THE PROBLEMS OF PLANNING & BUILDING A LARGE BUS DEPOT

L.A.C. ELLIS

ABSTRACT: *The planning and building of a depot to accommodate a large fleet of urban passenger transport vehicles requires the consideration of many and varied factors, including the services to be operated, the selection of a suitable site, the effect on the environment, traffic flows, engineering and administrative services to be provided, staff amenities and the like. The State Transport Authority, Bus and Tram Division, Adelaide is currently engaged on such a project, and this paper is presented to outline some of the problems encountered, and to demonstrate the advantages gained from the close working relationships between the planning and operations teams which were established to deal more effectively with these problems.*

PROBLEMS OF PLANNING & BUILDING A LARGE BUS DEPOT

INTRODUCTION

The South Australian State Transport Authority is engaged in building a 250 bus depot at Morphettville in the south-western suburbs of Adelaide. This paper deals with this project, with the problems that arose in its planning, and with the methods used to overcome these problems. Most of the matters discussed although specific to this site have a general application to similar installations.

The project will be discussed from an administrative viewpoint, and will be dealt with under the following headings:-

(1) Establishing the Need
(2) Preliminary Cost Estimates
(3) Site Selection
(4) Type of Contract
(5) The Planning Team
(6) Environmental Impact Statement
(7) Conclusion

Establishing the Need

For many years, the south-western suburbs of Adelaide were rural in character and mainly supported vineyards and market gardens. The somewhat sparse population was served by private bus services under licence from the Authority. These private bus services grew as the population increased, and in 1974 some six owners were operating services from small depots in the district. The Authority itself had two regular services on the outskirts of the district, but it was generally regarded as a private bus preserve.

In February 1974, most of the metropolitan private bus owners, including those in the south-western suburbs, trans-

ferred their services to the Authority. The six small depots in the south-west were located in areas where expansion to meet future transport needs was impracticable, crew amenities did not meet present day standards, and their continued existence as separate entities for any length of time was undesirable from an economic viewpoint.

The transfer of the private services to the Authority was unexpected and was accomplished with only two weeks' notice. The private owners cooperated very well and in all cases the Authority continued to run the same services as the private owners had done from the same depots, using the same buses and drivers. Most owners became employees of the Authority and continued at the depots as managers.

For the reasons set out above, this type of operation could not be continued indefinitely, and the first problem which arose was the updating of the Authority's forward plans so that:-

(a) the small independent services could be integrated into the Authority's suburban network

(b) the small depots could be closed and replaced by large depots offering economies of scale particularly in servicing, cleaning and washing facilities

(c) new standard buses could be ordered to replace most of the private fleets

(d) sufficient depot parking space would be available to house up to 200 more buses than

the combined Authority and private fleets. These additional buses were required to meet transport growth

(e) new Workshops could be built to cope with the enlarged fleet

(f) adequate crew amenities could be provided

The revised master plan was based on expected community needs to the year 2000, and latest estimates place the cost at not less than $47m. This plan, after being approved in principle by the Authority and State Cabinet, formed the basis of a submission in April 1974 to the Commonwealth Government for financial assistance under the Urban Public Transport (State Grants) Act. The building of a 250 bus depot in the south-western suburbs formed part of the plan.

Preliminary Cost Estimates

The traffic operations of the private bus companies have been continued with few alterations pending the opening of the new depot. However, all commercial activities of the companies needed to be integrated into the Authority's accounting system from the date of transfer of operations. During the six weeks between the date of transfer and the middle of April 1974, the master plan was prepared, approvals obtained and a submission made to the Commonwealth Government for financial assistance. This meant, of course, that estimates of cost could not be thoroughly researched.

No architects had been appointed for the south-western depot, and no plans had been prepared as to the precise location of the depot or of the areas needed for bus and car

parking, depot buildings, landscaping and the like. The Authority had last built a depot at Port Adelaide for 100 buses in 1957 and of necessity the cost of this depot was used as a guide for the cost of building a new depot in the south-west. After making allowances for increased size and inflation we estimated the new building would cost about $1m. Such checks as we could make in the time available appeared to support this figure, but later events have shown it to be considerably understated. The cost is now expected to be nearer $3.5m, including of course, an inflation rate of from 2 to 3% a month in building costs. We now make sure that all estimates are marked "preliminary estimates only" and will continue to do so until we receive contract prices.

We did rather better with the land cost. First estimates placed the cost at $1.5m but the land was finally acquired for $1.129m.

Site Selection

During the period between April and September 1974 whilst awaiting a decision from the Commonwealth Government regarding finance, tenders were called for the new buses required and a search was made for suitable land on which to build a depot to cater for operations in the south-western suburbs. The optimum location was considered to be within an area bounded by Morphett Road on the west, South Road on the east, Daws Road on the north and Seacombe Road on the south. See Figure 1[1] which also shows the approximate percentage of

---

1. Figure 1 extracted from Environmental Impact Statement for Morphettville Bus Depot.

south-western suburban buses serving major terminal groups.

The area designated was situated within relatively easy reach of the outer termini to be served and the locating of a depot in the area could avoid dead running for buses entering and leaving service. In this way spread of hours penalties for bus crews could be minimised. (Adelaide passenger traffic flow is towards the city in the mornings and away from the city in the afternoons and evenings.)

Other criteria used were:-

(a) the land should be correctly zoned under land use regulations to permit the building of a depot. Only two zonings could be used -

District Commercial, where a depot was a permitted use, or Industrial where a depot was a 'consent' use

(b) the site should be located on one or more main arterial roads to permit easy access to all termini to be served

(c) it should be situated on or near a bus route for ease of crew reliefs

(d) environmentally, the land should be located as remote as possible from buses

(e) topography needed to be suited to a depot

(f) the site needed to be large enough for depot requirements

An area of six ha., zoned District Commercial, and which largely met the above criteria, was located on the corner of Morphett and Oaklands Roads, Morphettville. The site was subject to a contract for sale to another developer and the Authority therefore took action for its acquisition.

