

By George Clarke and Peter Casey

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CHOOSING A PUBLIC TRANSPORT SYSTEM FOR ADELAIDE'S NORTH-EAST

A COMPARISON OF THE SERVICE, COST AND IMPACT
OF EACH DIFFERENT TYPE OF SYSTEM,
CONDENSED FROM TECHNICAL DATA IN NEAPTR WORKING PAPERS;
AND A DEFINITION OF KEY ISSUES

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POSTSCRIPT:

LETTER DATED 21ST AUGUST, 1978 FROM
DIRECTOR-GENERAL OF TRANSPORT TO TOWN
CLERK

23rd August, 1978.

PART 1

SUMMARY OF FINDINGS

We spent six weeks studying and cross-checking the 5,000 pages of technical work and computer assisted tabulations (including research by some of the world's most experienced transportation consultants), published by the South Australian Director-General of Transport's 'North East Adelaide Public Transport Review' (NEAPTR) over the past two years.

We have found that:

1. The South Australian Government, by sponsoring the NEAPTR study, has once again demonstrated its continuing leadership throughout Australia in seeking new ideas to improve the quality of life for ordinary people living in urban areas.
2. By making available such a wealth of facts and figures, prepared by reputable international consultants, on so many alternative possible transportation systems, the State Government has demonstrated a commitment to full public disclosure of technical information and its confidence in the final judgement of a well-informed public.
3. The facts and figures published during two years of research, when objectively evaluated, indicate that innovations and relatively minor investments in improving and extending Adelaide's existing types of bus and/or rail systems, will make better economic, social and environmental sense than big new capital-intensive construction projects involving complex imported technology. Such high cost systems using Freeways, Busways and Light Rail Transitways are more suitable for U.S. metropolises or European cities which are different in scale, density and character to Adelaide's North-East.
4. NEAPTR's interpretations of the basic data have been sympathetic to Light Rail Transitways, unfair to the potential of the Northfield-Ingle Farm Railway extension and have ignored the possibility that all-bus systems on normal roads might be economically and environmentally the all-round best answer to North-East Adelaide's particular future problems and needs.
5. When we compare NEAPTR's own projections of 1996 ridership, levels of service, costs and benefits for each of the multitude of alternative systems tested, we find that NEAPTR's own figures (carefully researched over the past two years) indicate that, compared to an all-bus system on normal roads which provides good radial and additional cross-suburban services, only the pull-on Busway would attract more public transport riders. The other "big project" systems would attract less. None would make any significant difference in total motor car usage in the North-East area even if the real costs of running a car double. In these respects, the LRT options are inferior to the pull-on Busway project.

6. The big projects involving Busways, Freeways or Light Rail Transitways would all have bad environmental impacts on the Torrens River Valley corridor. The Light Rail Transitway would have additional bad environmental impacts on the City Park Lands. The Torrens River Valley and the Park Lands, in the flat, often hot and dry Adelaide plain, are sensibly cherished and even revered by many Adelaide people.
7. The Torrens River Valley and the City Park Lands, in their natural state, appear to add more than any of the proposed construction projects ever could to the quality of life for ordinary people, and the attractive power of Adelaide as a location for economic activity.
8. None of the Light Rail Transitways or Busways would have future economic benefits greater than costs, as calculated by Travers Morgan of London, at a discount rate of 10 per cent, which is a sensible interest rate to apply when public funds have to be rationed out among a host of claims on the ordinary taxpayer. At 10 per cent, the Freeway, with buses using it, has a Benefit-Cost ratio of 1.76, which is approximately twice as high as for an LRT or Busway. But a Freeway in the Torrens River Valley ~~seems~~ unacceptable on social and environmental grounds. *has been rejected as*
9. Given the input data developed by the NEAPTR study group, the maximum Benefit/Cost ratio obtained from any of the systems involving major projects (other than the Freeway option) was 0.95 based on a discount rate of 10 per cent per annum. The validity of a number of inputs is open to considerable doubt and a review of these could lead to a significant reduction in the Benefit/Cost ratios obtained. Under the circumstances, these results do not justify the need to spend between an extra \$40M (for a pull on Busway) and \$80M (for an LRT or Freeway) on a project whose economic worth is marginal at best.
10. No economic assessment was made by NEAPTR of the moderate change via upgrading options for "all Bus on normal roads" system. As none of the big projects has a significant Benefit/Cost ratio, this option should be tested thoroughly.
11. The potential benefit of the extension of the existing rail line from Northfield to Ingle Farm has not been investigated as thoroughly as other schemes and appears to have been rejected out-of-hand without adequate reason. More investigation is required, with particular emphasis on the improved patronage that would accrue from a system of feeder and cross suburban buses oriented towards the Ingle Farm Shopping Centre.
12. In view of 4 to 11 above, it seems that none of the systems involving construction of an LRT, a Busway or a Freeway to serve Adelaide's North-East, could rationally be supported.
13. The only systems which deserve further consideration are the ones which include a Northfield to Ingle Farm Railway Extension Project, and the "all-bus on normal roads" systems which do not require any big construction projects at all.

14. A Northfield to Ingle Farm Railway extension deserves more, and fairer, consideration than it has had to date, because:-
 - . It has by far the lowest capital cost of any of the systems involving construction projects (an extension to Tea Tree Plaza involves a costly tunnel);
 - . it would have the lowest annual operating and maintenance costs of any of the systems - even lower than "all-bus on normal roads" systems.
 - . it would not have any bad environmental effects that we know of - NEAPTR's experts say it would have no hydrological effects on creeks or soils;
 - . it doesn't run through the Torrens River Valley;
 - . NEAPTR has been unfair in not calculating its future ridership on the same basis as other schemes - i.e., by providing special feeder bus services to a new Railway Station at Ingle Farm;
 - . Even without any special feeder buses to it, NEAPTR predicts that it would attract 15,000 trips a day (about 4 times the number in 1976) through the existing under-used Adelaide Railway Station on North Terrace in the City.
 - . Environmentally, it seems to be far better than any other system, in that it would actively improve the environment of the inner residential suburbs, North Adelaide, the Park Lands, and the City streets by channelling more people on existing long-established and under-used railway tracks, thus reducing the number of buses or other vehicles on streets in the suburbs, North Adelaide, the Park Lands, and the central City.
15. Demand for cross-town travel by public transport will increase substantially prior to 1996. This indicates the need for upgrading and increasing cross-suburban bus services in the short term, while longer term options are being considered and evaluated in the light of these short term measures being implemented.
16. There is considerable scope for improving bus service running times and reliability through low cost traffic management and bus priority schemes as designed and recommended by a number of consultants in preparing demonstration projects. Many of these recommendations have yet to be implemented. The appropriate time to ascertain the need for a high cost, fixed line public transport project is after the low cost, bus schemes have been progressively implemented, monitored and evaluated.
17. An "all-bus on normal roads" system with gradual, moderate, undramatic, improvements to give priority to bus movements on roads such as North-East and Payneham Roads, and with particularly good cross-suburban services linking people in the North-East to the western, northern and eastern suburbs, would be the most sensible, practical and flexible system to adopt in principle, if further investigation leads to a decision not to build the Northfield to Ingle Farm Railway Extension.

