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# PROBLEMS, ISSUES, AND CONSTRAINTS CONFRONTING PUBLIC TRANSPORT PLANNING IN KOTA BHARU, MALAYSIA: A POLICY REVIEW

A Thesis

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Master of Science

Degree

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## ABSTRACT

This study investigates the public transport service in Kota Bharu Municipality and what can be done to attract more people to use public transportation. Data and information used are based on existing statistics and surveys done by government agencies and consultants. Interviews with public transport operators and planning officers were also undertaken.

The attractiveness of the central area and the Central Business District (CBD) in Kota Bharu depends in part on accessibility. Accessibility is important for cities to develop their economic and urbanization activities. Congestion, inadequate parking facilities, poor public transportation, and inadequate pedestrian facilities can lower the accessibility level of a city. The segregation of residential areas from employment and business/shopping centers creates problems in providing access and a good public transport service. Public transportation is one of the ways to reduce congestion in cities. It also can reduce parking requirements and lower gasoline consumption for the city.

In order to increase the use of public transportation, variations in the level of service should be available to serve all segments of the population. The present public transport service (which consists of conventional bus, mini bus, taxi and trishaw) can be expanded and improved to cater to the demands of the public. A look at the response from the public toward current services, especially the illegal taxi service, shows that new services can be introduced. Government intervention and regulations should be reduced to give the operators freedom to design their services according to demand. Two systems would be possible. One that is comfortable and efficient enough to attract the middle and upper income segments of the population, and one that is affordable by the lower income population which is willing to sacrifice comfort.

Cooperation from the government in providing the necessary road infrastructure and subsidies is needed for the various public transport services to operate efficiently, without unnecessary delays and high costs of operation.

TABLE OF CONTENTS


| CHAPTER | | PAGE |
|---|---|---|
| 1 | INTRODUCTION | 1 |
| | Transportation in Developing Countries | |
| | Issues and Problems | |
| | Public Transport | |
| | Private Automobile | |
| | Infrastructure | |
| | Recommendations | |
| | Pricing | |
| | Traffic Engineering and Priorities | |
| | Public Transport | |
| | Kota Bharu Municipality Regional Transportation System | |
| | Purpose of Study and Limitations | |
| 2 | TRANSPORTATION PROBLEMS IN URBAN AREAS OF MALAYSIA | 21 |
| | Issues and Problems | |
| | Barriers | |
| | Recommendations | |
| 3 | KEY ISSUES RELATED TO PUBLIC TRANSPORT IN KOTA BHARU | 31 |
| | Land Use | |
| | Issues and Problems | |
| | Barriers | |
| | Relationship to Public Transport Service | |

CHAPTER PAGE

Road Infrastructure and Circulation System

Issues and Problems

Barriers

Relationship to Public Transport Service

4 PUBLIC TRANSPORT SERVICE IN KOTA BHARU..... 49

Conventional Bus and Mini Bus

Issues and Problems

Alternatives

Trishaw

Issues and Problems

Alternatives

Taxi

Issues and Problems

Alternatives

5 CONCLUSION..... 78

LIST OF REFERENCES..... 82

APPENDICES..... 87

APPENDIX A LAND SUITABILITY MAP (FLOODING)..... 88

APPENDIX B LEVEL OF SERVICE CHARACTERISTICS..... 90

APPENDIX C FINANCIAL ASPECTS OF MOTORIZED TRISHAW SCHEME..... 92

VITA..... 106

## LIST OF TABLES


| TABLE | | PAGE |
|---|---|---|
| 1-1 | Household Income Distribution in Kota Bharu (1980 - 2000)..... | 17 |
| 2-1 | Population Dependence on Public Transportation, 1984..... | 22 |
| 2-2 | Mode Split for Journey to Work in Urban Areas of Malaysia..... | 27 |
| 4-1 | Kota Bharu Town Bus Service Schedule (Departure from Buluh Kubu Central Market))..... | 56 |
| 4-2 | Kota Bharu Town Bus Service Schedule (Departure from Main Bus Terminal)..... | 57 |
| 4-3 | Express Bus Service to Out-of-Kota Bharu Destinations..... | 58 |
| 4-4 | Taxi Fare for Services to Out-of-Kota Bharu Destinations..... | 74 |

LIST OF FIGURES


| FIGURE | | PAGE |
|---|---|---|
| 1-1 | Malaysia: Topography | 14 |
| 1-2 | Malaysia: Transportation Networks | 15 |
| 1-3 | Kelantan: Transportation Networks | 16 |
| 1-4 | Kota Bharu: Road Network | 18 |
| 3-1 | Kota Bharu: Land Use Precincts | 34 |
| 3-2 | Kota Bharu Central Area: Land Use Precincts | 35 |
| 3-3 | Kota Bharu Central Area: Redevelopment Areas | 36 |
| 3-4 | Kota Bharu Central Area: Pedestrian Facilities | 45 |
| 3-5 | Kota Bharu Central Area: Circulation System | 47 |
| 4-1 | Kota Bharu: Bus Used by SKMK | 51 |
| 4-2 | Kota Bharu: Town Bus Service | 53 |
| 4-3 | Kota Bharu: Town Bus Service Routes | 54 |
| 4-4 | Kota Bharu: Bus Shelters | 60 |
| 4-5 | Kota Bharu Central Area: Main Bus Terminal | 61 |
| 4-6 | Kota Bharu: Trishaw | 68 |
| 4-7 | Kota Bharu Central Area: Taxi Terminal at Jalan Dato' Pati | 75 |

# CHAPTER 1

## INTRODUCTION

Transportation is an important aspect of everyday life. It is an essential element in improving the living condition of human beings, and it is also a source of major problems in cities. The movement of people and the movement of goods in cities are often in conflict with each other. As methods of moving people evolve and mobility increase, cities become bigger and spread out, people have the need and the opportunity to travel further, and the role of transportation increases. Moving people from one place to another becomes a major problem, especially in big cities.

Urban transport is an indicator of an area's social and economic well-being. It consumes considerable financial, land, and energy resources, and affects the environmental quality.(Kota Bharu Municipal Council, 1984, 159) Its basic functions include linking residence and employment, and producers and users of good and services.(Linn, 1983, 87) Accessibility is important if cities are to develop their economic and urbanization activities. Users should be able to have access to the activities offered without experiencing unnecessary delay and discomfort.

Developing countries are facing major problems in urban transport, especially in rapid urban growth areas. The problems are more severe than in developed countries since the level of motorized vehicles in the cities is lower. In general, the cities suffer acute traffic congestion, poor conditions for pedestrians and cyclists, poor public transport, poor access, and environmental pollution. The cities were not built to accommodate the great increase of traffic, especially of motorized vehicles which are usually in conflict with non-motorized vehicles. Transportation consumes a lot of financial resources and many countries have limited funds. Cities cannot cope with the rising demand from rapid urbanization process. The importance of good transportation

for economic development has been recognized by developing countries, but some of them have over-invested in transportation.

As population grows, a country will need a major increase in food production, industrial development, energy supplies, and other resources.(Owen, 1985, 366) Most of the developing countries have high population growth rates, a relatively undeveloped industrial sector, a poor and insufficient transportation system, and a severe scarcity of resources.(Carter, Chadda, and Schoenfeld, 1984, 74) With limited funds and high demand, the only possible solutions are extensive bus priorities, traffic management, traffic restraint, and selected road improvements.(Thompson, 1984, summary)

Transportation to a certain degree affects land-use patterns. It is important to look at the relationship between land use and transportation since non-transportation solutions are also needed to solve transportation problems. Automobiles create congestion, and planless cities generate unnecessary movements.(Gakenheimer, 1978, 293)

Transportation in Developing Countries.

Cities of developing countries face similar transportation problems regardless of their differences in physical conditions and socio-economic characters. The problems arise from factors such as inadequate facilities and high population growth rates, which result in higher demand for transportation, ambitious national development goals, lack of professional skills, and limited funds.(Carter, Chadda, and Schoenfeld, 1984, 73) Additional problems are created by the utilization of wrong and inappropriate solutions, or the misuse of available solutions.

Technology adopted upon recommendations of hired consultants from developed countries, often does not meet the specific needs of the developing countries. The planning process done by foreign firms has little participation from local government agency personnel, resulting in the production of plans that are static and rarely updated.(Carter, Chadda and Schoenfeld, 1984, 80) Consultants should adapt their solutions to the different conditions of the

developing countries within the time and budget limits of their contracts.(Thompson, 1984, 13) Despite limited available resources, most of these countries neglect the need for other essential social programs such as health, education, and housing in order to achieve an advanced transportation system. These countries emphasize expansion of road networks which are often below standard rather than improving or maintaining the existing facilities. A road infrastructure which was built to minimal standards has a low equipment life and costs a lot more to reconstruct or maintain. In addition, data needed for transportation are usually unavailable or inadequate.

Issues and Problems. The level of problems faced by the cities of the developing countries varies, regardless of their size. The common problem areas are congestion, public transport service, private vehicle ownership, and road infrastructure.

In most developing countries, economic activities and administrative services are focused in the central area. This tends to attract large number of people into the area. With increasing use of cars, the volume of travel causes acute congestion in central area and causes hazards to people. This decreases the efficiency of activities in the area and decreases the quality of life in the cities.

Congestion. Congestion in developing countries is more intense than in developed countries due to conflict between motorized and non-motorized vehicles. Among causes of congestion are:

i) the proportion of land used for roads is small, usually less than 10% and rarely over 15%,

ii) growth rate of urban population is rapid,

iii) mixture of different modes of traffic is great,

iv) urban infrastructures are not designed or have not been modified for automobile,

v) rapid population and income growth results in higher demand for private automobile,

vi) urban land use patterns which results in segregation between employment center and residential area,

vii) traffic management is poor,

viii) use of private automobiles tends to be concentrated during peak hours,

ix) topographical constraints,

x) road signs and markings are comparatively rare and are often confusing,

xi) high density of intersections, winding road configuration and changing widths reduce road capacity,

xii) methods of operation of public transport,

xiii) narrow right-of-ways which most of the time are occupied by carts, vendors, pedestrians, etc.,

xiv) activities are usually concentrated in the CBD, which usually has narrow streets. Shops and small businesses front directly onto roads without any provision for customers parking, and

xv) roads are sometimes lined with ill-defined verges with ditches and open drains.(Linn, 1984, 88; Roschlau, 1981, 11; Mogridge and Kuthbert, 1983, 302, and World Bank, 1975, 7)

Congestion raises vehicle operating costs, travel time, and discomfort. The costs of operating public transport rises and fares are increased. As a result, poor people are unable to use the services, and there is an increased tendency to walk or cycle. Employment opportunities become inaccessible to the poor.

Public Transport. Public transportation is often inadequate, offers poor service, and usually plays a small role in decreasing the use of private cars even though it is the most effective way to reduce congestion. (Gakenheimer, 1978, 293) Service usually ignores areas where the poor live

and areas of new growth. Services to poor neighborhoods can provide opportunities for residents to get jobs and provide accessibility to public services that are only available in cities.

Overcrowding of public transport during peak hours causes delays and hazards to users and non-users. Congestion imposes further delays. These increase the operating cost of public transportation, and at times the service becomes unprofitable. Users eventually experience higher charges for the inadequate and deficient service.

The limited road space limits the number of users able to use the public transport service. In countries where high temperatures are experienced all year round, users are not willing to walk additional distance to the provided services. Facilities such as bus shelters and laybys are not available or are inadequate in most countries.

Bus usage is likely to increase considerably with income and population growth since more people will be able to afford public transport. In order to attract more people to use public transport, measures such as providing lower fares, comfort and accessibility to the services are important.

Private Automobile. The level of private automobile congestion is rising rapidly in developing countries as income increases. The automobile is a status symbol. In addition, it gives the user flexibility, privacy, comfort, and unparalleled mobility. However, it is the least energy-efficient form of urban transport and the most excessive user of road space, causing increased congestion and other transport problems. (Roschlau, 1981, 22) There is a need to decrease the use of cars, especially in urban areas. Measures, such as imposing charges, should be used to discourage users of private cars going to the central area.

Improvement of public transportation is often a good way to relieve automobile congestion.(Gakenheimer, 1978, 292) Nevertheless, it is hard to attract car owners to use buses or other forms of public transport since once a car is purchased, the user can use it for any trip at a very low marginal cost.(Owen, 1972, 76)

An inadequate road network is, in general, the main cause of transportation problems.(Thompson, 1984, 7) This is exacerbated by a failure to use the available road efficiently due to i) poor management and maintenance of the total transport system, ii) generally low driving standards, iii) poorly designed road functions, bad conditions of road surfaces and edges, undisciplined pedestrians, chaotic parking practices, and inefficient traffic signals, and iv) sometimes poor police control.(Thompson, 1984, 7)

Infrastructure. The infrastructures for pedestrians and cyclists are often not adequate. In some countries, conditions for pedestrians and cyclists have worsened when roads were improved for motorized traffic. Sidewalks were not included in road designs, and no cycle time for pedestrian crossing or time allowed for crossing is reduced at traffic signals. Sidewalks were narrowed to widen roads or to provide parking spaces; sometimes sidewalks were located at undesirable areas/location, and are often occupied by vendors.

Separate lanes for bicycles are poor or nonexistent. It has become more dangerous and unpleasant to cycle in cities. Congestion sometimes forces bad driving practices which add danger to pedestrians and cyclists. In some countries, walking and cycling are important since a large percentage of the urban population cannot afford motorized transport.(World Bank, 1975, 19)

Parking facilities are inadequate. There are not enough off-street parking spaces, and there are cases where footpaths or any available open spaces in the cities are used as parking space. This causes danger, injury, and inconvenience not only to pedestrians, but also to other road users.

Public transport, especially buses and taxis, lack facilities such as terminals, bus stops and shelters, and laybys. Buses stop at any point the user wants and this causes congestion and hazards to users and non-users.