Type of Contract

It was clear that the project of building a new depot in the south-western suburbs would have to proceed even if Commonwealth funds were not provided, and whilst awaiting the Commonwealth Government's decision, investigations were made into the different types of contract which were available.

There are a number of different methods which can be used, including:-

* Project Management contract, under which one firm would be responsible for design, construction and cost control

* Maximum price contract, under which a firm of contractors offers to provide a complete building service to design, supervise and erect a structure for a guaranteed maximum price

* Lump sum contract - used when competitive tenders have been obtained from completed contract drawings and specifications

* Fixed fee contract - which enables construction to commence at an earlier date, with partial working drawings available at the start of construction. The documentation precedes construction by a few

weeks for the first two or three months. Sufficient documentation is supplied to tenderers to enable them to prepare estimates together with a fixed fee to cover preliminaries, overhead, management and profit. The tenderer is also required to state rates of charges for various tradesmen and labourers, and prices for supply of major materials.

We obtained advice from various Government agencies and decided to use the fixed fee contract because this seemed to be the one best suited to our needs. It provided the shortest construction time so that the depot could be built in time to meet the programmed delivery schedule for new buses, and at the same time provided an opportunity to limit the effect of cost escalation. Architects were appointed together with civil and site engineering consultants and electrical and mechanical engineering consultants.

As events transpired, delays occasioned by the need to submit an Environmental Impact Statement provided time for all plans to be prepared before tenders were called and we therefore changed to a lump sum type of contract. This delay was very costly and is again referred to under the section headed Environmental Impact Statement.

There is a choice in the method of calling tenders under a lump sum contract:-

* Tenders can be advertised and all applicants can submit prices. The Authority and its architects then have the task of sorting out the prices and judging if the tenderers have the technical ability and financial capacity

to meet the specification, or

* Applications can be called from builders who wish to register as prospective contractors. This list can be pruned to about five tenderers with known ability and financial resources and only these builders are asked to tender.

We chose the second method.

At the same time that tenders were called, copies of all tender documents were sent to the Commonwealth Government for study to help minimise delays in obtaining Commonwealth Government approval after the tenders were received.

The Planning Team

The necessity for a planning team to implement the long range plans soon became apparent. Because of the volume of administrative work involved, it was decided that the leader should be the Chief Accountant who would be responsible (part-time) for the coordination of the work of the various disciplines. Two senior engineers, a qualified accountant and a senior traffic officer, who are all specialists in their own fields, formed the remainder of the team.

The full-time members of the team were housed in one office so that there could be a full and free interchange of ideas and information. The major project for the team so far has been the planning and development of the Morphettville depot.

The team, with its advisers, spent many hours

devising a satisfactory site layout which would meet operating and environmental needs at a reasonable cost. These requirements rarely seem to coincide. Items which needed to be taken into account in the site layout included:-

(1) A requirement to keep any depot entrance on Morphett Road at least 100 metres south of the northern alignment of the property

(2) A Highways Department request to keep any depot entrance on Morphett Road as far as practicable north of Oaklands Road

(3) The need to keep noisy activities as far removed from houses as possible

(4) The need to provide adequate holding areas within the depot for buses awaiting berthing instructions so that there would be no back-up of buses on public roads due to delays in entering the depot

(5) The need to provide simple traffic flow arrangements within the depot

(6) The need to avoid as far as practicable pedestrians crossing bus lanes within the depot

(7) The need to provide a rational traffic flow for employees from car parks to sign-on room, locker room, amenity section and bus park and vice versa.

The value of a multi-disciplinary approach to these problems was self evident, and the locating of the planning team

within the one office gave maximum opportunity for discussion. The final plan of the depot layout is shown in Figure 2.

A similar approach was made to the siting of the various offices within the office and amenity building. This will house the Public Office, Depot Manager, Marshal, Revenue Office, Training Section and Uniform Store, as well as the Traffic locker and change room, billiard room, canteen, T.V. room, and a "quiet room" where employees can relax. The Revenue Office will include a strong room and a safe deposit system for those drivers who do not wish to wait and pay in their takings direct to a cashier. The whole building will be air-conditioned (partly refrigerated and partly evaporative) and will be protected by security alarms and fire alarms. In the event of a power failure, an automatic changeover device will provide emergency lighting in essential areas from a battery unit.

The Servicing Building needed a somewhat different approach, and here the planning team engineers conferred with other Divisional engineers to ensure that the final layout met operational requirements.

This building, which will also house an amenity section for workshop personnel, will be fitted with electrically operated roller shutter doors, and an extraction system for bus exhausts. There will be two "drive through" pits for normal servicing work, a wheel aligner, a brake testing machine and a twin post hoist. Other pits have been designed to provide ease of access to engines either located at the rear of the buses or underfloor amidships, and one bay of the building will house an under chassis degreaser of a type new to Australia. This incorporates a carriage equipped with high pressure cold water jets. The carriage moves along a track in the floor of the bay

beneath the bus and the high pressure water spray dislodges oil and grease. The water is recirculated after passing through grease traps.