18. The estimated patronage likely to be drawn to any LRT system is low compared with the patronage that would use improved "all bus on normal roads" systems with good cross-suburban as well as radial services. This is because 75% of the people using the LRT would have to use a feeder bus to get to and from an LRT station, wait and change modes of travel, thus making average trips longer and more inconvenient than conventional bus services for most people.
19. The environmental impact of an "all-bus on normal roads" system would be confined to roads along which people and land users have already adapted to traffic noise, fumes and traffic congestion. This would avoid impacts that the "big projects" would have on now unaffected areas.
20. If significant reduction of total vehicular road traffic is seen as an objective for a new transport system serving the North-East, then it will not be met. NEAPTR itself demonstrates that the shift to public transport induced by any LRT or other high cost system would not reduce road traffic by more than one or two per cent.
21. Any LRT or Busway would have had environmental impacts on the Torrens River Valley, the Northern Park Lands and on King William Street. NEAPTR's own research fails to demonstrate that building any such project would be so important to the welfare of ordinary people as to justify any sacrifice of the existing environmental amenity of the Torrens, the Park Lands and King William Street.
22. The most effective conservation solution to oil energy problems lies in improving fuel economy, reducing average size and changing to non-oil fuels for motor vehicles, not in massive fixed investments in public transport projects which cannot satisfy the free ranging travel needs of people in low density metropolitan regions like Adelaide's North-East.
23. Air pollution is believed by many people to be a reason for preferring a feeder bus plus electrified Light Rail Transitway to an all-bus system. In Adelaide's breezy and low density North-East, NEAPTR demonstrates that there is no basis for any such belief.
24. Noise is cited as a reason why Light Rail Transitways might be environmentally superior to diesel buses. The latest generation of buses (like Adelaide's 310 new Volvos) are quieter than other buses (about the same as most LRTs) and can be made even more quiet at much less cost than it takes to build an LRT system.
25. The noise of "all-bus on normal roads" systems is lost in the ordinary ambient noise levels of normal roads. From an environmental point of view, in already built up areas, it is better to confine new or extra public transport vehicles to existing trafficked road and rail routes (widened if absolutely necessary) so that noise, air, visual and other bad impacts are kept where people and land use have already adjusted to them, rather than to cut new routes through previously pollution-free residential, recreational, park lands or natural areas.

26. An "all-bus" system in 1996 would increase the number of buses from the North-East, in the peak hour, on existing roads crossing the City boundaries, from 120 in 1974 to 150 if the same proportion of passengers as today have to stand up, or to 180 if everyone had a seat. The extra 30 to 60 buses would have environmental impact on a large number of existing North Adelaide and City streets.
27. These extra bus movements can be handled and traffic can be managed on the existing networks of wide streets throughout North Adelaide and the City centre, without unacceptable impacts. The streets of the City of Adelaide are as wide or wider and as under-used today, as the streets of any comparable city centre in the world. Bus routes can be arranged and traffic managed in many different ways on many different streets to accommodate an extra 30 to 60 buses in the peak hour, with only marginal effect on existing travel speeds, levels of street congestion, parking, noise and other environmental impacts in North or South Adelaide.
28. The impact of a Light Rail Transitway on King William Street would accelerate the necessity to spend large additional sums to build the Hindmarsh Boulevard or other major new bypass road to take metropolitan north-south traffic out of the City streets.
29. Unless the Government is willing to bear the cost of building the Hindmarsh Boulevard or other major new bypass roads to take Metropolitan North-South through traffic out of City streets, it would be better not to create a "Transit Mall" in King William Street, but to distribute extra 1996 public transport vehicles (of whatever kind) on several existing City core streets.
30. A specific short term road project which should be implemented as soon as practicable and which would lead to the improvement of the environment of Lower North Adelaide is the conversion of Mann Terrace and Park Terrace to a one-way pair, combined with widening the link from this pair to the Hackney Bridge and improved traffic signal control at the intersection of Hackney Road and Botanic Road. This would allow diversion to Botanic Road and Hackney Road of all express and limited stop buses now using Frome Road and Lower North Adelaide during the evening peak period. Such diversion is likely to avert the need to introduce evening peak bus lanes in Melbourne Street.
31. Unless the unions agree to one man operation of Light Rail Transit vehicles (coupled pairs as well as singles) the operation costs of any LRT system will be \$2 to \$3 million a year more expensive than NEAPTR has estimated on the basis of one man operation.
32. The NEAPTR study was based on population projections for the Adelaide Metropolitan Area and the North-East which now appear far too high in the light of the most recent national population projections by Professor Borrie for the Australian Government in 1978, which postulate that Metropolitan Adelaide's growth over the next 25 years will only be about 75,000 instead of about 200,000 as NEAPTR assumed.

33. Even if NEAPTR's future population projections were realistic, workforce and workplace patterns will change radically as computers replace clerical workers in central city offices and more people work part-time, flexitime and in the suburbs. Commuter corridor peaks will be considerably lower and work trips spread throughout the day and across the metropolis in ways that high cost, inflexible, concentrated capacity, radial public transport lines cannot handle well.
34. In the light of 1-33 above, we conclude that the costs and impacts of moderate improvements and extensions to existing bus and rail services and systems, roads and intersections over the next 20 years, to ensure that bus systems (with Northfield rail possibly extended to Ingle Farm) give good levels of service to public transport passengers, would be much less than the costs of a Torrens Valley LRT or Freeway, the two most capital intensive systems involving major construction projects with maximum adverse environmental impacts on Adelaide's cherished City Park Lands and/or Torrens River Valley.

PART 2

HOW THIS "ENVIRONMENTAL IMPACT
STATEMENT" OR "GUIDE TO CHOICE"
CAME TO BE WRITTEN

Five thousand pages of highly technical working papers and public relations literature have been published over the past two years under the name of the S.A. Director-General of Transport's North-East Adelaide Public Transport Review (NEAPTR) study. These papers have been prepared by teams of experts of all kinds, assisted by computers, at a total cost now close to a million dollars.

Facts and figures define in detail how a large number of radically different types of public transport systems in Metropolitan Adelaide's North-East area would operate and be used on a typical weekday in the year 1996, with breakdowns of financial costs and attempts to measure benefits. This detailed factual information is excellent, but has been presented in highly complicated formats. To understand it, and to isolate the key issues, takes an experienced person several weeks of concentrated study and hard work.

We do not know of any other independent person (not employed by the S.A. Government) who has yet had the time to study, understand and evaluate the significance of the facts contained in the NEAPTR papers. Certainly, no one has published any such independent summary or evaluation.

The full facts and figures are in three volumes totalling one foot high, and in computer print outs. These have been available to the public in full since December, 1977.

However, the public has been mostly informed by widely distributed booklets and literature which, perhaps by necessity, grossly oversimplify and do not explain the facts documented in the detailed working papers. (For example, the widely-distributed March 1978 NEAPTR booklets on LRT routes, give unexplained lower LRT cost and higher LRT benefit figures than those calculated in detail by Travers Morgan of London in November 1977. NEAPTR has not responded to requests for a xerox copy of the work sheets on which these slightly more favourable ratios were calculated.)

On June 19, 1978, the S.A. Minister for Planning announced that State Cabinet had decided that it wished to build a "high speed tram" (or light rail transit) system linking Tea Tree Gully with Victoria Square and running down the Modbury Corridor (along the Torrens River Valley) through the inner suburbs, along Mackinnon Parade (through the City's northern Park Lands) and King William Street through the City.