Recommendations. The policy recommendations mentioned here are derived from comparisons with developed and developing countries. The policy needed for each city or town will depend on factors such as population growth, income, employment, geographical conditions, economic level, available resources, cultural and value differences, and political forces. The principal aim is to provide a satisfactory transportation option, to supply access to the city for non-motorists, and to reduce traffic congestion and parking problems.(Owen, 1972, 48)

In the near future, transportation solutions should be cheap and this can be achieved by:

i) having mixed residential area provided with economic opportunities and central services which should remain in the city center and be accessible from all parts of the city. This will help to avoid needless and needlessly long journeys,

ii) providing segregated bus lanes in order to have fewer interruptions from private traffic, and

iii) having high parking charges and various forms of taxes or restrictions to restrain private traffic.(Thompson, 1984, 10)

Pricing. Among the remedial measures that could be adopted are pricing policies which might only be suitable for large cities. Pricing policy includes congestion pricing, fare differentiation for public transport, staggered work hours, higher parking charges in the central area (especially the CBD), and different kinds of taxes.

Congestion pricing is pricing for the use of congested roads and is used to eliminate or discourage trips which have lower value than the value of delays and operating costs caused to others.(World Bank, 1975, 33 and Roschlau, 1981, 26) This will increase the expense of driving in the designated areas during rush hours. However, congestion pricing has been assessed to have political, technical, and logistical problems, and is generally thought to be undesirable to alleviate congestion; moreover, there appears to be no existing charging system that is satisfactory.(Roschlau, 1981, 26; Button, 1977, 27 and World Bank, 1975, 33)

Congestion pricing places authorities in a much better position to assess what additional transport facilities are economically justified.(World Bank, 1975, 35) Other methods used to alleviate traffic congestion tend to be either inefficient, short term, or limited to specific parts of the transport network.(Button, 1977, 39)

Fare differentiation is used to reduce the number of people traveling at peak hours when costs are highest, but also force the poorest to walk. Higher fares are charged during peak hours and lower fares during normal hours. At this lower fare, many residents who cannot afford regular fares have the opportunity to travel. However, this system will not attract many travelers from peak periods.(World Bank, 1975, 36)

Staggered work hours will help to stagger hours of travel. Even though it tends to lengthen peak hours, this method reduces the intensity of congestion by spreading travel loads.(World Bank, 1975, 37) However, the effect will not likely be large, especially if the urban transport system operates under conditions of excess demand for much of the day.(Linn, 1983, 114)

Charging higher rates for parking in the CBD will help to reduce private automobiles making unnecessary trips to the area during peak hours. Parking can be provided in the fringe of the CBD, and shuttle buses or mini-buses can be used to transport users into the downtown area. This can be a useful complement to the policy of controlling automobile use in central areas.(Linn, 1983, 114) Banning street parking also will help to improve the flow of traffic during peak hours, and the space can be used to provide sidewalks for pedestrians or bike-lanes.

Another method of pricing is taxation on private automobile ownership and use. This can be in the form of higher taxes on fuel, or on import and licence fees. Public transportation should have lower taxes. This is essential to lower user charges and to keep the operation profitable.

Traffic Engineering and Priorities. Traffic engineering and priorities can help to reduce obstructions that different flows of traffic cause to each other, particularly at intersections.(World Bank, 1975, 38) Road capacity can be increased by as much as 50% by installing coordinated signal controls, by intersection redesign or elimination, and by other control measures.(World Bank, 1975, 38)

Among the engineering solutions are one-way traffic circulation systems, localized road widening, lane-markings and channelization, junction improvements, provisions for curbs and footpaths, review of traffic signal timings, bus lanes and stopping bays, controls on frontage development, pedestrian guardrails and crossing facilities, selected vehicle probations, short sections of new roads releasing previously under-utilized capacity, improved standards of geometric design, street lighting and traffic sign improvements, and on-street parking controls.(Mogridge and Kuthbert, 1983, 7) In order for these engineering measures to succeed, an adequate level of enforcement, a respect for authority by road users, and a society educated in the sensible and courteous use of highways are needed. Without cooperation from users, these engineering measures will not operate as they are supposed to.

Public Transport. Improvement of the public transport system is likely to be the only solution for reducing traffic congestion and chaos in developing countries. Buses and various form of paratransit will be playing a key roles in meeting the rising demand for transportation in the cities. A public transportation system is vital in medium and large size cities in developing countries.(Wilson, 1987, 19) Most of these cities have roads with poor surfaces and/or have interference from non-motorized vehicles which results in low speed bus operations.

Good public transit is needed to serve those who do not own cars due to income, age, health, or choice, and to give an option rather than relying solely on the automobile.(Owen, 1972, 25)

Characteristics of urban public transport in developing countries are a high growth rate, diversity, and, most of the time, poor financial performance.(Jacobs, Maunder and Fouracre, 1986, 6) Emphasis should be on improving the existing mass transit facilities such as buses and mini buses which are the principal method of mass transport but which are seriously deficient. Improvements that are needed to provide better bus services include:

i) bus services should be affordable and accessible to the poorest people. The carless are mostly in the lower-income brackets. The high cost of public transportation decreases mobility and/or causes serious financial problems. In order to encourage the use of public transport, good service should be provided at the lowest possible price. In cities of many developing countries, public transport fares have become an important political issue, and it is not surprising that efforts are made by governments to keep public transport fares low,

ii) bus stock and quality should be improved and should be kept in good repair,

iii) bus operators should have priority in acquiring more buses and in operating them more effectively by having reserved bus lanes, preferential treatment at intersections, bus loading bays, shelters and terminals. A combination of new buses, bus roadways, traffic controls, and regulations that excludes automobiles from specific routes or from downtown areas might be implemented quickly and supplied at low fares,

iv) fares and routes should be rationalized. Poor neighborhoods should be provided with paved streets and bus shelters. Geographic coverage of the service should be greatly improved in most cities and much more money should be spent for this purpose.(Gakenheimer, 1976, 311 and 303, and Jacobs, Maunder, and Fouracre, 1986, 8)

In most cities, paratransit or intermediate public transport such as trishaws, minibuses, taxis and jitneys are used to serve the need and demand from users that cannot be offered by conventional buses. However,the bus cannot provide the flexibility and door-to-door service of

the automobile. This service can be supplemented by organizing taxis as a supplement, or a substitute, to the bus. Taxis could supply service comparable to that of the automobile, would eliminate parking problems, and would reduce the social gap that separates car owners from the carless by providing all urban residents with physically comparable equipment.(Gakenheimer, 1976, 320) A public automobile network, therefore, could not be fully effective without the limits on the use of private vehicles, at least during rush hours in central city and the CBD.

Dependence on surface street systems means excessive delays. Cities are increasingly faced with the need to give buses a preferential status or exclusive rights-of-way to convert the bus into a method of rapid transit.(Owen, 1972, 31) However, caution should be used in evaluating plans for modern technology and rapid transit investment, especially for subways. These options are desirable only in the largest cities of the most advanced countries in order for them to function as an efficient urban transport system or to benefit the urban poor.(Linn, 1984, 109)

The most fundamental of urban transport improvements is the achievement of urban physical patterns which economize on costs of transport and other infrastructures but which provide improved access and living conditions.(World Bank, 1975, 47)

The locational arrangement of urban activities plays an important role in solving transportation problems. Travel requirements, including unnecessary trips, can be minimized if urban activities are designed to complement each other. Efforts should be taken to reduce the conflict between the desire for mobility and the harmful effects of achieving it.(Owen, 1972, 2)

The approach of building better communities is a compromise between mobility and accessibility.(Owen, 1987, 64) Accessibility is a function of three factors, land use patterns, distribution of people in relation to land use, and transport systems, which form a triangle of forces that must be balanced if people in cities are to obtain efficiently the many amenities and opportunities the city offers.(Thompson, 1984, 4) Many critical needs were neglected in order to provide mobility when people moved into suburbs which require daily transportation to work

places, shopping, and other services.(Owen, 1987, 63) A workable transport system can be achieved by having housing, job opportunities, community services, and transportation integrated physically and designed to function together.(Gakenheimer, 1976, 332) The most fundamental of urban improvements is the achievement of urban physical patterns which economize on costs of transportation and other infrastructures but provide improved access and living conditions.(World Bank, 1975, 47)

The expansion of transport capacity will not overcome urban traffic congestion without more satisfactory community design aimed at rearranging land use and other measures aimed at reducing unmanageable demands on the system.(Owen, 1987, 63) Many new roads fail to achieve their purpose, as defined in plans, as efficient traffic arteries because they rapidly attract to their sides unforeseen land use patterns which unload all manner of slow-moving traffic into the roads.(Thompson, 1984, 16) Transportation has always had a strong influence on locations; the weaker the land use controls the more important is the role of transport policy and investment as a guiding force.(World Bank, 1975, 52) The use of urban transportation to foster desired patterns of urban growth is closely allied to land use regulation.(World Bank, 1975, 52) "Without effective land-use controls, the tendency toward greater concentration of economic activity will make congestion, including street congestion, worse than ever."(Owen, 1972, 49)

The municipality of Kota Bharu's public transport service will be examined and suggestions for improvement will be included. Land use and road infrastructure have an impact on the public transport service. In order to have a better look at the problems facing public transport in Kota Bharu Municipality, the next section will give a brief description of the municipality regional transportation network.

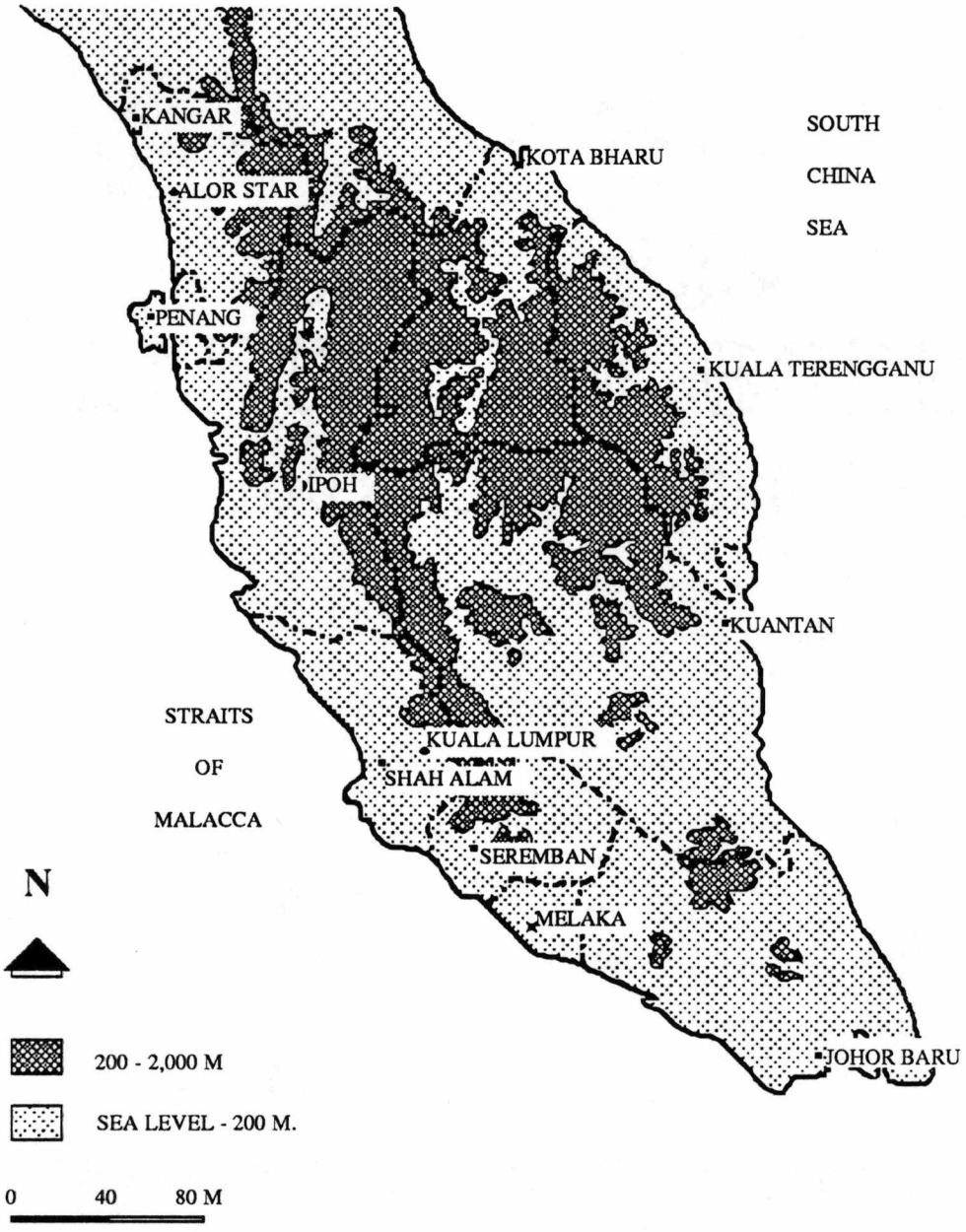
Kota Bharu Municipal Council Area Regional Transportation Network

Kota Bharu is the state capital for Kelantan, one of the states in West Malaysia. It is located far from the mainstream of economic activities and growth centers which are concentrated

along the west coast. Kota Bharu is the focus of the communication network, and the main center for shopping and high order services for the region. It lies in a flat coastal plain of the northern region of Kelantan and is only six miles upstream from the estuary. Every year Kota Bharu suffers severe flooding, especially the central area and the CBD.