The fuel station, with a storage capacity of 250,000 litres of fuel, will include three cyclone interior cleaning units so that buses can be automatically cleaned whilst they are being fuelled. From the fuelling station buses will pass through an automatic exterior washing machine. The fuelling and cleaning operations will be carried out each night to ensure that all buses are fuelled, interior cleaned and exterior washed each day. Because of the hardness of Adelaide water and its corrosive effect on bus radiators, a 136,000 litre underground rain water tank will be installed. This rain water will be piped to the fuelling station and to the servicing building for use in bus radiators. Normal mains water will be used to fill the fibreglass tanks for the evaporative air cooling systems which are being installed on all new buses.

The washing station will include an additional bay where each bus will be "spring cleaned" every six weeks.

The plans were discussed fully with the Division's Senior Officers, with Foremen, and with representatives of the employees who will be required to work in the new depot. Revisions arising from these discussions were incorporated into the plans by the architects.

Whilst the above planning was in progress, the Highways Department designed road widening in the vicinity of the depot and also designed a traffic light system to regulate traffic at the entrance and exit gate for buses on Oaklands Road. This work required an alteration to depot boundaries.

Investigations made by the consulting site engineers showed that existing Council drains would be inadequate to cope with storm water run off from paved areas and a new route for a drain from the depot to the Sturt Creek was surveyed and agreed with the Marion Council. Agreement was also reached for an easement across the privately owned drive-in theatre land.

The consultants have also negotiated with other Authorities to ensure that the depot's requirements for water, electricity, telephones and the like will not place an undue strain on local installations. Soil tests were made and the necessary surveys were undertaken.

An operating depot such as the one at Morphettville is a specialised project and the team has been called upon to provide day-to-day advice to the architects and consultants and has reviewed plans as they are produced.

The imminent start of building operations does not mean that the work of the planning team has been completed. Engineers will still be required for advice and review of building activities, but it is hoped they will be able to start other projects as well.

The Traffic and Commercial members of the team also have major work to carry out. We are still operating 15 former private depots as self-contained units and largely using the methods in use at these depots when they were under private control. After the Morphettville depot has been completed, the closing of these depots will be strictly timetabled to dovetail in with expected deliveries of new buses.

This timetable will also take into account:-

PROBLEMS OF PLANNING & BUILDING A LARGE BUS DEPOT

* the need to replace buses which are at the end of their economical and mechanical lives at other depots

* the need to provide buses at other depots to augment existing services

* the need to provide a pool of buses for changes in body work to accommodate a different method of displaying destinations

Clerical staff from former private depots will have to be trained in new procedures, and bus drivers who are now only familiar with existing buses will need to be trained in the operation of the new buses. More particularly, bus drivers at former private depots who drive over a restricted number of routes will have to become familiar with all routes over which the Authority operates. The reason for this is that economical rostering and timetabling arrangements require the buses to operate from terminus to terminus via the city, rather than terminus to city as is the case now for former private services.

The former private bus routes which we have continued to operate need to be rationalised and the opening of Morphettville Depot will provide an opportunity for this to be done. A number of the routes are to be changed to eliminate duplication and to provide services where none exist at present. An interchange with the State Transport Authority urban rail system is also planned for the Oaklands Railway Station. This will require fare schedules for the Bus and Tram Division and for the Rail Division to be adjusted so that passengers who transfer from one mode to the other will not be penalised.

The through routing of services together with the need for route changes to rationalise routes and to cope with wider and longer buses, will require major modifications to existing timetables and rosters.

Because of the "through routing" mentioned above, the Authority's buses may be required to travel from any destination to any other destination in the system. The destination name blinds now displayed on buses would be unable to cope with the increase in names required to meaningfully describe the suburbs served, so a system of route numbers to designate routes and destinations will be introduced with the opening of the new depot. As an aid to intending passengers, a "route" description of the major roads traversed and suburbs served by each route will be displayed at all stopping places throughout the system.

In summary, the opening of the new depot could mean:-

* A change in the type of buses in use
* A change of route
* A different destination sign (numbers instead of names)
* A change in some fares
* The use of through routes instead of a city terminal
* A change in timetables
* An interchange with the rail system
* A change in duty rosters
* A change in award conditions (drivers at former private depots have different industrial conditions from drivers at regular State Transport Authority depots)
* A change in clerical procedures

PROBLEMS OF PLANNING & BUILDING A LARGE BUS DEPOT

Theoretically it would be ideal if these changes could be made concurrently with the opening of the depot. From a practical point of view, I believe we will need to compromise because of the risk of failure and rejection of changes due to the inexperience of both crews and passengers. It could well be that the introduction of new buses displaying route number signs only instead of both numbers and destination names, a change in depot location and a change in clerical procedures is all that should be attempted at one time. This would allow passengers to get used to route numbers applying to known established routes without the complication of changing routes and route numbers while at the same time removing destination names.

At first glance the above matters may seem unrelated to the building of a depot, but the successful opening of the depot depends a great deal upon the efficiency of the detailed planning associated with this phase and explains part of the reason why an experienced traffic officer has been seconded to the planning team.

The planning team needs assistance from other officers from time to time, and it is clear that the Traffic Division will be heavily involved. The Staff Division, through its training and staff selection sections, will be called upon to mount extensive staff selection and training programmes in the immediate future.

Environmental Impact Statement

In September of 1974, the Commonwealth Government approved the depot project subject to environmental requirements being met. This proviso can cause hardship, and

experience shows that the Authority buying land needs to have sufficient resources to fund the project itself for a considerable period.

The submission of an Environmental Impact Statement (if required) is a long process, and to wait for this to be approved can mean that the property selected is sold to other interests in the meantime, or that the seller is unnecessarily penalised by being unable to sell his property and so is deprived of finance which he may need.

In our case, the land needed was under contract of sale to G.J. Coles & Company as a site for a K-Mart and to avoid Coles incurring any further preliminary expenditure, the Authority issued a Notice of Intention to Acquire the property on 26th September 1974, and finally acquired and paid for the land on 9th January 1975.