The Minister said: "an environmental impact statement will now be prepared on the route chosen by Cabinet, and there will be a further short period for public comment before the final decision is taken in September" (1978).

Some members of the Adelaide City Council were alarmed at the Minister's announcement. They feared that a high speed tram (or light railway) line from the North-East, with stops few and far between (which would force people to catch feeder buses, wait and change modes), might not attract significantly greater numbers of people to public transport, nor reduce road traffic or produce other benefits to the extent necessary to justify either its high money cost or the environmental damage it would do to the Torrens River Valley, the Park Lands and the City's streets. They felt it might monopolise the traffic lanes of King William Street for the use of a relatively few people from one small part of the Metropolitan area, leave the existing Adelaide Railway Station under-used, and not integrate well with the Metropolitan public transport system as a whole.

Some Aldermen and Councillors felt that there surely must be some other way of providing good public transport to the future residents of the North-East suburbs. They felt that there must be an alternative system which would be acceptable to all Metropolitan and State-wide interest groups.

The Lord Mayor, Aldermen and Councillors shared with the Council of the University of Adelaide and other citizens, a serious concern that the environmental impact of the LRT tram-train route(s) on the Park Lands and City streets would be unjustified. They felt it would:-

- . cut and blight the northern Park Lands, their trees, sporting and recreation facilities, with open cuts, fences, poles, wires noise and high speed vehicles;
- . spoil the appearance and atmosphere of the City's central processional King William Street; and
- . by removing two to three vehicle traffic lanes, cause intolerable congestion on King William Street unless a new north-south bypass road was built to the west of the City to carry the heavy existing, and heavier future, volumes of metropolitan through traffic.

The City Council decided to get independent advice, preferably from "foreigners" who had no local axes to grind, but had knowledge and experience of Adelaide. They asked us to study the system and route favoured by Cabinet, and to make an objective, independent assessment of its environmental impact on the City.

We had spent 1973 and 1974 in Adelaide doing the City of Adelaide Planning Study which produced the City of Adelaide Plan adopted by the City Council in 1976. The State Government's City of Adelaide Development Control Act, 1976, legislated for the control of private development in accord with the Plan. However, the State Government has not yet committed itself to the traffic and transportation systems in the Plan.

We warned the Lord Mayor that our studies might not confirm the Council's fears. In our work overseas and throughout Australia, we have long professional histories of favouring public transport solutions to urban movement needs, and of planning pedestrian malls - notably Sydney's Martin Place.

Our work on the City of Adelaide Plan clearly shows our "bias". From the start, we strongly supported the idea put forward by the Premier and the Director-General of Transport for the Rundle Mall. When the Director-General first began to explore the future possibilities for a City underground railway, improvements and extensions to the Glenelg tram line, and a then hazy idea of something called a "transit mall", we believed these concepts should be explored fully and encouraged. We said so in our 1974 City of Adelaide Planning Study.

The Lord Mayor agreed that whatever we wrote would be published by the Council under our names, and that the Council would not ask us to alter our conclusions.

As well as writing this report in our own names, we have guided Council staff in their preparation of material for a Public Exhibition of the detailed environmental impact of the NEAPTR-favoured route through the Park Lands and down King William Street.

This exhibition material includes large scale detailed plans, photographs and photomontages showing what the LRT route would do to the City and what it would look like. People can look at it and make up their own minds as to the seriousness of the visual and other impacts, and whether those impacts would be justified by any benefits an LRT might bring.

PART 3

WHAT WE STUDIED, AND WHAT WE FOUND.

We spent six weeks studying and cross-checking the 5,000 pages of technical work, computer assisted tabulations, and expert opinion produced by NEAPTR. We disregarded the NEAPTR public relations material, and emotional opinions for and against various different proposals which we heard, or saw in the newspapers.

We were impressed with the quality and comprehensiveness of the data produced by NEAPTR. No other Government in Australia has ever researched and made available to the public such a wealth of facts and figures on such a wide range of possible alternative future transport systems.

The South Australian Government and the Director-General of Transport are to be admired for their work and their willingness to publish this data. In other States, and at the Federal level, decisions of far greater import are made in an arbitrary way either without comparable data or without publication of any data that does exist.

By their secrecy, other Governments make it difficult, if not impossible, for anyone to prove that a Government decision is wrong in any way. The South Australian Government in this case is not in that position.

We have not been impressed with the way the complicated facts and figures on so many alternative 1966 systems have been presented or interpreted by NEAPTR.

We find that minor statistics are often given the appearance of great import, so that key issues are obscured or ignored. In many matters, NEAPTR did not see the forest for the trees.

We have tried to raise the level of public discussion by extracting what we believe to be the vital comparative statistics, and the key issues, in choosing between the different types of public transport systems.

NEAPTR publications tend to highlight or hide facts and figures so as to favour high cost, exciting, innovative, high technology, capital intensive new systems involving major construction projects in preference to low cost, conventional, labour intensive extensions of existing systems.

NEAPTR has been bold, but not bold enough. A high capacity transit line in a corridor could work well if each station was surrounded by high density residential and commercial development, as in traditional European cities, in high density 19th Century New York, or in modern Stockholm. But Adelaideans refuse to consider such densities in their suburbs. NEAPTR is only a transportation study, not a comprehensive land-use and transportation plan. It makes and envisages no changes whatsoever in existing patterns of living and working.

The fatal weakness of NEAPTR's work, we find, is that the simplest and most natural type of public transport system for a low-density area like the North-East is never seriously presented as a possible alternative, or even evaluated in the economic cost-benefit analysis.

The North-East is as low in overall density as any average outer suburban area in the world. The expected future residents are projected to come substantially from middle to upper middle income groups. Their travel needs are not highly concentrated on a single non-stop radial corridor to the city centre because many work in the western, northern and eastern suburbs. Average trip lengths are short. Cross suburban travel needs are high, and rising (See NEAPTR Working Papers Group 9 and City of Tea Tree Gully Community Needs Survey 1977).

We have been told that the NEAPTR project was originally prompted by the emptiness of the single radial corridor of land originally reserved (along the Torrens Valley to Modbury) for a freeway project which was cancelled on environmental grounds. It was later given impetus because the Government's Land Commission and Housing Trust acquired and want to develop 1,580 hectares (3,790 acres) of land on the outskirts of Salisbury, Ingle Farm and Tea Tree Gully.

The NEAPTR investigators started out with the idea that the prime need in the North-East was for radial travel to and from the city centre. NEAPTR papers express some surprise that many local residents wanted to talk more about their needs for cross-suburban public transport.

But by then, it may have been too late to change the radial emphasis of NEAPTR. Unfortunately, the empty radial corridor cannot be used to satisfy much cross-suburban travel demand.

NEAPTR predicted future journeys to work in the City of Adelaide, using our City employment projections in the 1974 City of Adelaide Planning Study.

The central area of the City where workers tend to use public transport, is the Y shaped area centred on King William Street, between the Torrens River (the top of the Y) and Victoria Square (the bottom of the Y), and between Hindmarsh and Light Squares. These are the areas marked A, B and C on the map on Page 24 of the 1974 draft City of Adelaide Plan (the red book).