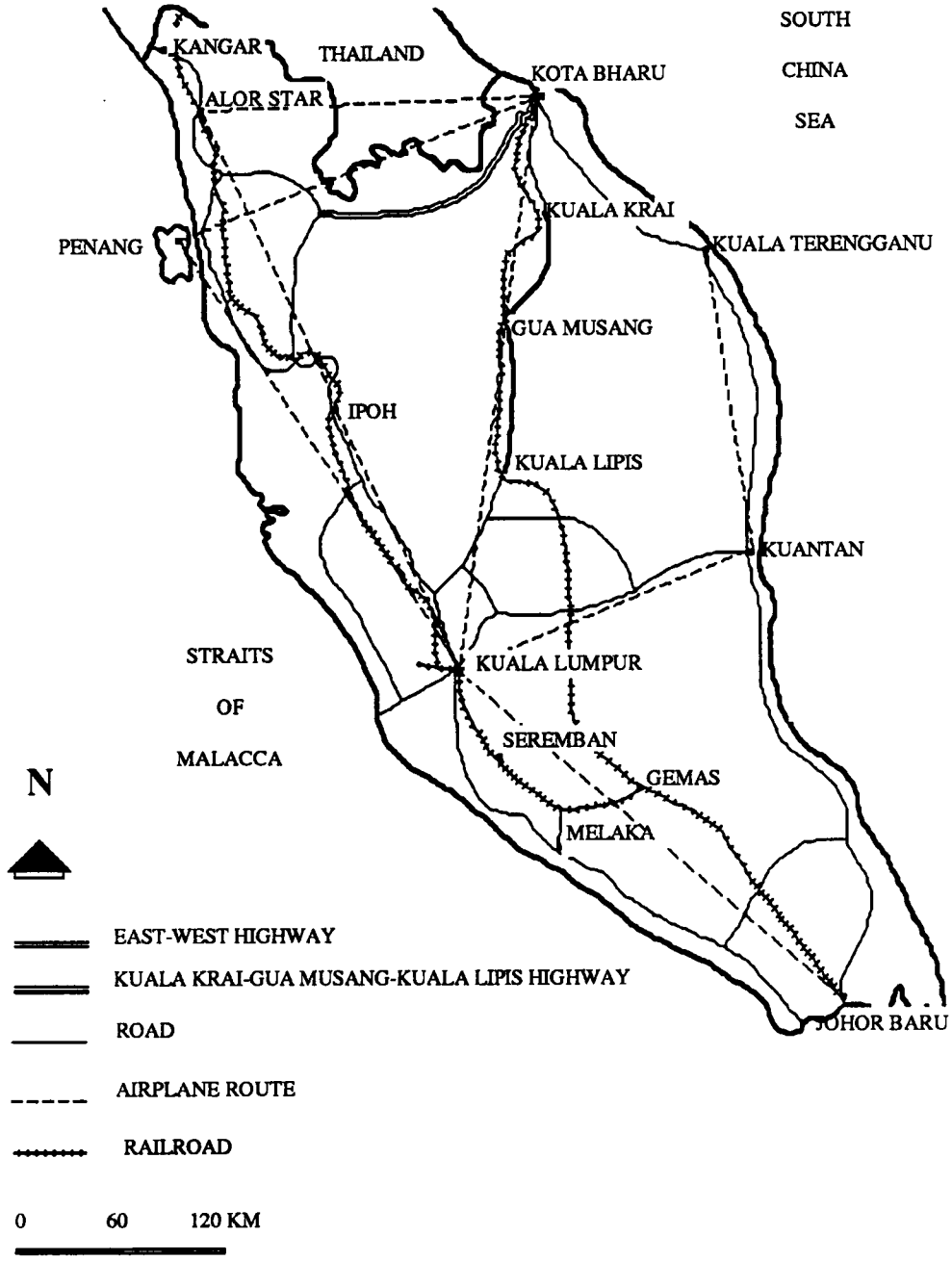
The Kota Bharu Municipal Council area has increased from 4.4 square miles in 1970 to 44.6 square miles in 1980.(Setiausaha Kerajaan Negeri Kelantan, 1984, 7) The population increased from 120,600 people to 170,600 people and is projected to reach 301,700 by the year 2000.(Majlis Perbandaran Kota Bharu, 1984, 61 and 68) The average population growth rate is 3.44% per annum, higher than that of Kelantan and Malaysia.(Majlis Perbandaran Kota Bharu, 1984, 62) The municipality has an average household income of M$ 586 per month (US$1.00 = M$2.70), lower than the national average of M$1,836 per month, due to low productivity and the level of economic activities in the area.(Majlis Perbandaran Kota Bharu, 1984, 55) The annual employment income growth rate is 4.1%, with 39% employed in the private services sectors. The projected household income distribution is as shown in Table 1-1.

As the population's income increases, there is a need to improve the present transportation system. This will enable the population to use the amenities and facilities to their fullest. In Malaysia, Kelantan is among the most poor, most rural, and least developed states. It is located far from the major economic activities and growth centers of Malaysia. It can be said that Kelantan is the forgotten corner of Malaysia. Mountain ranges in the southern and western parts of the state isolate it from the neighboring states as can be seen in Figure 1-1. Transport linkages with other states and within Kelantan are considered poor. The transportation network is as shown in Figures 1-2 and 1-3. Prior to the opening of the East-West Highway and Kuala Krai-Gua Musang-Kuala Lipis highway(Figure 1-2), connection to the southern region of the state was by water transport or railroad. Most of the roads are used for moving timber from the forest. The roads are unpaved. The two highways shorten journeys to the northern and western states of Malaysia.



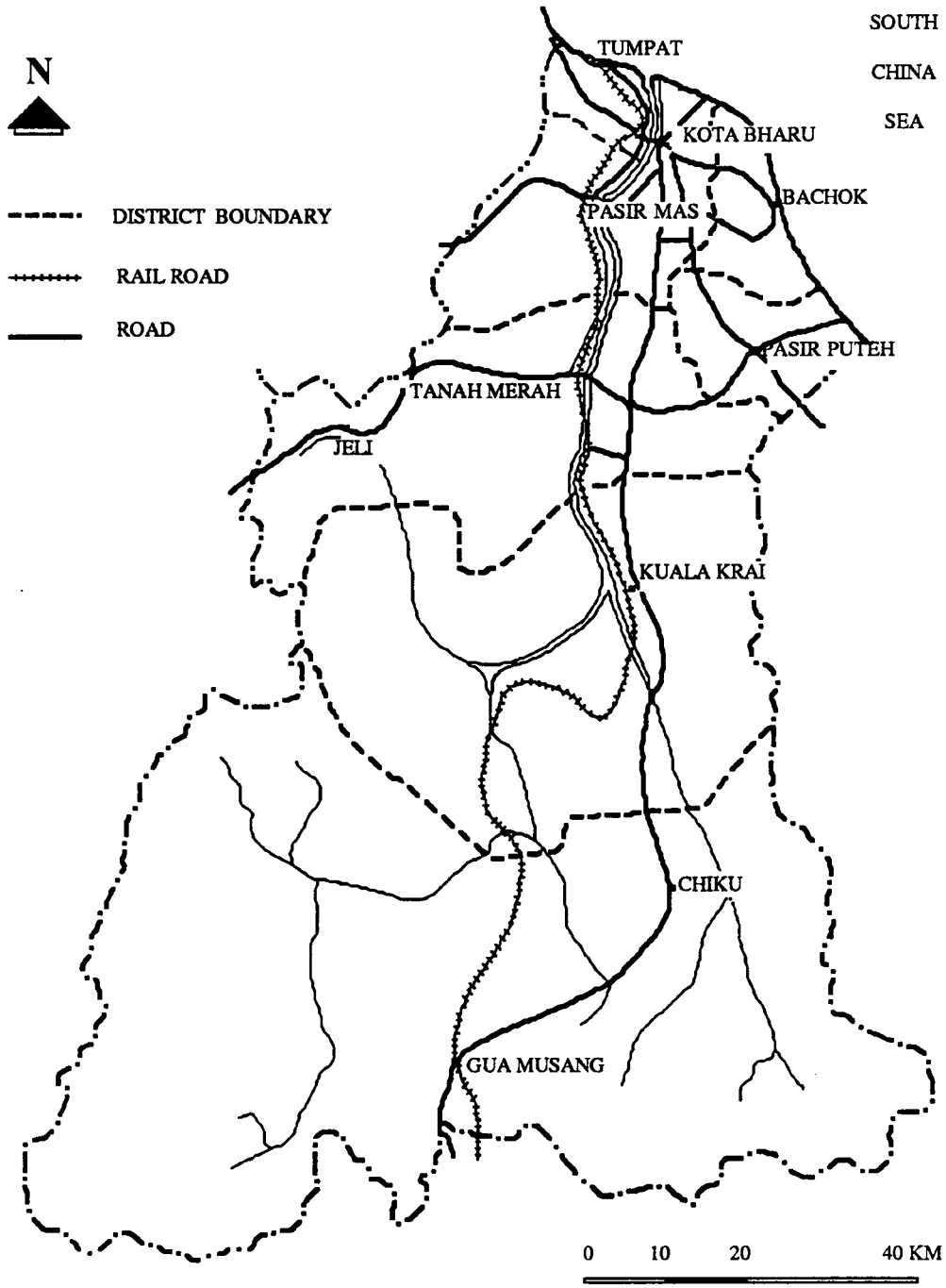

Source: Malaysian Secondary School Atlas

Figure 1-1 Malaysia: Topography




Source: Kota Bharu Municipal Council and Malaysian Airlines System

Figure 1-2 Malaysia: Transportation Networks




Source: Kota Bharu Municipal Council

Figure 1-3 Kelantan: Transportation Networks

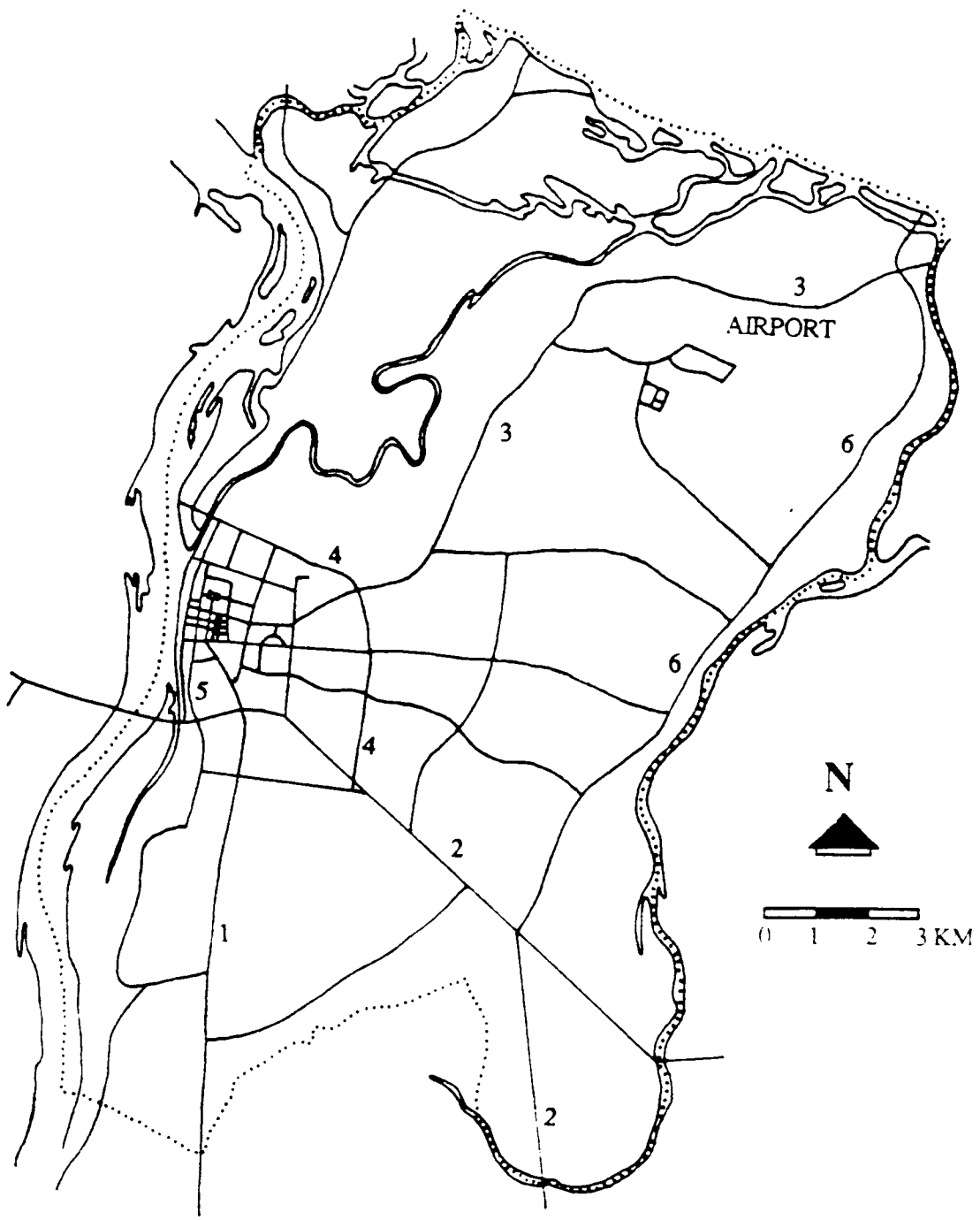
Table 1-1 Household Income Distribution in Kota Bharu (1980-2000)

| Household Income (M$/Month) | 1980 | 1985 | 1990 | 1995 | 2000 |
|---|---|---|---|---|---|
| 0 - 299 | 38.0 | 31.0 | 21.0 | 12.0 | 4.0 |
| 300 - 699 | 36.6 | 34.0 | 34.0 | 31.0 | 29.0 |
| 700 - 1,999 | 21.0 | 28.0 | 31.0 | 36.0 | 39.0 |
| 2,000 and above | 4.5 | 7.0 | 14.0 | 21.0 | 28.0 |

Source: Kota Bharu Structure Plan Report of Survey, MPKB, 1984, p. 58.

In 1973, it was estimated that there was 0.09km. of major road for every 1 square km., compared to 0.22km. for Peninsular Malaysia.( Majlis Perbandaran Kota Bharu, 1984, 13) Prior to 1982, the only road linkage to other states was along the coastal highway. The opening of the East-West Highway in 1983 and Kuala Krai-Gua Musang-Kuala Lipis Highway in 1986 has brought Kelantan closer to the west and north states of Malaysia. Both highways will help to increase the importance of Kota Bharu as the development focus of Kelantan and will increase accessibility to other major urban markets.( Majlis Perbandaran Kota Bharu, 1984, 159) This will result in greater development.