At the time of writing (February 1976) no Commonwealth contribution towards the cost of the project has been received because of the requirement that environmental requirements be met before finance is made available.

There is a Commonwealth Government Act[1] which sets out procedures to be adopted by Commonwealth Government Departments or Authorities to ensure that projects affecting the environment are fully examined. This Act also extends to environmental matters arising in relation to financial assistance granted to the States. At the time of writing, there is no South Australian Act but State Government Departments and Authorities are expected to comply with guidelines recommended by the Environment Protection Council for incorporation into a State Act.

---

(1) Environment Protection (Impact of Proposals) Act 1974

PROBLEMS OF PLANNING & BUILDING A LARGE BUS DEPOT

The procedure requires the proponent to prepare a Declaration of Environmental Factors which sets out brief details of the project and the environmental factors likely to be involved. In our case, this was a document comprising about seven pages. This is submitted to State and Commonwealth Departments of the Environment, either of which can require an Environmental Impact Statement to be prepared. Should this be required, it is prepared in draft form in considerable detail and the draft is required to be placed on display for not less than 28 days at advertised locations where the public can make submissions to either or both the State and Commonwealth Departments of the Environment. The submissions are then forwarded to the proponent together with any further requirements of the Environment Departments. The proponent must then submit a final Environmental Impact Statement to the Departments, taking into account the submissions from the public and the additional requirements of the Departments.

Within 28 days of the receipt of the final Environmental Impact Statement or such information as may be required, the Act requires the Minister to inform the proponent of his decision.

At the end of May 1975 a Declaration of Environmental Factors (Notice of Intent) was forwarded to the Commonwealth Department of the Environment and to the South Australian Department of Environment and Conservation.

The Declaration of Environmental Factors followed guidelines established for the project by the South Australian Department of Environment and Conservation, and gave brief answers to such questions as locality, description of project, description of site and surrounding district, land zoning,

vegetation to be destroyed, disposal of waste products, noise and air pollution, effect on traffic, beneficial effects and cost of project.

In June 1975, we were advised that a fully detailed Environmental Impact Statement was required. Detailed guidelines were supplied together with the format of the statement, which was as under:-

1. Summary of Environmental Impact Statement
2. Title of Project
3. Name of Proponent
4. Objective of the Proposed Action and Analysis of Need
5. Description of Proposed Action
6. Alternative Solutions Considered
7. Principal Features of the Existing Environment
8. Potential Environmental Effects, including both Detrimental and Beneficial Effects
9. Environmental Safeguards (and Monitoring) Proposed
10. Details of Public Involvement in, or Objection to the Proposal (following Public Review of the Draft Environmental Impact Statement)
11. Name and Authorities and Experts consulted in Preparation of the Environmental Impact Statement

At first glance, the requirements seemed innocuous but a study of the fine print (Attachment 1) "Guidelines for Preparation of Environmental Impact Statement for Morphettville Bus Depot", soon dispelled any doubts and it quickly became obvious that we had a major task on our hands. The finished document covered 110 pages of text, 67 pages of submissions from the public, and 29 detailed attachments, some of which were of a highly technical character.

PROBLEMS OF PLANNING & BUILDING A LARGE BUS DEPOT

This was the first Environmental Impact Statement to be produced in South Australia. The draft Environmental Impact Statement was placed on public display on 30th September 1975 and public comments were invited. It was withdrawn on 28th October 1975.

For some weeks prior to the display of the draft Environmental Impact Statement we employed a firm of consultants to:-

* contact local residents and organisations to determine resident perception of the project

* provide a means of communication between the Authority and the residents

By this time, a Bus Depot Action Committee had been appointed by local residents to oppose the building of a depot at Morphettville, and the consultants spent a lot of time with the group (and others) discussing each section of the draft Environmental Impact Statement as it was prepared.

During the time the draft Environmental Impact Statement was on display, we were required to hold a public meeting to explain the project to local residents and to answer questions. Two such meetings were organised and these were held at the Glengowrie High School which is near the depot site.

The meetings did not serve the purpose intended, but were used by local residents mainly to bolster opposition to the depot. The same people attended both meetings.

Some 20 submissions were received from residents and analysed by the Authority, by the Commonwealth Department of the Environment, and by the State Government Department of Environment and Conservation. In general, most of the items raised in the submissions had been adequately covered in the draft Environmental Impact Statement, but some further technical reports were required by the South Australian Department of Environment and Conservation.

The question of validity of value judgments was frequently raised and the Authority was accused of bias. For instance, a developer can count the number of houses near alternative sites which he thinks could influence the choice of a site. The local resident who is personally affected, will place a different value of the inter-relationship of this particular criterion with other values which have affected the choice.

The final Environmental Impact Statement was submitted on 22nd December 1975 and its assessment by the South Australian Department of Environment and Conservation was completed within the 28 day period allowed under the Act. The Commonwealth assessment was five weeks late.

As part of our public relations, a model of the depot was prepared showing buildings, parking areas and landscaping, and a composite photograph was also commissioned showing the model super-imposed on an aerial photograph of the locality. These were not given much exposure during the period when the draft Environmental Impact Statement was on display because it was felt that the local residents might have considered planning had been completed without regard for any objection or suggestion they might make. Now that the Environmental Impact Statement has been approved the model has been updated and placed on public

display at one of our offices.

We were fortunate in that much of the technical information required was available from highly qualified people in State Government Departments. Had charges been made by these Departments, it is roughly estimated that the total cost of producing the Environmental Impact Statement would have been in the vicinity of $30,000.