We projected that the 53,500 jobs in this central area in 1972 would grow at between 1.69 per cent and 2.84 per cent per annum, which would have produced 58 to 62,000 jobs by 1977. In 1977, the City Council re-surveyed jobs and land use in the City. Preliminary results (not previously available to NEAPTR) show that in 1977, total jobs in this area were only 55,390. This is 3,000 less than our "low" projection, because of heavy falls in job numbers immediately outside the edge of the Core District.

For the smaller City Core District (Area A) between North Terrace and Victoria Square, on both sides of King William Street, we projected that jobs would increase at between 2.1 and 3.3 per cent compound per annum from 31,000 in 1972 to between 40 and 48,000 in 1985. For the first five years to 1977, Core District jobs grew at 2.56% per annum to 35,190, right in the middle of our projected range. However, we now believe that this rate of increase will not continue to 1985 or 1996.

The 1972-75 period was a boom period for employment in the City of Adelaide. Commonwealth and State authorities expected public service employment to rise by 4 to 6% per annum. The same authorities now have firm "no growth" or staff-reduction policies.

In view of the current recession, recent drastic cuts in Metropolitan population projections, and recently accelerating trends for computerisation to replace clerical workers, our long term City Core job projections should now be revised downwards for the 1980s and 1990s.

The trend for people to work part-time, flexitime, or in the suburbs is now accelerating. In future, we expect work trips to spread out during the day and across the suburbs.

In areas like Adelaide's North-East, a public transport system using buses running on normal roads and streets, supplementing private car ownership and usage, is normally the simplest, most natural, most flexible and least costly system.

Such bus systems can be improved, upgraded and extended as population grows. Refinements in traffic management, new signalling systems, bus priority lanes, higher capacity intersections, cross-town services and other improvements can be introduced. There is flexibility to cope with unexpected circumstances, such as lower than expected growth, changes in lifestyle, in work habits and work places, in shopping habits and recreation patterns, in age patterns, and in levels of poverty and affluence.

Yet the low cost, conventional, labour intensive, flexible, undramatic, public transport system of simply using buses on roads to serve the North-East has not been presented by NEAPTR as a serious alternative to the high cost, high technology, capital intensive systems using buses to feed fixed, inflexible, yet dramatic, projects such as Light Rail Transitways, Busways and/or Freeways.

NEAPTR's own precise projections show that none of the costly projects and systems would attract more than a tiny percentage of people to "switch" from private cars to public transport, even by 1996 (see Table 5 herein). This is because significant "switching" is only prompted by serious road traffic congestion and extended delays, which do not exist now in Adelaide's North-East, and are unlikely to occur before 1996.

Despite the fact that NEAPTR's projections all assume a doubling by 1996 of the real cost of fuel for private vehicles, none of the NEAPTR public transport proposals are predicted by NEAPTR to reduce existing daily vehicular road traffic kilometres by more than 1.2 or two per cent (see Table 5 herein).

So much for the popular idea that high cost public transport projects in Adelaide's North-East would ease the energy crisis or the pollution crisis.

Popular misconceptions continue. For example, a letter in the Adelaide "Advertiser" on August 15, 1978, praises the idea of a "pollution free" LRT Transitway down the Torrens River Valley and through the Park Lands, and criticises "the hypocrisy of the people who criticise the (LRT) scheme on environmental grounds....when apparently they readily accept the sight of thousands of motor cars on probably hundreds of hectares of tar and concrete polluting their way through and parking around the park lands every day."

Yet NEAPTR itself states categorically that even the electric LRT system in Adelaide's North-East would not be superior to all-bus systems on the basis of air pollution.

We found that NEAPTR had published in December, 1977, the essential data on several alternative low cost "bus on roads" public transport systems, but did not treat them seriously. Comparative projections of ridership, speeds, times etc. for each system were calculated on the same basis by De Leuw Cather and published by NEAPTR in Working Paper 25. We have been able to use NEAPTR's own data to compare these low cost systems with the "big project" systems favoured by NEAPTR.

These comparisons are set out in detail in the next Part of this report.

PART 4

COMPARISONS OF NEAPTR'S DIFFERENT TYPES OF PUBLIC TRANSPORT SYSTEMS FOR THE NORTH-EAST, USING NEAPTR'S OWN FACTS AND FIGURES (WITH COMPARATIVE STATISTICAL TABLES)

We compared NEAPTR's own basic data on the costs, levels of service and environmental impacts of each of the many different public transport systems simulated by NEAPTR for the year 1996.

Following discussions with NEAPTR officials, we narrowed down their long list to seven. All the others are less effective in terms of attracting a few people to switch to public transport.

The seven selected alternative systems fall into 3 categories:-

- A LOW COST, LABOUR INTENSIVE SYSTEMS USING BUSES ON ROADS AND STREETS, AND THE EXISTING NORTHFIELD RAILWAY WITHOUT ANY EXTENSION.
- B MEDIUM TO HIGH COST, CAPITAL INTENSIVE SYSTEMS INVOLVING CONSTRUCTION PROJECTS.
- C HIGHEST COST, MOST CAPITAL INTENSIVE SYSTEMS INVOLVING MAJOR CONSTRUCTION PROJECTS.

Here are the seven alternative systems:

- A. LOW COST, LABOUR INTENSIVE SYSTEMS USING BUSES ON ROADS AND STREETS
-

- A1. Improved, Upgraded Radial and Cross-town Bus Services on Normal Roads and Streets, and the existing Northfield Railway without any extension.

NEAPTR calls this the 'Moderate Change, Base Case Option 2'. Details of how it would work in 1996 are given in Section 5 of Working Paper Group 25, 'Operational Analysis of Radial Options', by De Leuw Cather.

In the 'Economic Assessment' Working Paper, by Travers Morgan, this is called the 'Base Case' but not evaluated in terms of socio-economic benefits.

- A2. Same as A1, but with bus priority lanes on the radial North East and Payneham Roads.

- A3. Same as A1, but with extra cross-suburban bus services between Tea Tree Plaza and the western, northern and eastern suburbs.

NEAPTR details what we call A2 and A3 as Moderate Change Base Case Options 3 and 4, but does not evaluate them in terms of socio-economic benefits.

B. MEDIUM TO HIGH COST, CAPITAL INTENSIVE SYSTEMS INVOLVING CONSTRUCTION PROJECTS

B1. Railway Extension Northfield to Ingle Farm, combined with radial and cross-town buses on ordinary roads.

This is the cheapest, simplest and most cost-effective of the Railway options evaluated by NEAPTR. It has been unfairly treated by NEAPTR which, strangely, did not propose to serve it with feeder buses. It may well carry more passengers than any other alternative system if provided with feeder buses to a new Ingle Farm Railway Station.

B2. Busway (pull-on-type) in Torrens Valley Corridor, combined with some feeder buses, other radial and cross-town buses on ordinary roads.

A pull-on Busway is one where feeder buses run through suburbs and pull on to the Busway without stopping and forcing travellers to wait and change to "corridor" vehicles, as feeder buses to LRT stations must do. This is the simplest and most cost-effective of all the Busway options, and would attract almost 2 per cent more patrons to public transport than any LRT system.