The main road links to Kota Bharu from other districts in the state need to be upgraded in order to provide better services, as the number of automobiles and bus services increase. Pasir Puteh, Kuala Krai, and Pengkalan Chepa roads need to be upgraded to improve access to Kota Bharu town center and the airport.( P.G. Pak Poy and Yunken Alam Bina, 1981, 8) These roads are as shown in Figure 1-4. They are the main roads connecting Kota Bharu's town center to other districts in the state. Pengkalan Chepa road is the main connection from Kota Bharu to the




1 - JALAN KUALA KRAI
2 - JALAN PASIR PUTIH
3 - JALAN PENGKALAN CHEPA
4 - JALAN PEKELILING
5 - JALAN SULTANAH ZAINAB
6 - JALAN KUBANG KERIAN/SABAK

Source: Kota Bharu Municipal Council

Figure 1-4 Kota Bharu: Road Network

airport. The number of passenger flights has ncreased substantially during the past few years. Currently, Malaysian Airline System(MAS) flies four to five times daily to Kota Bharu from Penang, Alor Star, and Kuala Lumpur. There is a need for a new route linking the airport to Kota Bharu's town center. Recommended routes include using Hospital, Bayam, and Sabak/Tanjung Mas road.

Rail service has no or little impact on the municipality. It is recommended by the consultant that the service have no further extension but be retained as it is. This is an essential service linking north and south regions of the state. It used to be the vital or only mode of transportation for people living in the remote area of Ulu Kelantan district before the opening of the two new highways. In the future, the service will emphasize bulk freight due to the expected decline in passenger traffic.( P.G.Pak Poy and Yunken Alam Bina, 1980, 10)

Purpose of the Study and Limitations.

The purpose of this study is to examine the public transport service in Kota Bharu Municipality. This study includes discussion of key issues that are related to the performance of the public transport service. The issues discussed are land use and road infrastructure. There are a number of new services, that can be introduced in Kota Bharu to induce more people to use public transport services which will subsequently reduce the number of private vehicles on the roads. This will reduce the level of congestion, especially in the central area.

Due to only one bus company providing services to the municipality and the state, most data are not available to the public. Data on taxis are not extensive since taxis were not given much attention as a support to public transport service. A detailed survey of trishaw operations was conducted by the Prime Minister's Department and State Economic Planning Unit, and consultants also have been doing some surveys of them. Information available is from interviews with bus company representatives and the taxi association. Recommendations are based on

existing data. In order to implement the service or to choose the appropriate services, feasibility and market studies need to be done.

# CHAPTER 2

## TRANSPORTATION PROBLEMS IN URBAN AREAS OF MALAYSIA

The middle class population in Malaysian cities is richer than in other South East Asian cities.( Meier, 1977, 16) This is one of the reasons for the higher percentage of private car ownership and the lower percentage of public transportation users. The wealth also contributes to the development of dispersed housing development which can only be reached by private vehicles. It is not profitable to provide public transportation service to these low density areas. A strong feeling of status also influences the modal choice of the middle class population. However, the choice is constrained by the unwillingness of the government to allow innovation in transportation.(Meier, 1977, 16) These factors have influenced the traffic mix in Malaysian cities.

Major urban areas in Malaysia can be categorized as intermediate-size cities. According to Linn, intermediate cities are cities with populations of 100,000 - 500,000 people.(Linn, 1984, 101) The transportation characteristics of these cities are:

i) increased importance of motorized transportation due to high degree of car ownership, high concentration of economic activities, and provision of public transportation for major corridors;

ii) traffic management becomes a problem, resulting in congested city centers and around markets and intercity transportation terminals;

iii) street networks of city centers are not adapted to high-density motorized traffic and to the generally unconstrained driving and parking of private vehicles on streets;

iv) employment opportunities are still accessible within a reasonable time from virtually all locations and are not significantly affected by the above problems; and

v) a great need for a transportation infrastructure.(Linn, 1984, 101)

Issues and Problems.

Inadequate or insufficient public transportation service is one of the main issues facing urban areas in Malaysia. Malaysia depends less on public transportation compared to other countries such as Singapore, Japan, Indonesia, and India. In 1984, only 40% of the population depended on public transportation compared to 90% for Indonesia, as can be seen in Table 2-1. Malaysia has a higher standard of living compared to its neighboring countries such as Thailand and Indonesia. Car ownership is higher in Malaysia due to the increase in income. Private cars are preferred over public transportation. For example, in Kuala Lumpur, there are about 300,000

Table 2-1: Population Dependence on Public Transportation, 1984.

| Country | Population (%) |
|---|---|
| Malaysia | 40 |
| Singapore | 45 |
| Japan | 60 |
| Indonesia | 90 |
| India | 95 |

Source: Kuala Lumpur Public Transportation Working Paper, 1985

vehicles moving within the town center and CBD at peak periods despite the high level of congestion.(Kamal, Jailani, and Abdullah, 1985, 1) Seventy five percent of these vehicles are private vehicles, with 60% of them having an occupancy rate of only 1.5 passengers per

vehicle.(Kamal, Jailani, and Abdullah, 1985, 1) Prior to 1977, Kuala Lumpur traffic jams were comparable to cities five times its size.(Meier, 1977, 17) The high use of private vehicles can be attributed to inadequate and insufficient public transportation modes which fail to attract users.(Kamal, Jailani, and Abdullah, 1985, 1) Public transportation is primarily used for shopping and for personal business such as trips to the bank, doctor, and government offices.

Modes of public transportation used in urban areas are trishaws, buses, minibuses, and, to a lesser extent, taxis. Trishaws are used for public transportation in Kota Bharu, Penang, Kuala Terengganu, Kangar, Alor Star, Kuantan, and Melaka. The trishaw differs a bit from state to state. Pedallers pedal from behind or from the side, with passengers in front or on the side. Kota Bharu has the largest number of trishaws operating in a town center. Trishaws have been banned in Kuala Lumpur and central areas of Penang, Alor Star, and Melaka. They are used for tourists or for short distance trips in other development nodes or rural areas. In Kuala Terengganu, the trishaw is the main public transportation mode.(Majlis Perbandaran Kuala Terengganu, 1982, 232) This is due to the narrow streets and on-street parking which make it hard for buses to maneuver in the CBD. Penang and Melaka are using trishaws for tourism purposes with cooperation from local hotels. Trishaws are slow and cause congestion in the central area and the CBD, and have a low occupancy rate. Since there are inadequate provisions for separate trishaw lane, they tend to hinder the smooth movement of traffic, especially at traffic signals. The revenue gained by trishaws is low. Trishaws are also used as freight vehicles. In Kota Bharu and Kuala Terengganu, they are used to transportation produce to the market. They are hired to make deliveries every morning and evening. Trishaws are also hired to send students to school. Trishaws provide door to door service. Children are in good hands since pedlars will make sure that they are safe in school. This kind of service is not available if they used school buses. Waiting time to go to school and to go home are less compared to using school buses which travel on fixed routes.

A few intermediate transportation modes have emerged in various cities. For example, illegal shared taxi system in Kuala Lumpur, illegal urban taxi service in Kota Bharu and tricycle in Penang. These types of transportation can provide services that cannot be provided by the available conventional public transportation mode such as bus and taxi.

Bus and taxi terminals are often located inappropriately. This causes congestion and environmental problems to the surrounding areas. Problems are worsened by narrow roads to maneuver which have to be shared with pedestrians and other vehicles. New locations and well-designed terminals are needed in a number of cities.

One of the major operating problems of public transportation is the delay in getting permits to expand services in response to demand.(Majlis Perbandaran Kota Bharu, 1984, 166) Public transportation planning and control in most urban areas is done by two separate Federal ministries and this creates problems. Among the problems created by the different authorities on transportation planning and control are:

i) lack of local involvement in public transportation control and the setting of standards at the Federal level which may not reflect local conditions;

ii) lack of local discretionary powers often resulting in lengthy bureaucratic delays in processing permit applications;

iii) lack of planning resources to develop and administer public transportation policy; and

iv) lack of coordination between the authorities involved, impeding policy implementation.(Majlis Perbandaran Seremban, 1982, 208 and Majlis Perbandaran Kota Bharu, 1984, 178)

Street networks in city centers and the CBD do not have any preconceived hierarchy. Use is concentrated on few roads and other roads are not used up to their capacity. Narrow roads crowded with slow moving vehicles mixed with motorized vehicles, on-street parking, and pedestrians result in acute congestion and a high level of accidents. Poor road surfaces reduce

traffic speed. The large number of junctions in old city centers slows down traffic. Services by various authorities such as the National Electrical Board, Public Works Department, and Telecoms cause roads to be temporarily narrowed and this creates congestion. The above elements contribute to the increasing operation costs of public transportation which will affect fare rates and consequently the lower income population, who may be without transportation services. This will deprive them of participating in economic activities which are inaccessible without affordable public transportation.

Additional networks are also needed for vehicles to by-pass town centers. This will relieve the level of congestion in the town center and the CBD. However, the new roads attract adjacent developments which impede through-traffic, and conflict with local traffic (Majlis Perbandaran Seremban, 1982, 185) This tends to create another congested route. By-pass routes with a high degree of access can also increase the amount of traffic going to the town center since it becomes more accessible with new roads. An example is main roads from other areas that run through heavily developed areas. This creates congestion on routes approaching the town center.

One-way streets are being used in most urban areas in Malaysia as a way to increase traffic flow and to reduce delays. One-way flows are more suited to the narrow existing roads in old town centers and CBDs. Problems faced by using one-way streets are non-CBD traffic, longer trips, difficulty for pedestrians in crossing streets and under-utilization of available road space for vehicle movements.(Majlis Perbandaran Kota Bharu, 1984, 178) Numerous parking, and high turning movements, and high volume of non-motorized traffic and pedestrians reduce road capacity in the CBD which results in restricted vehicle movement.(Majlis Perbandaran Kota Bharu, 1984, 119)

New developments give little consideration to the effect that they will have on the volume of CBD traffic, or to the road system that will serve them.(Majlis Perbandaran Kota Bharu, 1984, 120) Road improvements and redevelopments to provide adequate traffic service level are

level are not satisfactory due to their short-term capacity. Widening of roads and provisions for parking spaces are still below levels of service standards.

Centrally-located business and government offices, and schools cause congestion in central areas. Most schools in Malaysia operate two sessions a day due to inadequate classrooms. The morning session starts at 7:30 a.m. and ends between 12:30 p.m. and 1:00 p.m. The evening session starts between 12:50 p.m. to 1:10 p.m. and ends between 5:30 p.m. to 6:00 p.m. Business and government offices normally operate from 8:00 a.m. to 12:00 noon and from 2:00 p.m. to 4:30 p.m., except for Thursday or Saturday (which depends on the individual states), when offices only operate from 8:00 a.m. to 12:00 p.m. Afternoon and morning peak hours generate the most traffic, mostly consisting of journeys to work and school. The market place area and the CBD are congested on Friday and Saturday. These are the days when local people do their shopping, and people from other districts do their business and shopping. Saturday is the day for all boarding school students or other educational establishments, such as the teachers training college and Mara Institute of Technology, to have a day out. They usually crowd the CBD. It is also the day for people from other parts of the state to conduct their business and shopping in the central area. Bus terminal areas will be congested and the number of pedestrians increases substantially.

Twenty five to 57 percent of the population in urban areas of Malaysia cycle or walk. About half of the population cycles or walks to work, as can be seen in Table 2-2. Current provisions for pedestrians and cyclists are inadequate. Most major roads in the CBD do not have walkways or sidewalks for pedestrians. Pedestrians and cyclists have to share the right-of-way with other motorized traffic. In Kota Bharu, only one road has separate lanes for bicycles and pedestrians. In Penang, yellow lines are used to indicate lanes for bicycle.(Meier, 1977, 19) This is dangerous since other motorized vehicles often just cut through the lines without warning. The conflict between non-motorized and motorized traffic results in high accident rates. Road

Table 2-2 Mode Split For Journey to Work in Urban Areas of Malaysia

| Mode/Percentage | Kota Bharu(1980) | Seremban(1980) | K.Terengganu(1982) |
|---|---|---|---|
| Car | 30 | 32 | 23 |
| Motorcycle | 30 | 23 | 28 |
| Bus | 10 | 16 | 6 |
| Others | - | 4 | 5 |
| Walk | 10 | 13 | 20 |
| Bicycle | 20 | 12 | 18 |

Source: Report of Survey: Kota Bharu Structure Plan, Pelan Struktur Seremban: Laporan Pemeriksaan and Draf Rancangan Struktur: Majlis Perbandaran Kuala Terengganu.

improvement and redevelopment often does not incorporate facilities for pedestrians and cyclists. There are cases where pedestrian walkways or bikeways were eliminated when roads were improved to provide more space for motorized traffic. The only overhead crossing in the CBD is rarely used by pedestrians due to the inconvenience of going up and down stairs. It is time and energy consuming to use overhead crossings. Pedestrians jaywalk and sometimes risk their lives crossing busy streets rather than use the facilities provided for them. Traffic signals do not have a phase for pedestrians to cross streets, or the phase is too short for pedestrians to cross the streets safely.

Parking provisions for central areas are below the desirable standard. Service lanes are sometimes used for parking, forcing service vehicles to double park, increasing the level of congestion. New development and business establishments often provide insufficient parking spaces. This is either to lower construction costs or to use the available lot space to the

maximum. New establishments will attract more cars into the area which will either double park or will increase the number of vehicles on the street since drivers will circle the block to pick up whoever they dropped off.

Barriers.

Financial constraints are one of the barriers to providing better transportation services in Malaysia. The government spends more in providing housing and health services to the population and less in improving the transportation system. Public transportation in Malaysia is provided by private companies with little assistance from the government. Bus companies have to provide bus shelters and bus stations for the users. Bus stations that should be maintained by local government body are done so by bus companies. This is quite a burden due to the high maintenance cost. They have to find sponsors to build bus shelters. It is also difficult to get space for bus stops from the government. Bus laybys are rarely provided, and congestion caused by buses stopping to pick-up or drop-off passengers is blamed on the inefficient service of bus companies.

At present, there is no specific declared policy position on the part of the relevant Federal government authorities for upgrading public transportation services.(P.G. Pak Poy and Yunken Alam Bina, 1981, 7) These authorities establish criteria and standards such as fares and operating regulations, which are uniformly applicable throughout the country. There is little scope within the present system to allow for variations in standards and conditions to best fit local needs and requirements.