The major cost of the Environmental Impact Statement however, lies in the escalation in building costs. As previously stated, the chosen method of building the depot was a fixed fee, fast track contract under which construction would have commenced at an early date with only part documentation. Using this method, construction would probably have commenced in September 1975. It has been estimated by our architects that building costs have escalated by about 8½% between September 1975 and February 1976 - a somewhat lower rate than applied previously. The cost of the delay if we are able to start building in April amounts to about $300,000. On a daily basis, this is about $1,600 a day, a figure which was much quoted in our efforts to meet various deadlines.

The delay is also likely to result in other costs which are as yet unresolved. The depot is expected to be completed in about 32 weeks from the date tenders are let. A start in September 1975 would have meant that earth moving and concrete work could have been carried out during spring and summer months when suitable weather could have been expected. A start in April of this year means that the work will commence in the autumn and continue through the winter, andan extension of the construction period beyond 32 weeks appears to be inevitable, with a resultant increase in escalation costs.

Planning was continued during the whole time the Environmental Impact Statement was being prepared, but of course no site work could be done and no contracts could be let until after the final Environmental Impact Statement was approved.

The days when one could buy land and build a depot subject only to operational constraints have gone forever. Developers are now required, and rightly so, to give every consideration to preserving as far as possible the existing quality of life in any district. However, I raise for discussion the question of whether or not the pendulum has swung too far in favour of environment and conservation without sufficient regard to the cost in time and money of producing the required information.

CONCLUSION

The questions which now arise are:-

* What lessons are to be learned from the exercise
* If we were doing the project again would we approach it in the same manner
* What mistakes did we make

Establishing the Need

This was the easiest part of our assignment and raised few problems, as the need for a new depot to take care of transport in the south-western suburbs was self-evident.

Preliminary Cost Estimates

This is an area which provides abundant opportunities

for mis-calculations. Estimates invariably tend to be too low because one finds it difficult to reconcile past costs with the tremendous increases in building costs which have occurred over the last few years, or indeed with the increase in costs which will accrue between the date of the estimate and the date of completion of the buildings. Making such estimates on the basis of a price per square for various types of buildings, when the total square footage required is at best an informed guess, it is a risky business. Even estimates prepared by professional advisers when plans are half-prepared tend to be much too low. Any Authority building a new depot would be well advised to ensure that sufficient funds are in hand to cover expenditure substantially in excess of preliminary cost estimates or of cost estimates based on partly completed drawings.

This tendency to under-estimation is in daily evidence in newspaper reports of various projects and buildings, but despite our knowledge of this, we still continue to make the same mistake.

Site Selection

I believe that the criteria used for site selection were adequate in all aspects other than area. The site finally selected comprised six ha., whereas we had been looking for about four to five ha. We could have been in trouble had we bought the smaller area. Road widening has sliced 0.2 ha from the site, and landscaping has used about another 0.7; the larger site has permitted us to provide for these requirements and still keep buildings restricted to ground floor without affecting safe and efficient bus movements within the depot yard.

Type of Contract

The fixed fee contract originally decided on was the right choice in the circumstances at the time. A lump sum contract is a superior type of contract, but in individual contracts it can be more expensive when the cost of escalation is taken into account. Because of the delays experienced, the problem as to which type of contract to use largely solved itself.

The Planning Team

The concept of the planning team with its members drawn from the various operating divisions was good. If there is a criticism, it is that the team could have been constituted at an earlier date. Capital programmes have a tendency to run late - it is always later than you think.

Environmental Impact Statement

There are a number of areas open to question in the way the Environmental Impact Statement and our relations with the public were handled. Each person must make his own value judgment on whether our approach was right or wrong.

The problem of whether to buy land first and then submit an Environmental Impact Statement if required, or whether to submit an Environmental Impact Statement and then buy the land, is very much akin to the age old question of which came first, the chicken or the egg.

The circumstances in this and in a similar project left us with little choice other than to buy the land first, but in taking this course the proponent needs to be extremely careful that he has given due weight to environmental factors

which may be involved. "Environment" in this context means far more than just the birds and the bees. It means traffic volumes and road capacities, locations of traffic generators, air and noise pollution and all the other items referred to in the guidelines. It also means taking into account the natural and understandable emotional approach to the project which will be used by residents, as opposed to the logical and analytical approach that the proponent will no doubt use himself. This difference in approach should not be under-estimated.

Whichever course is adopted, the proponent can expect to be committed for architectural fees and other expenses in order to be in a position to provide the information required for the submission of an Environmental Impact Statement.

In the final analysis, the proponent who buys the land first must be prepared to have his purchase criticised and analysed in public documents and in the press, and to accept the consequences if his choice is proved incorrect. He can help himself by talking to the Department of the Environment and by showing the land in question to officers of that Department before any commitment is made.

One question often asked is whether the appointment of consultants to liaise with local people was worthwhile. Taking an overall view, I believe that in this case it was. We did not have officers who could be spared, virtually full-time, for this task. Nevertheless, I believe now that we should have used senior officers to make some of the earlier contacts so that residents would get the message that the Authority and its senior officers really care about the residents and their problems. Consultants would still have been needed for follow-up, but their contact with the public should probably have been less concentrated.