C. HIGHEST COST, MOST CAPITAL INTENSIVE SYSTEMS INVOLVING MAJOR CONSTRUCTION PROJECTS

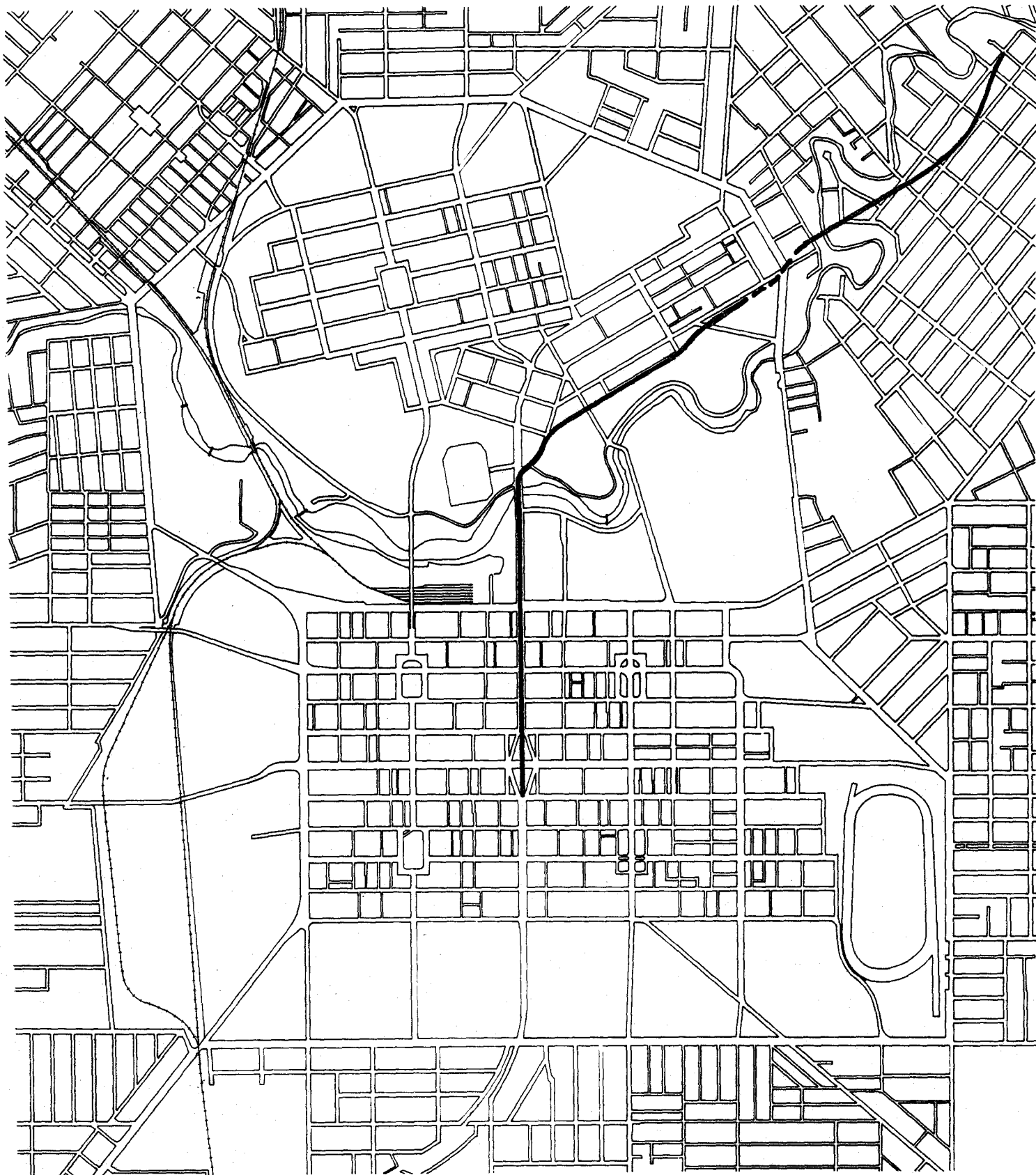
C1. Freeway for all vehicles including buses, in Torrens Valley Corridor, combined with other radial and cross-town buses on ordinary roads.

This is the only system which, in NEAPTR's analysis, would yield any future socio-economic benefits in excess of costs at a discount (or interest) rate of 10 per cent.

C2. Light rail transitways (medium to high speed) in Torrens Valley Corridor, combined with feeder buses to LRT stations, and other radial and cross-town buses as well.

NEAPTR and the State Cabinet strongly favour the LRT route which enters directly into the City through the northern Park Lands. They are now believed to favour a medium speed, partly grade-separated track, a compromise between the high and low speed options separately evaluated by NEAPTR, but with luxury vehicles costing \$500,000 each.

We note that of the above seven systems, the Light Rail Transitway, Freeway and Busway systems have very high costs, won't attract significant extra numbers of people to public transport and have highly controversial environmental impacts on the Torrens River Valley (See Table 1).



THE NEAPTR FAVOURED LRT
ROUTE THROUGH THE CITY.

The LRT reserve would be 8 metres wide, the Busway 11 metres, and the Freeway could be between 20 and 29 metres - all plus side slopes, cut and fill batters, drainage, grade-separations and other necessary ancillary engineering works. NEAPTR states that land acquisition costs are similar for all three (See Table 3 herein).

It seems that their bad environmental impacts on the Torrens River Valley would all be severe.

However, the NEAPTR-favoured Light Rail Transitway route goes through the historic and revered Park Lands of the City of Adelaide as well as through the Torrens River Valley. The environmental impact it saves on width could be lost by its extra length through the emotionally sensitive and fragile Park Lands.

As mentioned earlier, the Freeway with buses on it is the only one of all the systems studied by NEAPTR which would yield future socio-economic benefits which exceed costs by any significant degree at any reasonable discount (or interest) rate: B/C 1.76 at 10%; 2.81 at 7%; 5.61 at 3%.

But the Torrens River Freeway seems still to be unacceptable to the Adelaide public and the S.A. Government, largely on environmental grounds.

A Busway is only a narrower Freeway, and is suspect to many people who think it could easily be converted later to a Freeway (tramway reserves have often been converted to roadways). Presumably, it must also be unacceptable on environmental grounds, even though it would attract, on De Leuw Cather's assessment, more passengers to public transport than any other option studied by NEAPTR.

The proposed Torrens River Valley-Park Lands Light Rail Transitway has not been justified by NEAPTR's and their consultant's sympathetic (and, we believe, overstated) benefit-cost analyses. At a discount (or interest) rate of ten per cent, future nebulous socio-economic benefits are optimistically projected to be only 74% of (or 26% less than) costs. At a seven per cent discount rate, the claimed marginal B/C ratio of 1.12 would be insignificant, even if it were not wiped out by margins of error.

The NEAPTR-favoured LRT would have bad environmental impacts on the Park Lands as well as the Torrens River Valley. It seems to us that it could only be accepted as an extra \$70 million dollar luxury for the less than 20,000 people who would ride it each way on weekdays by 1996, and as a tourist attraction for Adelaide as a whole.

All our findings, set out above, are based on acceptance of NEAPTR's population projections for 1996. NEAPTR began in 1976 and adopted then reasonable projections that Metropolitan Adelaide's population would grow by 1996 to 1,100,000, an increase of about 200,000 (or 22 per cent) over 20 years.

The North-East study area was defined by NEAPTR as a pie-wedge shaped area covering the Local Government Areas of City of Adelaide, Campbelltown, Enfield (part), Kensington, Norwood, Payneham, Prospect, St. Peters, Salisbury (part), Tea Tree Gully and Walkerville.