New permits are difficult to obtain from the Federal Road Transportation Licensing Board to operate new routes and to increase the number of buses operating on existing routes, resulting in an inability to expand service in accordance with demand.(P.G. Pak Poy and Yunken Alam Bina, 1981, 11) The main barrier for bus companies to provide better service is the difficulty in getting new permits. The permit application process takes a long time, due to lengthy

bureaucratic delays caused by a lack of local discretionary powers.(Majlis Perbandaran Seremban, 1982, 208)

A division of power between various Federal government bodies creates conflict between transportation and urban planning agencies. This leads to coordination and implementation difficulties, such as disagreement on transportation policy and lack of formal involvement of state and local authorities in the planning process.(Majlis Perbandaran Kota Bharu, 1984, 178 and Majlis Perbandaran Seremban, 1982, 208) Dispersed land use and a lack of land use regulations make it hard to satisfy travel demands and to provide better quality of service. New housing tracts and kampong settlements are dispersed, causing difficulties in providing good public transportation services that are profitable. This type of development also segregates employment and shopping from housing. Length and cost of journeys increase. A demand for a satisfactory transportation network increases. (Majlis Perbandaran Kota Bharu, 1984, 169) Design and layout of new housing development also cause problems for bus service. An insufficient density of development per route length, together with greater distance and poor connection between housing areas and main roads, have often prevented the effective provision of public transportation.

Recommendations

Problems faced by the municipalities are the same, but the level of problems differs. The most important step to be taken by the municipalities is to create an agency that is responsible for coordinating transport and urban planning activities. The agency will also act as a liaison between the different government bodies that are responsible for policy making, to ensure that conflicting policies do not exist. State and local governments should be given the opportunity to participate in decision making, especially concerning transportation policies and plans. This will help to produce plans and policies that are suited to different communities.

The municipalities could seek to obtain "observer status" representation at the Federal Road Transportation Licensing Board and to develop liaisons with the appropriate departments of the Ministry of Transportation in order to speed up the process of expanding and improving public transportation services.( Majlis Perbandaran Seremban, 1982, 213) In addition, the municipalities should also:

i) provide improved information on bus services to the public with help from bus companies;

ii) ensure liaison between the relevant parties of new development; and

iii) provide the necessary liaison between the bus operators and the various road design and construction authorities to enable proper planning of roadside bus facilities.(Majlis Perbandaran Seremban, 1982, 213)

This would help to overcome the other major operating problems such as increasing car ownership and usage, dispersal of land uses and increasing operating costs which affect the demand and quality of public transportation services.(Majlis Perbandaran Kota Bharu, 1984, 166) There is no specific declared policy from the relevant Federal authorities for upgrading public transportation in the municipalities.(Majlis Perbandaran Kota Bharu, 1984, 163)

Many of the activities in the central area do not need to be centrally-located, and the relocation of government offices and schools will help to decrease the level of congestion. Schools and other educational establishments can be removed from the CBD area since they generate a lot of non-motorized traffic. Should schools be located at the periphery of the central area, most of the traffic that they generate can be moved from the central area. The days for students to spend the day out of schools or other educational establishments should be staggered to avoid concentration of pedestrians on one single day of the week.

The authorities should take into consideration the intermediate transport modes that emerged in several cities and develop public transport services that are designed to cater to the needs of the population.(Meier, 1977, 18)

# CHAPTER 3

## KEY ISSUES RELATED TO PUBLIC TRANSPORT IN KOTA BHARU

In order to provide an efficient and adequate public transportation service, improvements of other transportation-related elements are needed. Land use, road infrastructure, and the circulation system have an impact on the performance of the urban public transportation service.

The arrangement of activities in urban areas dictates the quality of the public transportation service. The chaotic location of urban activities and dispersed housing development have resulted in high operating costs and inefficient bus service. High concentration of economic activities tends to create acute congestion in the central area, and this causes delays in bus or taxi operations. High operating costs put a burden on the lower income population who cannot afford private vehicles.

Narrow roads, poor road surfaces, inadequate bus laybys, on-street parking, and numerous junctions deter the smooth movement of traffic and buses. Delays caused by these conditions increase operating costs. There is no priority such as bus lanes and laybys given to bus services on roads.(Majlis Perbandaran Kota Bharu, 1984, 163)

One report notes that,If circumstances arise such as substantial traffic delays, non-availability of parking spaces, and inadequate alternatives in the form of public transportation to access the center, the level of accessibility and the consequent attractiveness of the central area for investment will decline.(P.G. Pak Poy and Yunken Alam Bina, 1981, 120)

Due to the increase in car ownership, personal mobility, total vehicle volume, and growth and dispersal of the population and employment opportunities, the public transportation service needs to be more comprehensive to and within the central area.(P.G. Pak Poy and Yunken Alam Bina, 1981, 119)

Land Use

Location is strongly influenced by access since the role of transportation policy and investment in guiding development has increased as land use controls have decreased.(World Bank, 1975, 52) Transportation can be used to create urban patterns that can reduce the number of trips needed. However, the arrangement of employment centers and housing developments is also important.

Effective land use controls are needed to avoid the tendency toward greater concentration of economic activities which causes congestion.(Owen, 1972, 48) Accessibility is also important in using transportation to guide development. Access provided by transportation creates undesirable land use patterns if control over access is weak.

A city form with radial roads that converge into a central area is compatible with an urban form that is corridor-oriented and has a strong CBD.(Chatterjee, 1980, 190) This pattern is suitable for bus and rail rapid transit systems which can provide direct access to the central area.(Chatterjee, 1980, 190) This road pattern encourages concentration of vehicles in the central area. An efficient bus service along the corridor might be able to reduce the number of vehicles on major roads going into CBD and vehicles in the CBD.

Another type of road pattern is the radial-circumferential which is compatible with concentric as well as multi-center urban forms with a strong central area.(Chatterjee, 1980, 190) This pattern encourages circumferential trips on ring roads or the loop.

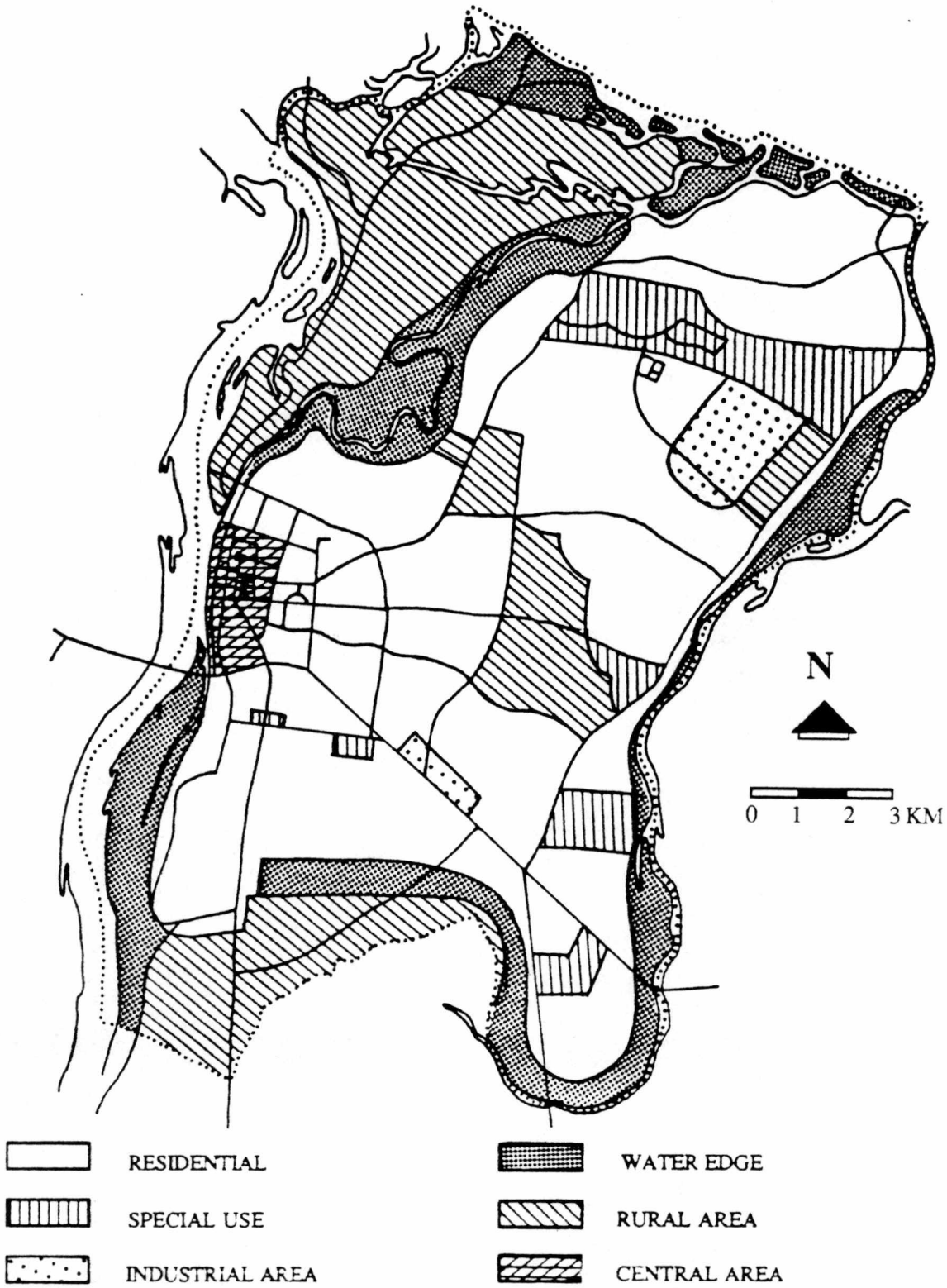
The development pattern adopted by the Municipal Council is a development node pattern. The nodes are Kota Bharu Central area, Kubang Kerian and Pengkalan Chepa. Kota Bharu node is the dominant employment growth center center, Pengkalan Chepa node is the main enter for manufacturing activities, and Kubang Kerian node is the nucleus growth for government institution and private sector.(Majlis Perbandaran Kota Bharu, 1984, 47) Employment and residential areas will be developed in the development nodes, and the nodes will have equal employment and population growth which will reduce commuting between nodes. (Majlis

Perbandaran Kota Bharu, 1984, 102) This will shorten the journey to work and decrease the volume of traffic in the central area. A big housing project is under construction in Kubang Kerian to accommodate housing demand and to provide housing close to employment center. Low cost housing housing projects are also planned for the industrial area at Pengkalan Chepa. Future residential development will be restricted to the three development nodes except where it is justified by local housing needs, existing planning permission and committed infrastructure investments.(Majlis Perbandaran Kota Bharu, 1984, 88)

The haphazard location of urban activities has created unnecessary movement which has resulted in cities relying on travel to compensate for disorder.(Gakenheimer, 1978, 293) Growth of residential areas should be aimed at reducing traffic problems. Activities that do not need to be centrally located should be moved out of the city center and provided at local centers. This will avoid concentration of humans and vehicles at the same place at the same time and will avoid unnecessary trips.

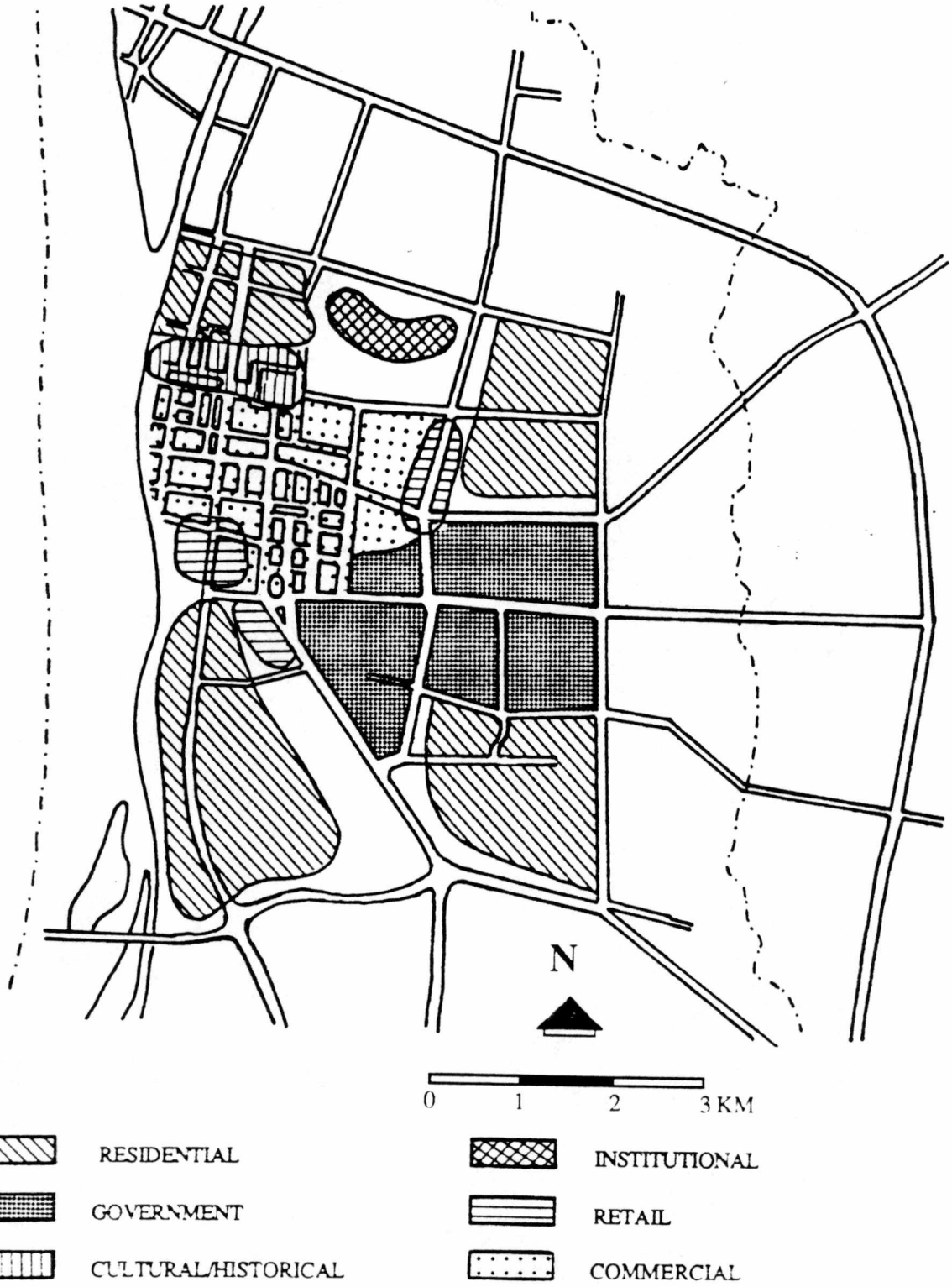
Kota Bharu is experiencing segregated land uses. Settlements are dispersed, and new housing projects in the suburbs segregate employment and shopping centers from residential areas. The low density of these developments creates problems in providing access and in providing public transportation services. Trips are longer, and the cost of trips to work increases. The demand for new roads increases. Traffic flow on main roads is increased and mobility in the central area decreases as more vehicles occupy the existing narrow right-of-ways.