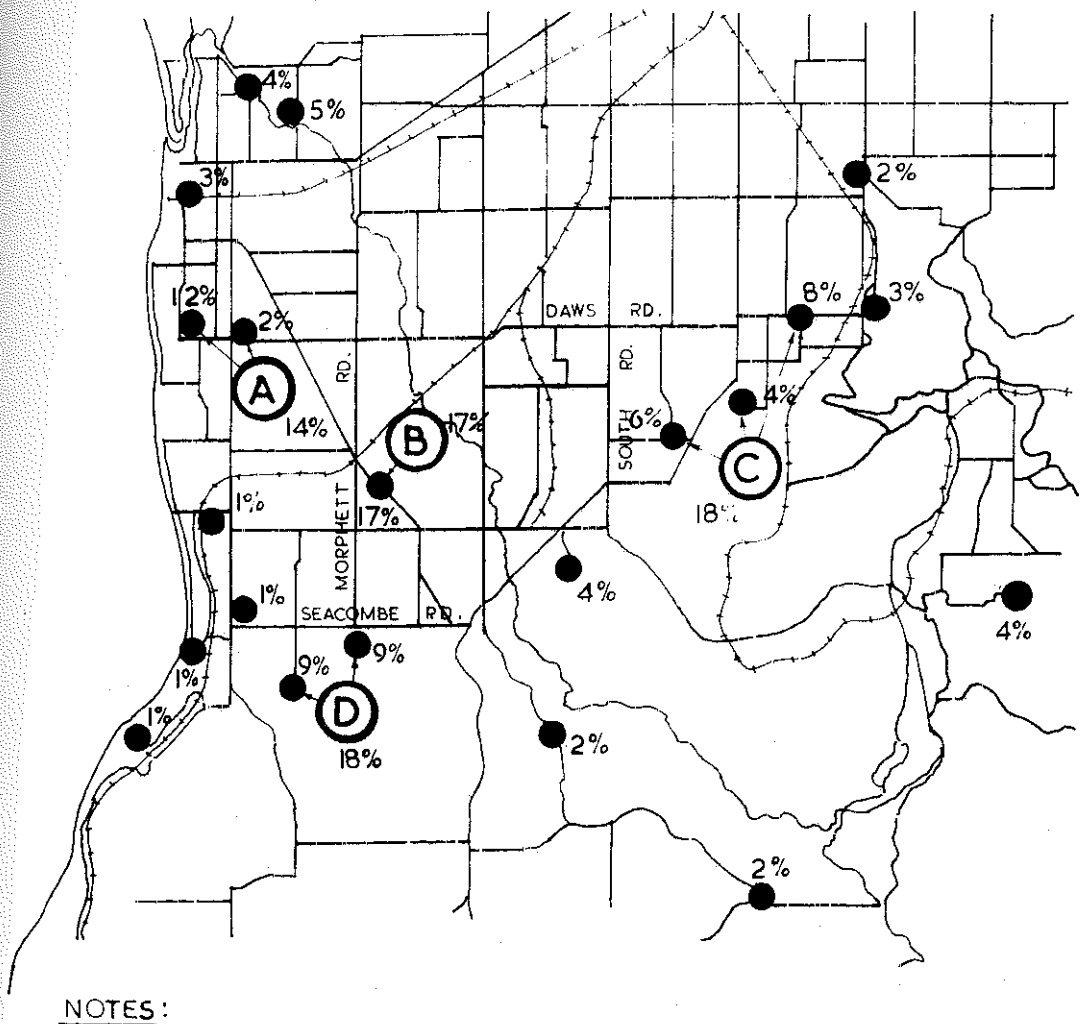
The public meetings did not fully achieve their intended purposes and I would not recommend these for any future assignment.

The advantages of feeding to the public small sections of the Environmental Impact Statement as it was prepared, rather than the whole story when it was completed, are open to question.

There is a fine balance between doing too much and not doing enough and I have the feeling that in this case we did too much. It will never be known whether we achieved our objectives of keeping residents fully informed and of providing a means of incorporating objective suggestions in the overall depot complex, or whether the frequent meetings of the consultants with residents simply served to "keep the pot boiling".

FIGURE 1

APPROXIMATE DISTRIBUTION OF BUSES SERVING THE SOUTH WESTERN SUBURB TERMINALS



NOTES:

1. A, B, C AND D INDICATE MAJOR BUS CONCENTRATIONS AT TERMINALS.
2. Ⓐ% INDICATES APPROXIMATE PERCENTAGE OF BUSES SERVING MAJOR TERMINAL GROUPS
3. SHADED SECTION DENOTES AREA SUITABLE FOR BUS DEPOT LOCATIONS IN THE SOUTH WESTERN SUBURBS