In 1976, 273,000 people lived in this North-East area. NEAPTR projected that by 1996 it would house 339,000 people, an increase of 66,000 (or 24 per cent) over 20 years.

NEAPTR assumed that 33 to 35 per cent of the total Metropolitan population growth to 1996 would live in the North-East study area.

But in early 1978, Professor Borrie, in the Supplementary Report of the National Population Enquiry, postulated that even with Australian national net immigration of 50,000 people each year, the population of Metropolitan Adelaide might only reach 983,000 by the year 2001.

Borrie cannot be disregarded. If his postulation is accepted, then the whole population of Metropolitan Adelaide would only grow by 70 to 85 thousand between 1976 and 2001. It is not reasonable to expect that the North-East would attract 66 thousand of those extra people.

All NEAPTR's computer simulations of how many people would use public transport systems are based on a North-East population increase of 66,000 to a total of 337,000 to 1996. This must now be regarded as a potentially serious over-estimate.

This means that all NEAPTR's predictions on the future need for, and future use of, high cost, high capacity public transport systems are probably even more exaggerated than our earlier findings have indicated.

COMPARATIVE STATISTICAL TABLES

The Tables on the following pages compare the costs and levels of service provided by each of the major types of alternative systems. The figures, except where specifically noted, come from NEAPTR's own Working Papers published over the two years ending December, 1977.

NEAPTR does not deal with the problem of staffing arrangements for LRT operations. NEAPTR's operating cost estimates for LRTs are based on one-man operation of all LRTs, most of which are coupled pairs, 53 metres long. The small Glenelg trams still run with 2 men. We estimate the additional cost of LRT 2 men operation at \$2.64M per annum. This would push annual operating costs for an LRT based system to \$16.3M (1977 dollars), and give it the highest operating costs, as well as the highest capital costs, of all the systems costed by NEAPTR.

It should be noted that all money figures in NEAPTR's economic analyses, and in this report, are expressed in 1977 dollars.

TABLE 1: SUMMARY OVERALL COMPARISON
BETWEEN DIFFERENT SYSTEMS

		PERCENTAGE DIFFERENCE, USING ALL-BUS SYSTEM WITH EXTRA CROSS-TOWN SERVICES AS THE BASE CASE (100%).			
		TOTAL CAPITAL TIED UP IN VEHICLES, LAND & CONSTRUCTION (See Table 3)	TOTAL ANNUAL COSTS (See Table 4)	1996 TOTAL WEEKDAY PUBLIC TRANSPORT RIDERSHIP (See Table 5)	1996 MILEAGE OF HIGHWAY TRAFFIC (See Table 5)
Low Cost	LABOUR INTENSIVE				
	A1. Basic improved all-bus and existing rail system.	- 0.7%	- 1.0%	- 3.7%	+ 1.0%
	A2. Same as A1, but with bus priority lanes on major radial arterials.	+ 1.5%	- 0.6%	- 3.2%	+ 0.9%
Medium to High Cost	A3. Same as A1, but with additional cross-town bus services.	-	-	-	-
	B1. Ingle Farm Railway Extension with radial and cross-town buses, but no feeders.	+ 30%	- 6.8%	- 4.6%	+ 1.0%
	B2. Pull-on Busway, with other parallel radial and cross- town buses.	+ 86%	+ 21.4%	+ 1.2%	- 1.2%
Highest Cost	C1. Freeway with buses, plus other parallel radial and cross-town buses.	+ 149%	+ 29.4%	- 3.6%	+ 1.1%
	C2. LRT with feeder buses, parallel radial and cross-town buses.	+ 149%	+ 24% one man operation + 37% two man operation	- 0.4%	- 0.9%

See also Table 6 for detailed comparisons of operating characteristics, including average trip times.

TABLE 2: COMPARATIVE CAPITAL COSTS OF VEHICLES

		1996 PUBLIC TRANSPORT ROLLING STOCK FLEET	UNIT COSTS	PURCHASE OR REPLACEMENT COST OF FLEET	PER CENT CHANGE FROM ALL-BUS SYSTEM A3
LABOUR INTENSIVE	Low Cost	A1. Basic improved all-bus and existing rail system.	\$100,000 \$750,000 \$285,000	\$37,100,000 3,000,000 2,280,000 <u>\$42,380,000</u>	+ 4%
		A2. Same as A1, but with bus priority lanes on major radial arterials.	\$100,000 \$750,000 \$285,000	\$37,100,000 3,000,000 2,280,000 <u>\$42,380,000</u>	+ 4%
		A3. Same as A1, but with additional cross-town bus services.	\$100,000 \$750,000 \$285,000	\$35,400,000 3,000,000 2,280,000 <u>\$40,680,000</u>	0
CAPITAL INTENSIVE	Medium to High Cost	B1. Ingle Farm Railway Extension with radial and cross-town buses, but no feeders.	\$100,000 \$750,000 \$285,000	\$29,900,000 3,000,000 7,695,000 <u>\$40,595,000</u>	- 0.2%
		B2. Pull-on Busway, with other parallel radial and cross-town buses.	\$100,000 \$750,000 \$285,000	\$40,200,000 1,500,000 1,710,000 <u>\$43,410,000</u>	+ 7%
		C1. Freeway with buses, plus other parallel radial and cross-town buses.	\$100,000 \$750,000 \$285,000	\$42,600,000 1,500,000 1,710,000 <u>\$45,810,000</u>	+ 13%
CAPITAL INTENSIVE	Highest Cost	C2. LRT with feeder buses, parallel radial and cross-town buses.	\$100,000 \$300,000* \$750,000 \$285,000	\$33,900,000 19,800,000* 1,500,000 1,710,000 <u>\$56,910,000</u>	+ 40%

All estimates are taken from NEAPTR Working Papers and expressed in 1977 dollars.

* NEAPTR is now believed to be considering using LRT cars costing \$500,000 each.

TABLE 3: COMPARATIVE TOTAL CAPITAL COSTS

		COST OF VEHICLES	VALUE OF LAND	TOTAL CONSTRUCTION COSTS	TOTAL CAPITAL TIED UP	PER CENT CHANGE FROM ALL-BUS SYSTEM A3
Low Cost	LABOUR INTENSIVE					
	A1. Basic improved all-bus system.	\$42,380,000	Bus depot	\$2,500,000	\$44,880,000	- 0.7%
	A2. Same as A1, but with bus priority lanes on major radial arterials.	\$42,380,000	Bus depot Priority lanes	\$2,500,000 1,000,000 <u>\$3,500,000</u>	\$45,880,000	+ 1.5%
Medium to High Cost	A3. Same as A1, but with additional cross-town bus services.	\$40,680,000	Bus depot	\$2,500,000	\$45,180,000	0
	B1. Ingle Farm Railway Extension with radial and cross-town buses, but no feeders.	\$40,595,000	\$ 470,000	\$17,680,000	\$58,745,000	+ 30%
	B2. Pull-on Busway, with other parallel radial and cross-town buses.	\$43,410,000	\$6,309,000	\$34,328,000	\$84,047,000	+ 86%
Highest Cost	C1. Freeway with buses, plus other parallel radial and cross-town buses.	\$45,810,000	\$8,054,000	\$58,645,000	\$112,509,000	+ 149%
	C2. LRT with feeder buses, parallel radial and cross-town buses.	\$56,910,000	\$7,317,000	\$48,366,000	\$112,593,000	+ 149%

All estimates are taken from NEAPTR Working Papers and expressed in 1977 dollars.