Issues and Problems. The Kota Bharu Municipal area covers approximately 490 acres. The main land use precincts for the central area and the municipality are as shown in Figure 3-1 and Figure 3-2. The main shopping area covers 45 acres which are mostly developed with multi-storey shop-houses.(P.G. Pak Poy and Yunken Alam Bina, 1981, 117) The main development areas that have an impact on the transportation system and road network for the central area and the CBD are as shown in Figure 3-3. The Buluh Kubu area used to be a squatter area for low



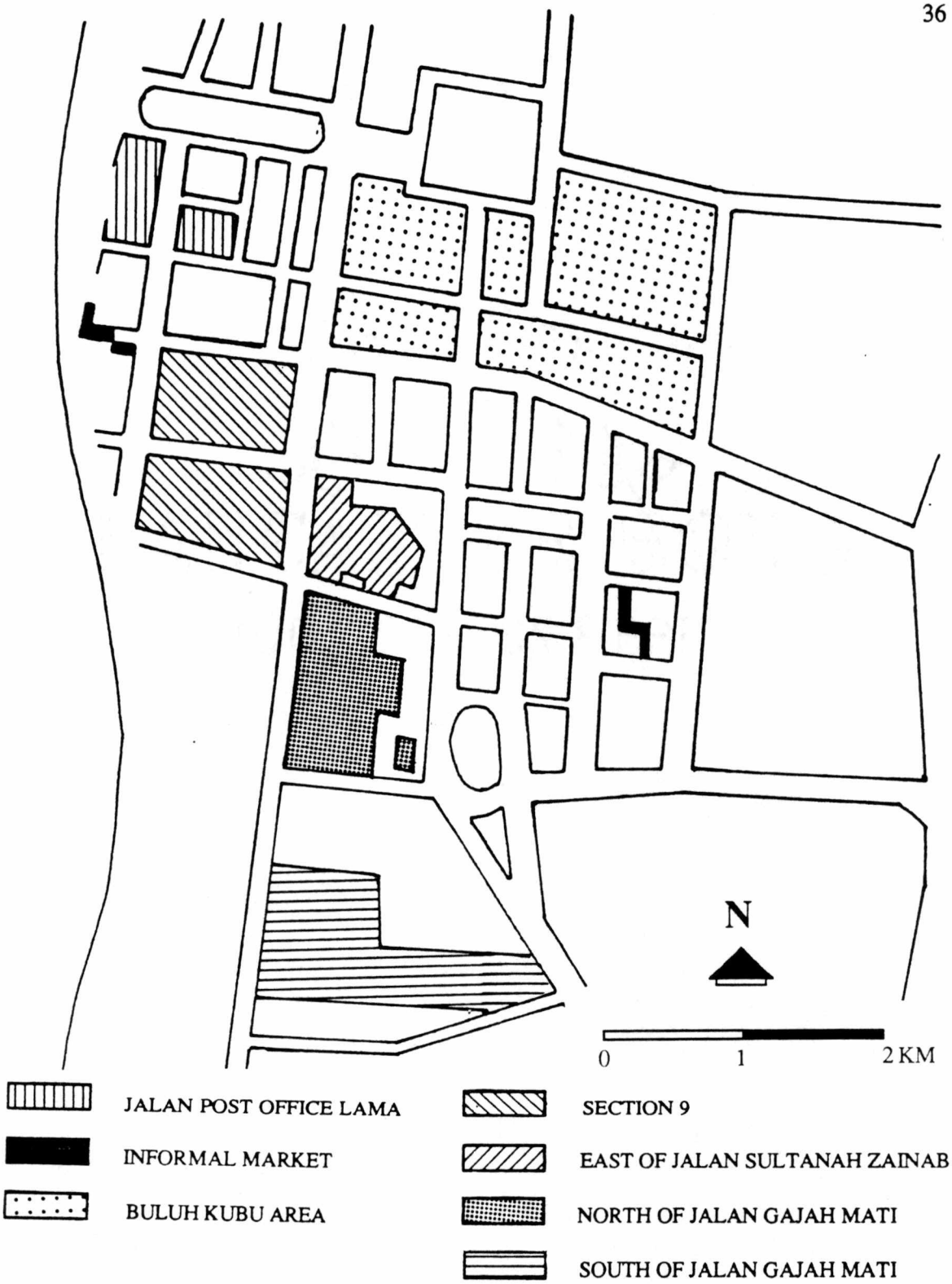

Source: Kota Bharu Municipal Council

Figure 3-1: Kota Bharu: Land Use Precincts




Source: Kota Bharu Municipal Council

Figure 3-2 Kota Bharu Central Area: Land Use Precincts




Source: Kota Bharu Municipal Area

Figure 3-3 Kota Bharu Central Area: Redevelopment Areas

income Malay residents living in very low quality kampong houses in an unsanitary and crowded environment. The area is now the location of a new central market, a shopping bazaar, a bank, commercial development in multi-storey shop-houses, flats, and a proposed bus/taxi terminal. This area is in the flooding zone.

According to the land suitability map (shown in Appendix A), this area is not suitable because of flooding. Activities in this area usually will be interrupted during the rainy monsoon season. Due to the location near the Kelantan River, this area and most of the central area are prone to flooding. Drainage and flood mitigation programs to alleviate the level of flooding will take up to twenty years to be implemented.(Majlis Perbandaran Kota Bharu, 1984, 23) The central market attracts a large volume of traffic and this will increase substantially when the proposed taxi/bus terminal is built. At present, the main bus stop for town bus service is located adjacent to the market. During peak hours, this area is hazardous to pedestrians and non-motorized vehicles.

The central market provides only 77 parking spaces, which is less than half of the minimum requirement.(P.G. Pak Poy and Yunken Alam Bina, 1981, 143) The traffic generated by the market and adjacent commercial development have an adverse effect on the historical landmarks nearby. As shown in Figure 3-2, the area adjacent to the Buluh Kubu redevelopment is zoned as an historical/cultural precinct.

Residential and school complexes nearby limit the expansion of commercial activities in the area. The road network surrounding the area is not suitable for the high volume of traffic which is expected to be generated by additional projects in the area.(P.G. Pak Poy and Yunken Alam Bina, 1981, 143) This will create congestion in the residential area and the school complexes. The central market will generate new commercial developments which will take advantage of the high level of passing trade.(P.G. Pak Poy and Yunken Alam Bina, 1981, 143) Unfortunately, the planning for the area does not include any provision for open spaces, landscaping, and pedestrians.

The next redevelopment area is the Jalan Post Office Lama area, which at present contains a mixture of small timber and tin shophouses and a number of shanty residences. Residents are almost exclusively low and middle income Chinese. Should this area be re-developed, 550 people will be displaced.(P.G. Pak Poy and Yunken Alam Bina, 1981, 136) As with most of the residents in the CBD area, their job locations and family social ties are in the CBD.(P.G. Pak Poy and Yunken Alam Bina, 1981, 136) Roads are narrow and a lot of loading and unloading is being done in this area, which causes acute congestion during mid-day peak hours. At present the area is not developed extensively.

The Section 9 area used to house 500 people, mostly middle income Chinese living in shop-houses.(P.G. Pak Poy and Yunken Alam Bina, 1981, 136) It is now being developed into a commercial precinct with multi-storey shophouses and shopping complexes. A car park will be built adjacent to a new multi-storey supermarket. Access into this area is very poor and circulation is difficult since roads surrounding the area are too narrow for two-way flows. This situation is worsened by on-street parking. Major activities in this area are substantial traffic generators. New roads or widened roads are not capable of supporting an increase in traffic flow since it was built or improved without consideration of future traffic increase. Further road improvements of Jalan Sultanah Zainab will improve access and circulation to section 9.(P.G. Pak Poy and Yunken Alam Bina, 1981, 136)

The area south of section 9, east of Jalan Sultanah Zainab, consists of generally small and low quality single-storey shop-houses along the street. At times, activities such as additional newspaper stands or fruit stalls spill into the streets and narrow footpaths, causing disruption to traffic flow and difficulty for pedestrians using the footpaths. The illegal practice of on-street parking and double parking makes the situation worse. The internal part between Jalan Sultanah Zainab and Jalan Temenggong is generally underdeveloped with a few old kampong style houses. Along Jalan Temenggong are two storey shop-houses, which were built in the 1800's. Redevelopment of the area will involve demolishing 90 living quarters and rehousing 900

people, mainly Chinese.(P.G. Pak Poy and Yunken Alam Bina, 1981, 137) Access to this area is very poor. It is in the prime trading area and closest to the main commercial zone.(P.G. Pak Poy and Yunken Alam Bina, 1981, 137) Shop-houses facing Jalan Temenggong are of historical significance and should be protected. This will give the sense of an old city center. Redevelopment of this area will help to provide access and circulation to other sites.

Another important area is south of section 9 and west of Jalan Sultanah Zainab. It is a large residential area, densely developed and housing over 1,000 people who are mostly lower and middle income Malay and Chinese.(P.G. Pak Poy and Yunken Alam Bina, 1981, 137) The frontage of this block to Jalan Sultanah Zainab is important to the implementation of traffic proposals. The main issue is that two large gravesites occupy strategic sites.

The area south of Jalan Gajah Mati is principally residential, except for sites adjacent to the main roads. This area consists of kampong and better quality timber and brick detached houses. The area which extends down to Jalan Zainal Abidin is the main area under consideration. This area contains mainly poor quality kampong houses. A good road system on its perimeter will help to easily integrate this area into the commercial expansion of the CBD.

North of Jalan Gajah Mati, the internal part of the block is mainly vacant or consists of low quality houses. Along Jalan Temenggong there are new shop-houses, and along Jalan Sultanah Zainab there is a mixture of old one-storey shophouses and new brick two-storey shophouses. Improved access and circulation will help to develop this area and also will help adjacent sites.(P.G. Pak Poy and Yunken Alam Bina, 1980, 142) It is in the retail development zone.

Two informal markets which exist on lanes between buildings, service lanes, and streets at Taman Sekebun Bunga and Jalan Suara Muda need to be relocated and reorganized. They block traffic, and a lot of loading and unloading is being done at these sites. Clearing up the sites will improve circulation and provide for car parking. Trading activities on Jalan Hilir Pasar and Jalan Hulu Pasar should be discouraged and moved out of the CBD since trucking operations are

not appropriate for the CBD. Overall, the project shows little consideration for the impact of traffic that will be generated by the activities surrounding the area.(P.G. Pak Poy and Yunken Alam Bina, 1981, 142)

Barriers. Redevelopment constraints in the CBD area include acquisition costs, social problems, and the continuing viability of existing uses.(P.G. Pak Poy and Yunken Alam Bina, 1981, 134) Most of the 6,500 people living in the redevelopment areas are low income who depend on CBD activities for income.(P.G. Pak Poy and Yunken Alam Bina, 1981, 139) Large scale dislocation of the present residents should be avoided in order to reduce disruption of social and economic structure of the people, and to assist longer term social, economic, or physical development of Kota Bharu's town center and its surrounding areas.(P.G. Pak Poy and Yunken Alam Bina, 1981, 139) Resettlement will deprive the residents of job opportunities.

Little communication between planners and the decision makers is also a barrier. Plans are often not accepted for political reasons, and undesired development occurs because of political reasons. Planners do not have a reliable means of controlling the way in which land is developed or redeveloped.(Thompson, 1984, 27) Politicians think only of the built environment and the physical form rather than the impact to the environment.(P.G. Pak Poy and Yunken Alam Bina, 1980, 142) Planners need to find politically acceptable means of achieving desired ends. Political constraints are the most severe constraint.(Hutchinson, 1974, 14)

Lot arrangement outside the central city area is a barrier to development. Most residential development exists in a linear fashion along major roads. If the land/lot is not adjacent to an existing road, accessibility become a difficult problem. Roads providing access to internal lots develop in an ad hoc manner, resulting in road networks that are not suitable for public transportation service.

Dispersed village settlement and low-density suburb housing development segregate employment centers, shopping centers, and other services from housing, which increases the

length and costs of journeys.(Majlis Perbandaran Kota Bharu, 1984, 169) In addition to low density development, the long distance and poor connection between housing projects and main roads results in difficulty in supplying the transportation needed.(Majlis Perbandaran Kota Bharu, 1981, 169)

Relationship to Public Transport Service. Redevelopment of the CBD into a compact and consolidated area will provide convenient shopping, maximize returns on investment, facilitate better traffic management, minimize trip time and vehicle movements within the area, and facilitate more effective development phasing.(P.G. Pak Poy and Yunken Alam Bina, 1981, 139) Land development and redevelopment are beyond the power of the planners. Effective land-use controls are needed to minimize concentrations of economic activities that create congestion.(Owen, 1972, 48) Ineffective land-use controls will result in chaotic and dispersed development which is not feasible to provide cost effective transport.(Thompson, 1984, 27)

Road Infrastructure and Circulation System.