EXTRACTED FROM ENVIRONMENTAL IMPACT STATEMENT FOR MORPHETTVILLE BUS DEPOT - NOV 1975

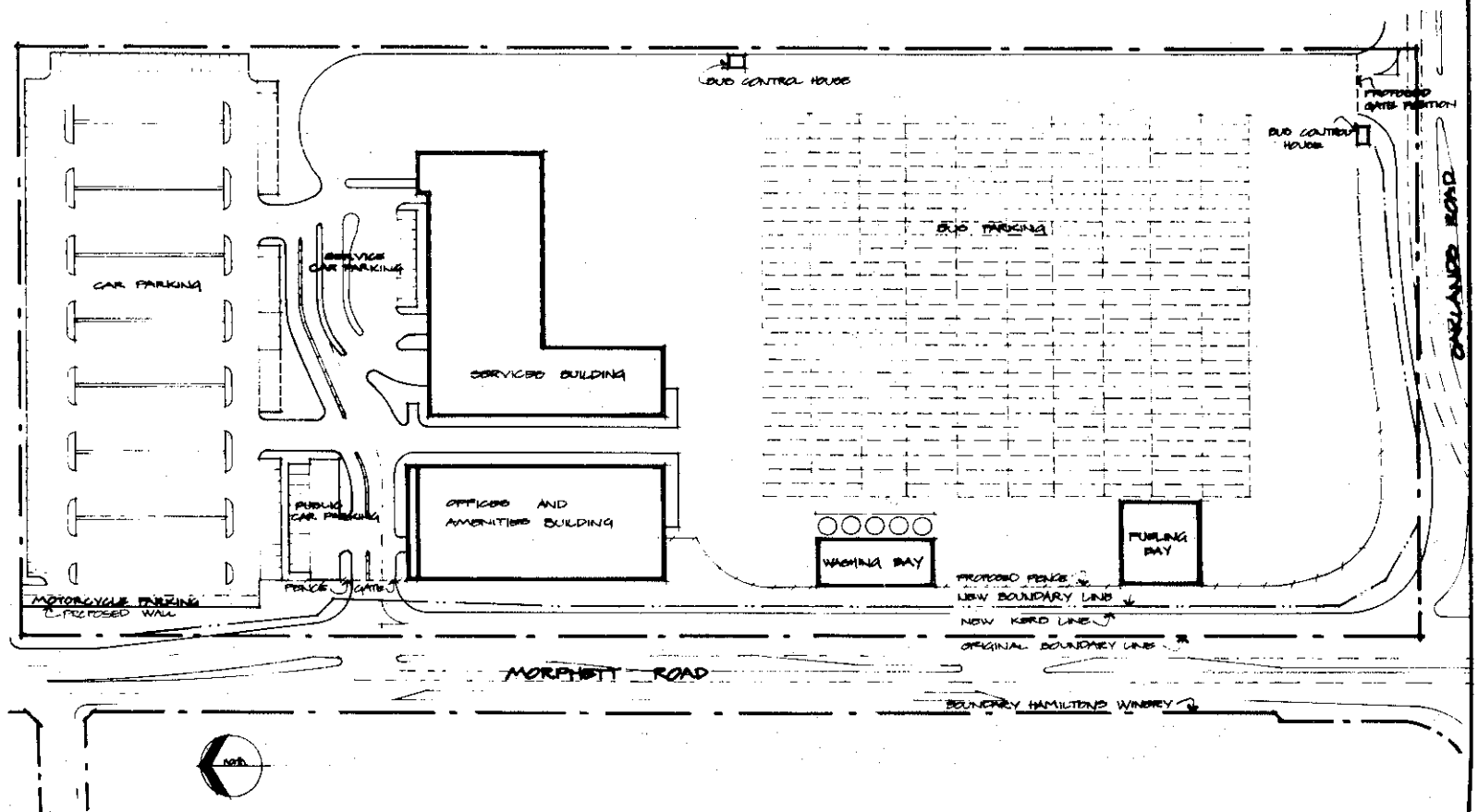


FIGURE 2: SITE LAY OUT MORPHETTVILLE BUS DEPOT

PROBLEMS OF PLANNING & BUILDING A LARGE BUS DEPOT

GUIDELINES FOR PREPARATION OF ENVIRONMENTAL IMPACT STATEMENT FOR MORPHETTVILLE BUS DEPOT

1. Choice of Site

Alternative sites to that selected should be described, including:

(1) a map showing their location with respect to the bus routes to be served by the depot.
(2) the existing land uses and zoning of the alternative sites.
(3) the land uses and zoning for the general locality.

The reasons for not selecting each of the alternative sites should be stated. The proposed site should be evaluated on a similar basis to that above to indicate its advantages over the alternatives.

2. Construction of the Depot

The Environmental Impact Statement should describe activities during the depot's construction phase, including:

(1) the earthmoving activities and the disposal of material, (is this to be used for the formation of mounds around the perimeter?).
(2) the means of temporary drainage of the site and measures to be taken to prevent silt in the runoff from reaching Sturt Creek.
(3) the type of construction materials required and their likely sources of supply.
(4) the nature and levels of noise as measured at the site perimeter likely to be associated with the construction activities.
(5) the type and height of temporary lighting to be used.
(6) the location of access and egress to the site for use by construction traffic, and
(7) the likely duration of the construction phase and whether it will be confined to day-light hours or continue at night.

3. Impact within the Site

(1) Existing use:
The acreage and significance of the vineyards should be described.

(2) Proposed use:

(i) Layout

Indicate by drawings and text the proposed layout and alternative layouts which were considered. Describe the advantages and disadvantages of each, both operationally and in regard to their possible effect on the neighbouring environment. From this analysis, the proposed layout should emerge as the best from both viewpoints.

(ii) Periods of Traffic Movement

The number of buses moving in and out of the depot at different times of the day and night should be graphed. The timing and approximate number of buses being moved about within the site for servicing, washing, and cleaning should be estimated and shown separately on the graph.

This graph will assist in estimating noise levels and emissions within the site and the incidence of possible traffic congestion and traffic volumes on neighbouring streets, and the subsequent traffic hazard for school children. (see later)

(iii) Bus Washing, Cleaning and Servicing

In addition to the disposal of water from flushing batteries (referred to in the D.E.F.) the Environmental Impact Statement should describe the means for the disposal of waste oil from the servicing of buses.

The means of collection and disposal of wastes from the cleaning and washing of the buses (included in D.E.F.) should be described in the Environmental Impact Statement.

(iv) Stormwater Drainage

The means of stormwater disposal should be described as in the D.E.F.

Runoff from the site must trap any oil and grease which collects under standing vehicles before it reaches the stormwater drain. Provision needs also to be made for the collection and disposal of oil or fuel in the event of a major spill on the site. Unless it is held within the site, it may well escape via the drain and Sturt Creek into the

Patawalonga Haven. There have been several instances of this occurring from sources farther removed from the Sturt Creek and the Patawalonga Haven than is the proposed depot. Precautions against this event need to be taken and described in the Environmental Impact Statement.