TABLE 4: COMPARATIVE ANNUAL RUNNING COSTS

		ANNUAL COST OF CAPITAL AT 10%	ANNUAL OPERATING & MAINTENANCE COSTS	TOTAL ANNUAL COSTS	PER CENT CHANGE FROM ALL-BUS SYSTEM A3
LABOUR INTENSIVE	Low Cost				
	A1. Basic improved all- bus system.	\$4,488,000	\$15,388,000	\$19,876,000	- 1.0%
	A2. Same as A1, but with bus priority lanes on major radial arterials.	\$4,588,000	\$15,388,000	\$19,976,000	- 0.6%
	A3. Same as A1, but with additional cross- town bus services.	\$4,518,000	\$15,576,000	\$20,094,000	0
CAPITAL INTENSIVE	Medium to High Cost				
	B1. Ingle Farm Railway Extension with radial and cross-town buses, but no feeders.	\$5,874,500	\$12,835,000	\$18,709,500	- 6.8%
	B2. Pull-on Busway, with other parallel radial and cross-town buses.	\$8,404,700	\$15,985,000	\$24,389,700	+ 21.4%
	C1. Freeway with buses, plus other parallel radial and cross- town buses.	\$11,250,900	\$14,747,500	\$25,998,400	+ 29.4%
	C2. LRT with feeder buses, parallel radial and cross-town buses.	\$11,259,300	\$13,636,000 with one man operation \$16,276,000* with two man operation	\$24,895,300 \$27,535,300*	+ 23.9% + 37%

All estimates are taken from NEAPTR Working Papers and expressed in 1977 dollars.

* Two man operating costs estimated by Clarke and Casey.

TABLE 5: COMPARISON OF RIDERSHIP ATTRACTED TO ALTERNATIVE SYSTEMS

Projections from NEAPTR Working Papers by De Leuw Cather, published by NEAPTR, December 1977.

		1996 TOTAL WEEKDAY PASSENGER TRIPS ON PUBLIC TRANSPORT IN NORTH-EAST AREA	PER CENT CHANGE FROM ALL-BUS SYSTEM A3	1996 AVERAGE DAILY HIGHWAY VEHICLE MILES OF TRAVEL IN NORTH-EAST AREA	PER CENT CHANGE FROM ALL-BUS SYSTEM A3
Low Cost	LABOUR INTENSIVE	A1. Basic improved all-bus system.	- 3.7%	3,694,080	+ 1.0%
		A2. Same as A1, but with bus priority lanes on major radial arterials.	- 3.2%	3,690,683	+ 0.9%
		A3. Same as A1, but with additional cross-town bus services.	0	3,657,720	0
Medium to High Cost	INTENSIVE	B1. Ingle Farm Railway Extension with radial and cross-town buses, but no feeders.	- 4.6%	3,694,080	+ 1.0%
		B2. Pull-on Busway, with other parallel radial and cross-town buses.	+ 1.2%	3,614,232	- 1.2%
Highest Cost	CAPITAL INTENSIVE	C1. Freeway with buses, plus other parallel radial and cross-town buses.	- 3.6%	3,697,960	+ 1.1%
		C2. LRT with feeder buses, parallel radial and cross-town buses.	(20.2% use Feeders & LRT) - 0.4% (6.6% use LRT only)	3,625,182	- 0.9%