Good road conditions help make good transportation systems. A good infrastructure requires high capital investment, which is a major problem for developing countries. Solutions should use the existing infrastructure by fitting the demand to the facilities, instead of catering to the demand by building additional road networks.

Improvements of road infrastructure can also create adverse effects on an area. For instance, improvements to roads for motorized traffic can make it worse for pedestrians.(Roschlau, 1981, 15)

Providing parking is another problem. Demand for parking spaces is high compared to existing supply. Parking provided by developments is below standard.

An inadequate road network is, in general the main transportation problem and it is coupled with the failure to use the available road efficiently, which includes:

i) poor management and maintenance of the total transportation system,

ii) generally low driving standards,

ii) police control is sometimes weak, and

iv) poorly designed road junctions, bad conditions of road surfaces and edges, undisciplined pedestrians, un-roadworthy vehicles, chaotic parking, and inefficient traffic signals.(Thompson, 1984, 7)

According to the World Bank, the best urban transportation improvement is the development of urban physical patterns which economize on costs of transportation and other infrastructures which also provide improved access and living conditions.(World Bank, 1975, 47)

Issues and Problems. The existing inadequate supply of parking in the central area is going to be made worse over time by converting the space into other uses such as bus shelters and trishaw parking or converting the street into pedestrian-only areas.(P.G. Pak Poy and Yunken Alam Bina, 1981, 68) There are no comprehensive development control standards used by the Municipal Council for the establishment of off-street parking spaces required for new development approvals.(P.G. Pak Poy and Yunken Alam Bina, 1981, 64)

At present there is only one off-street public parking area available in the central area. Another public parking facility will be built in section 9 area. The present off-street public parking area is located near the Buluh Kubu redevelopment area and provides 120 parking spaces.(Majlis Perbandaran Kota Bharu, 1984, 191) This facility is rarely used since it is some distance from major government and business offices. Users of the central market do not use the parking facility since it is far away. They double park or park illegally near the market place. In order to attract more people to use the parking, landscaping which is compatible with the historical structures adjacent to the car park is needed.

Private off-street parking is available for most government offices such as the new State Secretariat complex, Wisma Persekutuan, which houses all federal offices, the old State Secretariat complex, and the Public Works Department. Most of the offices do not provide parking spaces for the public and this creates a parking problem in the area surrounding such establishments. This is the problem facing the RIMV, the Post Office and the Federal Office building, a situation which forces the public to park on sidewalks and to double-park. Parking spills into the streets or into any open spaces available nearby without safety considerations. This kind of parking practice causes disruption to the traffic flow. The main post office and the RIMV office are located along the main arterial, which has high traffic volumes.

Parking for taxis at Jalan Hilir Pasar and Jalan Suara Muda creates environmental problems, and causes congestion, as well as restricts movements in the area. The new town bus service does not have any formal parking area. Buses are parked at the end of the route, at a dead end road, to the north of the central market. A well planned parking area for these buses is needed since the dead end road will be extended in the near future.

Parking for non-motorized vehicles is also deficient. Trishaws and bicycles use spaces intended for cars. This decreases the availability of parking spaces for cars. Parking spaces are not used to their full capacity. There are no formal parking spaces available for trishaws except near the central market. Fifty percent of all road fatalities in 1980 were to cyclists and pedestrians.(P.G. Pak Poy and Yunken Alam Bina, 1981, 76)

Facilities for pedestrians are inadequate. Conditions get worse when roads are widened or new roads built, since a provision for pedestrian walkways is usually not included. This makes walking in the CBD hazardous. Using the right-of-way creates conflict with vehicular movements and reduces the efficiency of road surface.(Majlis Perbandaran Kota Bharu, 1984, 194) The existing pedestrian facilities are:

i) signal-controlled intersections with phases for pedestrians; no pedestrian walkways are available;

ii) no sidewalks or footways along buildings force pedestrians to use the pavement edge or the drain edge when cars are not parked along the side of the road;

iii) footways along shophouses in the CBD are not continuous. They are at different levels according to the floor level of the adjacent building. In some instances, the footway is partly occupied by columns of the building or by goods being displayed or stored. Steps to the footway are frequently provided but are often poorly located in relation to car park and pedestrian needs,

iv) the overhead crossing at Jalan Temenggong connects to the old market place but is rarely used due to inconvenience;

iv) footways along or over JPT covered drains along arterial roads. The grids used to cover the drains at intervals are not designed to be stepped on by pedestrians; and

v) road crossings are difficult and hazardous since traffic flow is continuous with few breaks to permit crossing. Jaywalking is common due to insufficient facilities for crossing.(Asian Development Bank, 1988, 121 and Majlis Perbandaran Kota Bharu, 1984, 194)

Figure 3-4 shows some of the pedestrian facilities in the central area.

Bus shelters are mainly provided in the CBD and the central area. These shelters are provided by sponsored advertisement. Laybys for buses are needed, especially on main arterials in order to avoid congestion and disruption to traffic flow.

Most of the roads in the municipality have not been designed according to any hierarchy in relation to the functions and traffic volumes served. They are often designed at standards below those necessary to accommodate present usage.(Majlis Perbandaran Kota Bharu, 1984, 178) Saturation capacity of a two-way road (level of service E) is about 2,000 passenger car unit's(pcu's) per hour, though operating conditions in Malaysia would suggest a slightly higher figure (of about 2,200 pcu's per hour). This is a maximum (or saturation) capacity and a desirable level of service would be of about 1,700 pcu's( near level of service D). (Refer to




Figure 3-4 Kota Bharu Central Area: Pedestrian Facilities

Appendix B for characteristics of level of service.) Main arterials in the municipality need to be upgraded to this level.(P.G. Pak Poy and Yunken Alam Bina, 1980, 174)

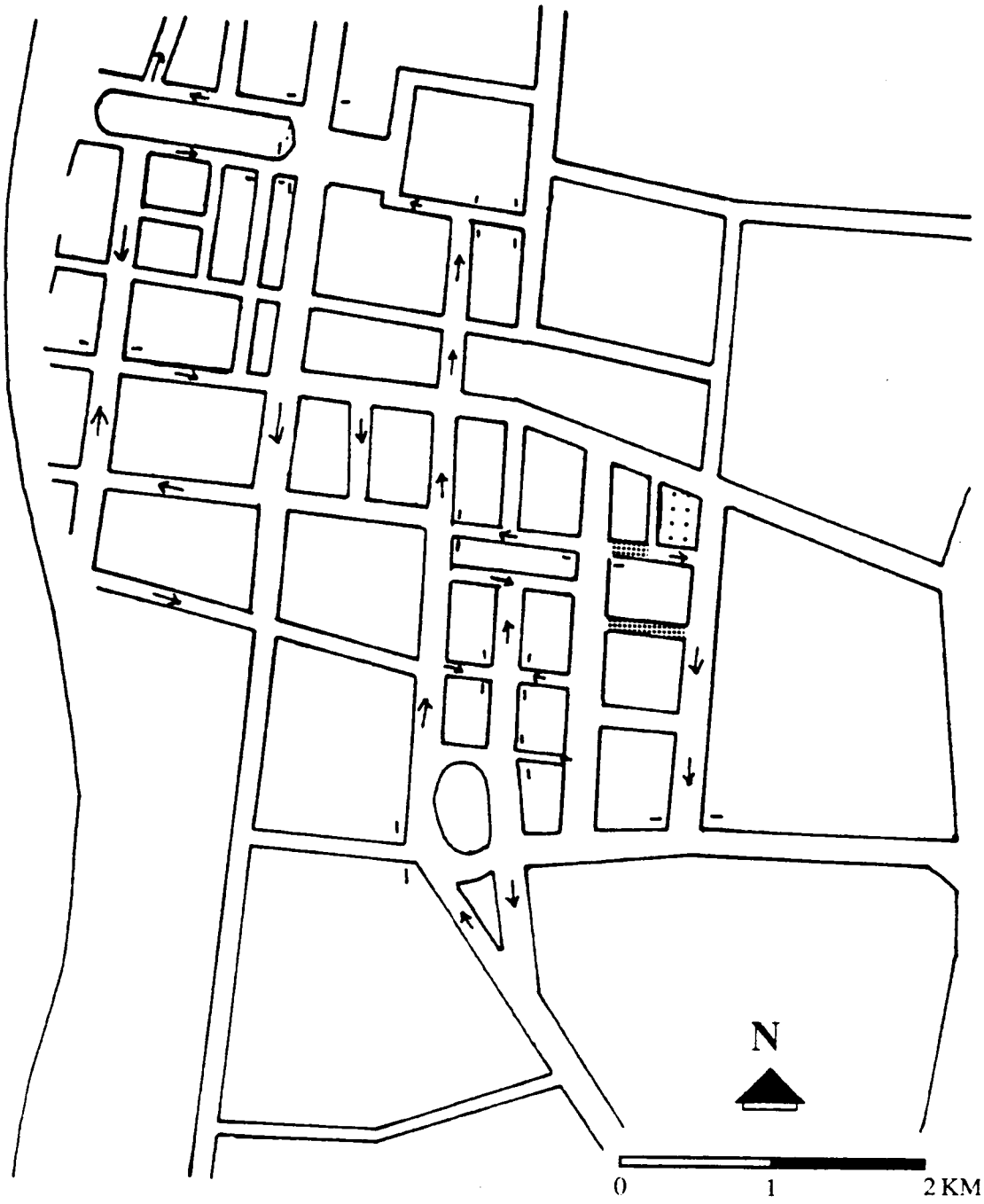
The main arterials in the municipality are inadequate to handle forecasted traffic volumes. Jalan Kuala Krai between Wakaf Che Yeh and Jalan Hamzah needs to be a four-lane road. This is important since the new Kuala Krai-Gua Musang-Kuala Lipis highway was opened in 1986. Since than, traffic flow on this road has increased substantially. Jalan Pengkalan Chepa provides the main link to the airport and the industrial area in the Pengkalan Chepa development node. The existing road needs to be upgraded to a four-lane road, from the Taman Uda Murni housing project to the airport. Jalan Padang Tembak provides adequately for the traffic to the industrial area, but access to Jalan Padang Tembak from Jalan Sabak and Jalan Pengkalan Chepa needs to be improved.

The present circulation system in the central area is one-way streets, as shown in figure 3-5. This system helps to speed up traffic, but it also tends to lengthen trips, to make pedestrian movements more difficult, especially when medians are not available, and to underutilize the available road space for vehicle movement.( P.G. Pak Poy and Yunken Alam Bina, 1981, 60) It also tends to channel traffic into a few routes which are the mostly heavily traveled, such as Jalan Temenggong and Jalan Tok Hakim.( P.G. Pak Poy and Yunken Alam Bina, 1981, 119) Another problem with the one-way street is the circular trips that it creates and turn restrictions, resulting in small lanes receiving substantial traffic volumes.

Narrow roads with numerous intersections and changing road widths reduce the capacity of the roads. This affects the performance of the public transportation service.

Barriers. Political constraints force planners to utilize methods that are compatible with political preferences even though they are not the most feasible solutions.

Financial constraints on both capital and operating expenditures are associated with the transportation system.(Hutchinson, 1974, 14) Transportation plans exceed available resources




→ ONE WAY STREET

BUS TERMINAL

– NO ENTRY

TAXI TERMINAL

Source: Kota Bharu Municipal Council

Figure 3-5 Kota Bharu Central Area: Circulation System

and have to compete with other needs such as education, health, water supply, and housing. Some of the other need are higher priority for politicians.

Relationship to Public Transport Service Road infrastructure is important in providing good public transportation, especially for bus operations. Narrow roads, poor road surface and numerous junctions cause delays in public transportation operation. They also increase operation costs.

New roads, in the long term, will affect public transportation services. They also give the opportunity for the public to live further from their work places and for dispersed housing development, which is not feasible to serve. Car ownership increases and lowers the use of public transportation. Then, the public transportation service has to increase the fares in order to avoid losses. Quality of service is also reduced. "Since individuals do not make major changes in location of their home or job very frequently, increasing road congestion and deteriorating conditions of public transportation gradually trap some people in locations which they would not have chosen. This leads to discontent and to demands both for better roads to fulfill the expectations of motorists and for better public transportation to restore the quality of service expected by public transportation users."(Chevy, 1974, 166) This affects the urban poor, who cannot afford the increase in fares. It also affects the more affluent, who have to experience congestion due to the increase in private vehicle use.

The Kota Bharu town center provides major functions within the region and the state. However, the concentration of activities creates transportation problems in the old city center. Some of the activities can be moved to other development nodes such as Kubang Kerian and Pengkalan Chepa. The redevelopment of roads connecting Kota Bharu's town center to these two nodes will increase their accessibility and disperse the traffic from the town center. Good public transportation services from the town center to the two nodes will also help to decrease congestion.

# CHAPTER 4

## PUBLIC TRANSPORT SERVICE IN KOTA BHARU

Public transport service is the most efficient mode of moving large numbers of people, especially in dense urban areas.(Armstrong Wright(b), 1986, 20) Users are willing to pay more for comfort and for the alternative that they can have. The public should be given the opportunity to choose the kind of transport they desire. The lower class would prefer low fares, even though they have to sacrifice comfort, and the middle class would be tempted to use the public transport service if the service is reliable and comfortable.(Armstrong-Wright, 1988(b), 1986, 26) In order to attract the public to use public transport service, they should be provided with choices that can satisfy their preferences and needs.

In the municipality, public transport is provided by bus, taxi, and trishaw. Prior to the introduction of the town bus service in 1986, trishaw was the main public transport mode in the central area. It is the most expensive mode of public transport in terms of cost and time. The main issue of public transport service in the municipality, especially in the central area, is the use of trishaws. The question is whether to eliminate trishaws and replace them with other modes, and what would be the most acceptable alternative politically and socially.

The taxi does not play an important part in providing urban public transport. Almost all taxi services are to other districts or states. Illegal taxis provide minimal service in the central area and in other development nodes.

Bus service has improved in recent years. New services and more comfortable buses are being used to provide better service and to attract more people to use them. Syarikat Kenderaan Melayu Kelantan (SKMK), which has a majority equity holding by MARA, is the only bus

company in the state. Other small companies only provide out-of-state service, such as to Kuala Lumpur and the northern state. There is no plan to have another bus company serve the state.