(v) Lighting

The type of lighting to be used should be described, together with a brief description of alternatives considered and their disadvantages.

(vi) Noise Levels

The ambient noise level for the area throughout the day and night should be established followed by an evaluation of the likely levels of noise to be encountered at the perimeter of the site when the depot is operating. The levels should make allowances for the character of noise in accordance with the appropriate standard (AS 1055-1973). Measurements should take into account noise both from the movement of buses and their washing and cleaning.

(vii) Exhaust Emissions

The level of emissions should be estimated for buses which are idling and moving under load. The total level of emissions during the period of peak movement of the buses should be estimated and, in addition an estimate made of the maximum and mean average level of emissions during the night.

(viii) Appearance of Depot

Measures to be taken to ensure a high standard appearance of the depot, including the treatment of buildings and treeplanting, should be described with the aid of perspective sketches and cross-sectional drawings. The Environmental Impact Statement should state the types of trees and shrubs to be planted around the depot's perimeter, their heights and the depth of planting from the boundary, and the length of time before the vegetation will effectively screen the depot.

4. Impact on Adjacent Roads and Land Uses

(1) Access and Egress:
The location and function of each access and egress serving the depot should be explained, together with the location of openings serving the Drive-In Theatre, the Army Camp and Hamilton's Winery. Weekday volumes of traffic along Oaklands Road and Morphett Road throughout the day from early morning (5 a.m.) to late evening (9 p.m.) should be determined and graphed as for the bus movements.

Measures intended to be taken to avoid or reduce congestion of traffic during periods of high traffic flows and peak bus movements should be described. An estimate should be made of the extra delay to vehicles using Oaklands Road caused by the depot's traffic lights. These should be phased to correspond with the lights at the intersection of Morphett and Oaklands Roads to minimise their delay.

Congestion may arise from traffic associated with the winery (workers' and visitors' cars, and service trucks) interfering with the movement of buses and other vehicles into and out of the depot. An evaluation of this problem should be provided.

(2) Adjacent Roads:
An assessment should be provided of the significance of the bus traffic compared with the total volume of traffic along Morphett and Oaklands Roads. Figures obtained of the traffic volumes along the two roads should be related to the data (provided in the D.E.F.) of the number of buses leaving and entering the depot per hour. If possible, an assessment should be made of the industrial traffic (i.e. trucks, vans, other buses) component of the existing volumes of traffic to enable a proper comparison of the significance of the buses to the future traffic. The figures obtained of traffic volumes and its industrial traffic component will assist in evaluating the marginal increase in noise, traffic congestion, exhaust emissions etc., due to the bus traffic (see later).

Following on from the derivation of the bus traffic significance, an assessment should be made of the adequacy of Morphett Road to carry the additional bus traffic and whether widening will be necessary.

(3) Adjacent Land Uses:
(i) Winery

Apart from the possible problems of traffic

congestion, no other detrimental impact of the depot upon the winery or its operations can be foreseen.

(ii) Army Camp

The depot is considered unlikely to affect the operations of the Army Camp.

(iii) Drive-In Theatre

An assessment should be made of the likelihood of interference with the Drive-In from the depot's night lighting and means whereby this may be avoided (e.g. by direction and height of lighting, high screening along boundary). Noise from the depot at night should be similarly assessed. The possibility of congestion between patrons' cars waiting to enter the Drive-In from Oaklands Road and buses returning to the depot in the evening should be reviewed. Opening times at the Drive-In vary from summer to winter and at times may result in a queue of cars across the entrance to the depot.

(iv) Housing

Estimates should be made of the ambient noise levels experienced at present within housing along Lawson Avenue, immediately north of the proposed depot along Morphett Road, and Oaklands Road immediately east of the Metro Drive-In. The estimates should be made for the entire 24 hour period and compared with noise levels likely to be experienced when the depot is operating. This would include noise from the acceleration and movement of buses past housing areas, and from bus cleaning and washing at night.

5. Impact on Surrounding Area

(1) Schools:
A map should be prepared showing the location of schools in the vicinity and their catchment areas (information from Building Planning Unit, Education Department). This will indicate the suitability of the depot's location with respect to schools.

A number of buses in the locality when children are travelling to and from school and their homes should also be shown. An estimate should be obtained of the number of school children at Glengowrie High School

who regularly walk or cycle along either Morphett or Oaklands Roads, or who need to cross these roads on their way to or from school. From this an assessment can be made of the need for further school crossings.

(2) Housing:
An estimate should be made of the marginal increase caused by the buses in levels of exhaust emissions and noise likely to be received by houses along Morphett Road and Oaklands Road (as in 4 (iv)).

The location of shops in the district should be determined and an assessment made of whether the movement of buses along the roads will limit access to them.

(3) Intersections:
An assessment should be made of whether the extra volume of bus traffic at peak hours will markedly affect the flow of traffic at unsignalled intersections in the district, in particular the intersections of Oaklands Road and Daws Road with Marion Road.

6. Beneficial Aspects of the Project

Included in the analysis of the impact of the project should be a section on the advantages and benefits which it will convey. This should fully describe any direct and indirect benefits and may include the following:-

(1) advantages to neighbouring area of closing down the six existing depots, four of which are sited within residential zones.

(2) the new depot is an important part of an urban public transport programme which will result in a faster frequency of bus services, and a denser network of service coverage in the metropolitan area. The depot will improve bus links throughout the south-western suburbs enabling cross suburban links to shops, employment, schools, recreation areas, etc., where previously no such service was available.

(3) the improvements to the urban public transport service will enable buses to offer an attractive alternative to the private car and thus reduce congestion, noise and pollution, and save fuel.