TABLE 6: SUMMARY OF OPERATING CHARACTERISTICS OF ALTERNATIVE SYSTEMS

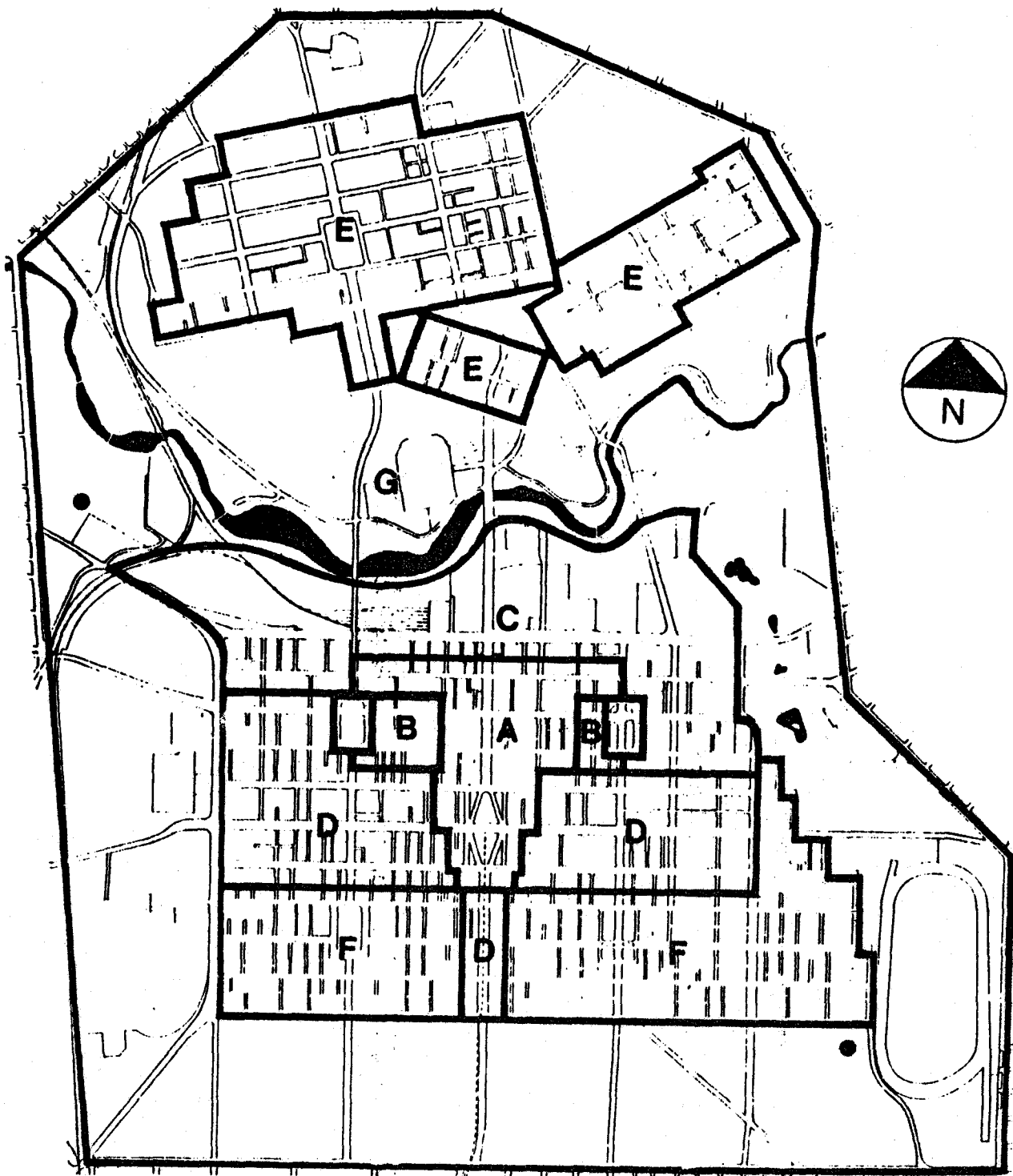
Projections from NEAPTR Working Papers by De Leuw Cather, published by NEAPTR, December 1977.		TOTAL DAILY TRIPS	AVERAGE LENGTH (km)	AVERAGE RUNNING TIME (hrs)	AVERAGE RUNNING SPEED (kmph)	AVERAGE WAIT TIME (hrs)	AVERAGE TRIP TIME (hrs)	(mins)	AVERAGE WEIGHTED WAIT TIME (x 2.67) (hrs)	AVERAGE WEIGHTED TRIP TIME (hrs)
A1.	Inner Radial	70,075	4.74	0.264	18.2	0.034	0.298	18.0	0.080	0.355
	Outer Radial	47,906	8.66	0.390	22.2	0.039	0.429	25.7	0.104	0.494
	Cross-town	13,540	5.94	0.275	21.2	0.068	0.343	20.6	0.160	0.425
	Northfield Rail	5,017	14.47	0.242	60.3	0.083	0.325	19.5	0.222	0.464
A2.	Inner Radial	70,353	4.74	0.255	18.6	0.043	0.298	18.0	0.115	0.370
	Outer Radial	48,308	8.67	0.371	23.4	0.039	0.410	24.6	0.104	0.475
	Cross-town	13,540	5.94	0.275	21.2	0.068	0.343	20.6	0.160	0.425
	Northfield Rail	5,017	14.47	0.242	60.3	0.083	0.325	19.5	0.222	0.464
A3.	Inner Radial	61,729	4.49	0.251	17.9	0.038	0.289	17.3	0.101	0.352
	Outer Radial	45,824	8.26	0.372	22.2	0.042	0.414	24.8	0.112	0.484
	Cross-town	29,251	6.37	0.296	21.5	0.061	0.357	21.4	0.163	0.459
	Northfield Rail	4,941	14.20	0.237	59.9	0.083	0.320	19.2	0.222	0.459
B1.	Radial	106,266	5.86	0.292	20.1	0.050	0.342	20.5	0.133	0.425
	Crosstown	13,529	4.91	0.226	21.7	0.083	0.309	18.5	0.222	0.448
	Northfield Rail	15,389	14.33	0.240	59.7	0.083	0.323	19.4	0.222	0.462
B2.	Feeder and Corridor	5,470	15.68	0.480	32.7	0.090	0.570	34.2	0.240	0.720
	Pull-on Feeder	22,706	12.10	0.320	37.8	0.045	0.365	21.9	0.120	0.440
	Radial	63,607	4.23	0.231	18.3	0.044	0.275	16.5	0.117	0.348
	Cross-town	36,444	4.86	0.232	20.9	0.040	0.272	16.3	0.107	0.339
	Northfield Rail	3,255	10.68	0.192	55.6	0.083	0.275	16.5	0.222	0.414
C1.	Freeway Bus (Fdr.27,307)	36,282	13.82	0.470	29.4	0.061	0.531	31.9	0.163	0.633
	Radial	62,723	4.65	0.254	18.3	0.039	0.293	17.6	0.104	0.358
	Cross-town	34,372	5.10	0.244	20.9	0.053	0.297	17.8	0.142	0.384
	Northfield Rail	3,250	10.65	0.195	54.6	0.083	0.278	16.7	0.222	0.417
C2.	LRT (Feeder 28,493)	37,889	14.52	0.384	37.8	0.052	0.436	26.2	0.139	0.523
	Radial	63,607	4.23	0.231	18.3	0.044	0.275	16.5	0.117	0.348
	Cross-town	36,444	4.86	0.232	21.0	0.040	0.272	16.3	0.107	0.339
	Northfield Rail	3,255	10.68	0.192	55.5	0.083	0.275	16.5	0.222	0.414

TABLE 7: CITY OF ADELAIDE EMPLOYMENT CHANGES 1972-77

	ACTUAL JOB NUMBERS	COMPOUND GROWTH RATES PER ANNUM PROJECTED IN 1973 FOR PERIOD TO 1985		ACTUAL JOB NUMBERS	ACTUAL COMPOUND RATE
		Low	High		
* CORE DISTRICT, (Area "A")	31,000	+ 2.1%	+ 3.3%	35,190	+ 2.56%
* INNER FRAME DISTRICT, (Area "B")	3,900	+ 2.34%	+ 3.52%	4,100	+ 1.0%
* OUTER FRAME - West End Precinct, North Terrace Precinct, East End Precinct, (Area "C")	18,600	+ 0.79%	+ 1.78%	16,100	- 2.84%
TOTAL	53,500	+ 1.69%	+ 2.84%	55,390	+ 0.7%

Source: Adelaide City Council 1972 Land Use Survey, and preliminary counts from the Council's 1977 Survey.

* See map on page 24 of the 1974 "red book" of the City of Adelaide Plan.



WORKFORCE FORECAST AREAS

Source: USC City of Adelaide
Plan, page 24.

POSTSCRIPT

We believe that the Director-General of Transport himself was interstate or overseas for periods while NEAPTR studies were proceeding.

We visited NEAPTR staff in late June and July so as to be fully briefed on NEAPTR's published and unpublished work over the past two years, and their latest thinking.

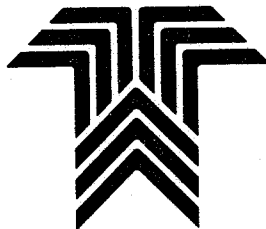
We kept NEAPTR officials informed as to the trend of our thinking, and asked to be informed of any relevant new information they might have. Nothing of any significance was forthcoming.

When the Director-General returned to Adelaide, we obtained a conference with him, the NEAPTR project director and senior staff, to tell them of our draft conclusions as now set out in this report. That conference was held between 10.00 a.m. and 1.15 p.m. on Monday, August, 14th.

We presented our draft comparative analyses of facts and figures drawn from NEAPTR papers prepared for and published by NEAPTR over the past two years. We were then immediately told that these figures must be wrong. We asked for more information, but none was forthcoming before we had to leave Adelaide.

After we had finished and submitted our report to the City Council on August 18th, the attached letter was received by the Town Clerk.

23rd August, 1978.



Director-General of Transport

South Australia

21 August 1978

Mr. R.W. Arland,
Town Clerk,
Adelaide City Council,
Town Hall,
King William Street,
ADELAIDE S.A. 5000

Dear Mr. Arland,

Further to our continuing discussion on the NEAPTR proposals, I am happy to have had an opportunity to review the work being undertaken for the City Council by George Clarke and Peter Casey.

I am particularly grateful for their careful analysis of some of the sketch planning data which led to discrepancies being identified. For example, the working paper which shows the base case all bus system attracting more patronage than a system including a rapid transit link, is obviously incorrect.

The purpose of this letter is to advise that these inconsistencies exist and the data should therefore not be used for comparative economic assessment. Although the economic factors were not the prime consideration in our recommendation to construct LRT, a new set of assignments and economic analyses will be prepared using the Metropolitan Adelaide Data Base Study instead of the sketch planning models. The new data will supersede that which was drawn to our attention by your consultants. Its primary purpose will be in preparation of a submission to the Commonwealth Government for financial support.

A copy of the revisions will be forwarded to you in due course.

Yours sincerely,

DEREK SCRAFTON