As mentioned in the previous chapters, cooperation from local, state and federal government is needed in order to improve present conditions. Public transport policy should be formulated as soon as possible. Provisions for public transport facilities are inadequate and are really needed, especially in the central area and for major arterial roads. Road infrastructure for public transport, especially bus service, is inadequate. Lay-bys, terminals, shelters, and bus stops are needed in order to provide an efficient and profitable public transport service. Delays caused by congestion can be reduced. Comfort, safety, and reasonable fares are important in order to increase use of public transport and decrease use of private vehicles.

Conventional Bus and Mini Bus.

The bus system plays a vital role in transporting people at rates that are affordable to most urban poor. The various levels of bus service operation provide choices for the public according to their preferences. Buses are more flexible compared to rail transit.

Since 1980, the number of buses operated by Syarikat Kenderaan Melayu Kelantan (SKMK) increased from 260 buses to 334 in 1988.(P.G. Pak Poy and Yunken Alam Bina, 1981, 10 and SKMK(a), 1988, 6) In 1988, the company operated 49 mini buses for town bus services, using 30 passengers capacity buses, 7 school buses, 176 limited stop buses, and 102 express buses.(SKMK(b), 1988, 3) Figure 4-1 shows some of the buses used by SKMK for the various type of service. SKMK provides services from Kota Bharu to twenty five destinations out of the municipality. (SKMK(a), 1988, 4) The number of passengers declined from 18.6 million in 1986 to 19.3 million in 1987, but the company managed to retain its profit from the express bus service.(SKMK(a), 1988, 6) SKMK has two other branches, SKMK-Tanjong Keramat Express Company and SKMK-STAR Limited. The two branches provide the profits for the SKMK The company's profits increased from M$713,270.00 in 1986 to M$990,341.00




Figure 4-1 Kota Bharu: Bus Used By SKMK

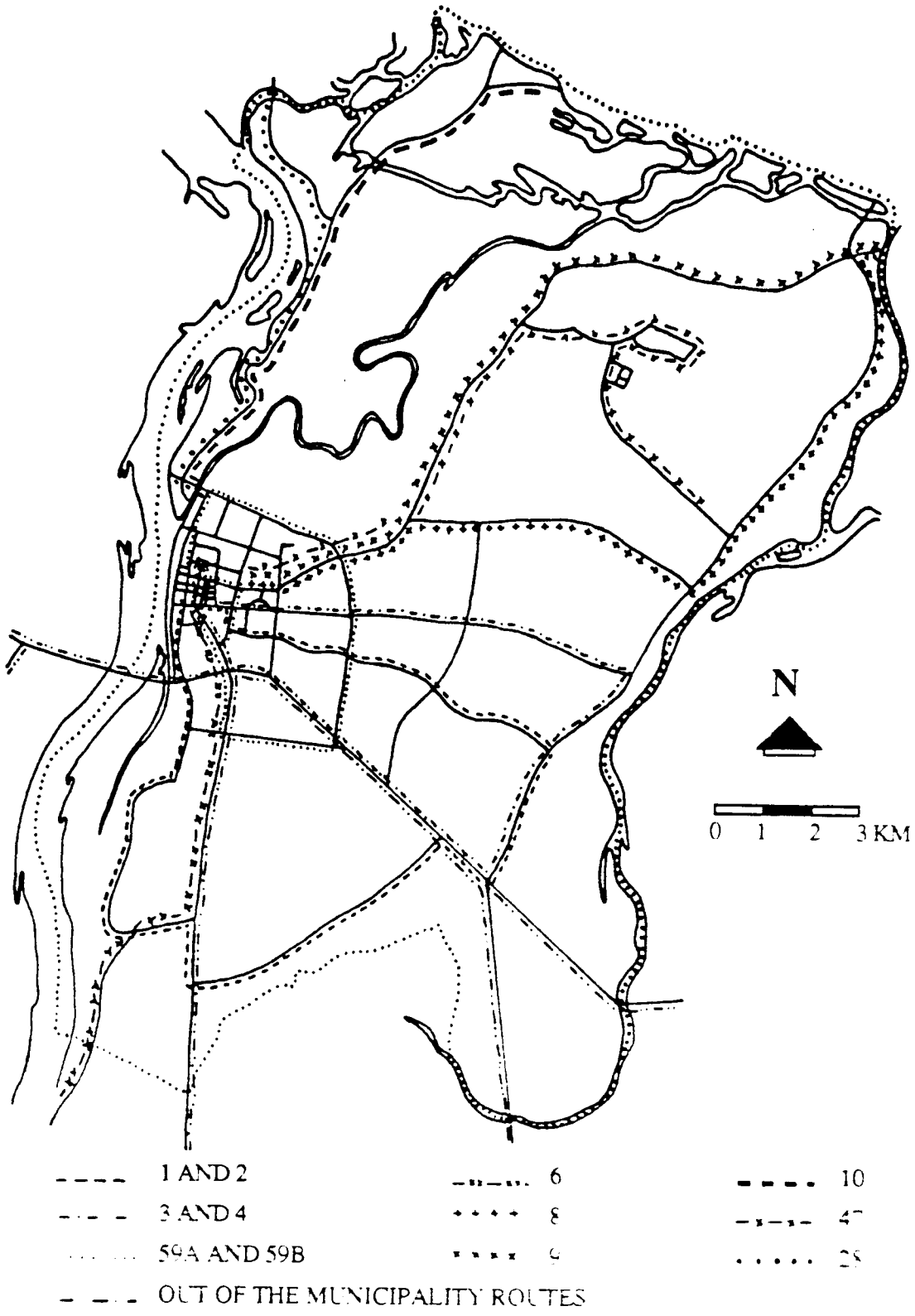
in 1987.(SKMK(b), 1988, 5) The profits are quite low due to the economic conditions of the country. The company is planning to increase express bus service to help compensate for unprofitable routes. The company will provide more air-conditioned buses for inter-district services in the future to attract more users. At present, air-conditioned buses will be added for services to Tanah Merah, Pasir Puteh, and Jertih.(Tuan Yahya, 1988) In order to reduce costs of operation, the number of employees was reduced even though the number of services was increased. This is possible by the introduction of modern equipment such as computers and by an increase in training programs for employees. Work can be done more efficiently and service to users can be improved.

The introduction of mini buses for town bus service, as shown in Figure 4-2, is to serve the suburbs and villages in the municipality. The service is operated by Syarikat Kenderaan Melayu Kelantan. The town bus service is used mainly by the lower class and recently more middle class have started to use it. This is due to the areas that the service serve. Referring to Figure 4-3, town bus service provides access for residential area in the municipality to the central area. Prior to the introduction of this service, the public has had to rely on private vehicles, trishaws, and illegal taxis for trips to the central area and other places in the municipality. The only roads served by bus service were Jalan Pengkalan Chepa and Jalan Semut Api. Other major roads entering the central area from other districts were served by buses coming from destinations outside from the municipality.

According to the traffic manager of SKMK, Mr. Wan Mohamed, routes for town bus service are determined by house surveys. The assumption of using this kind of survey is that the number of potential passengers is high if there are a lot of houses in the area. If the route proved to be unprofitable or if there are not enough passengers to support the route, a new route would be used. Mr. Wan Mohamed is confident that the present routes have good coverage of the needed areas in the municipality and profitable. Users seem to prefer the mini bus used for the




Figure 4-2 Kota Bharu: Town Bus Service




Source: Syarikat Kenderaan Melayu Kelantan

Figure 4-3 Kota Bharu: Town Bus Service Routes

town bus service. It is more profitable than larger buses, and SKMK will increase use of small buses for town service. At present, 10 small buses are used which replace conventional buses (each with a capacity of 60 passengers) for the Pengkalan Chepa route. Schedules and routes for town bus service are as shown in Table 4-1 and Table 4-2.

The company is in the process of providing service to the industrial estate at Pengkalan Chepa. This service will be called factory bus service (bas kilang), as has been provided in Penang and Kuala Lumpur.

More than half of the buses used are Mercedes buses, and the rest are Japanese-made buses. SKMK has its own workshops at the Kubang Kerian main bus depot. In the future it will establish workshops at other districts. Training for mechanics are given by MARA, a quasi-government agency.

Bus fare rate is M40¢ for the first kilometer and M10¢ for additional kilometers. This fare rate does not apply to air-conditioned express bus service which is a little bit higher. Schedules and fare rates for express service to out-of-state destinations are as shown in Table 4-3. Buses to Kuala Lumpur will be increased due to high demand during religious and public holidays, and school and higher education term breaks. SKMK will rent buses from other companies, in and out of the state, to cater to demand. Passengers on express buses will be given blankets, pillows, and light snacks and drinks. If the road condition is good, movies will be shown on the bus. Buses will stop at designated bus stops for dinner and prayers for muslims.

Bus systems have potential benefits such as:

i) provision for low-cost, convenient, and flexible mass transportation services accessible to most of the urban poor. Bus fares are cheaper than taxis or trishaws in the municipality and the state. For example, it costs M$5.00 to take a taxi to Kuala Krai, but it only costs M$3.00 to take the limited stop bus;

Table 4-1 Kota Bharu Town Bus Service Schedule
(Departure from Buluh Kubu Central Market)

| Bus Number(Number of Bus Used) | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1(4) | 2(4) | 3(3) | 4(3) | 59A(2) | 59B(2) | 10(3) | 28(3) |
| 7.00am | 7.10am | 7.15am | 7.30am | 6.40am | 6.50am | 7.05am | 6.55am |
| 7.20 | 7.30 | 7.40 | 7.50 | 7.00 | 7.10 | 7.30 | 7.20 |
| 7.40 | 7.50 | 8.00 | 8.15 | 7.20 | 7.30 | 7.55 | 7.45 |
| 8.10 | 8.20 | 8.25 | 8.40 | 7.40 | 7.50 | 8.20 | 8.10 |
| 8.30 | 8.40 | 8.50 | 9.05 | 8.00 | 8.10 | 8.45 | 8.35 |
| 8.50 | 9.00 | 9.15 | 9.30 | 8.30 | 8.40 | 9.10 | 9.00 |
| 9.10 | 9.20 | 9.40 | 9.55 | 9.00 | 9.10 | 9.35 | 9.25 |
| 9.40 | 9.50 | 10.05 | 10.20 | 9.30 | 9.40 | 10.00 | 9.50 |
| 10.10 | 10.20 | 10.30 | 10.45 | 10.00 | 10.10 | 10.25 | 10.15 |
| 10.30 | 10.40 | 10.55 | 11.10 | 10.30 | 10.40 | 10.50 | 10.40 |
| 10.50 | 11.00 | 10.20 | 11.35 | 11.00 | 11.10 | 11.15 | 11.05 |
| 11.15 | 11.25 | 11.45 | 12.00 | 11.30 | 11.40 | 11.40 | 11.30 |
| 11.40 | 11.45 | 12.10 | 12.25 | 12.00 | 12.10 | 12.05 | 11.55 |
| 12.00 | 12.10 | 12.35 | 12.50 | 12.30 | 12.40 | 12.30 | 12.20 |
| 12.20 | 12.30 | 12.55 | 1.15 | 1.00 | 1.10 | 12.55 | 12.45 |
| 12.40 | 12.50 | 1.25 | 1.40 | 1.30 | 1.40 | 1.20 | 1.10 |
| 1.20 | 1.30 | 1.50 | 2.05 | 1.50 | 2.00 | 2.00 | 1.50 |
| 1.40 | 1.50 | 2.35 | 2.50 | 2.20 | 2.30 | 2.25 | 2.15 |
| 2.00 | 2.10 | 2.55 | 3.15 | 2.40 | 2.50 | 2.50 | 2.40 |
| 2.20 | 2.30 | 3.25 | 4.40 | 3.30 | 3.40 | 3.15 | 3.05 |
| 2.50 | 3.00 | 3.50 | 4.30 | 4.00 | 4.10 | 3.40 | 3.30 |
| 3.20 | 3.30 | 4.15 | 4.55 | 4.20 | 4.30 | 4.05 | 3.55 |
| 3.50 | 4.00 | 4.40 | 5.20 | 4.40 | 4.50 | 4.30 | 4.20 |
| 4.10 | 4.20 | 5.30 | 5.50 | 5.10 | 5.20 | 4.55 | 4.45 |
| 4.30 | 4.40 | 5.55 | 6.10 | 5.40 | 5.50 | 5.20 | 5.10 |
| 4.50 | 5.00 | 6.20 | 6.35 | 6.10 | 6.20 | 5.45 | 5.35 |
| 5.20 | 5.30 | 6.35 | 6.55 | 6.30 | 6.40 | 6.10 | 6.00 |
| 5.40 | 5.50 | 7.05 | 7.20 | 7.00pm | 7.10pm | 6.35 | 6.25 |
| 6.00 | 6.10 | 7.30pm | 7.45pm | | | 7.00pm | 6.50pm |
| 6.20 | 6.30 | | | | | | |
| 6.50 | 7.00 | | | | | | |
| 7.20pm | 7.15pm | | | | | | |

* Schedule for Saturday to Thursday.

Source: SKMK, January, 1988

Table 4-2 Kota Bharu Town Bus Service Schedule(Departure From Main Bus Terminal)

| Bus Number(Number of Bus Used) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Saturday to Thursday | | | | Friday and Public Holiday | | | |
| 9(4) | 8(2) | 6(3) | 47(3) | 9 | 8 | 6 | 47 |
| 7.00am | 7.00am | 6.30am | 7.40am | 7.40am | 7.50am | 7.00am | 7.40am |
| 7.20 | 7.30 | 7.00 | 8.10 | 8.00 | 8.20 | 7.50 | 8.10 |
| 7.40 | 8.10 | 7.50 | 8.50 | 8.30 | 9.00 | 8.10 | 8.50 |
| 8.00 | 8.50 | 8.10 | 9.20 | 9.00 | 9.40 | 8.50 | 9.20 |
| 8.20 | 9.30 | 8.50 | 10.15 | 9.20 | 10.20 | 9.40 | 10.15 |
| 8.40 | 10.10 | 9.40 | 10.45 | 9.45 | 11.00 | 10.10 | 10.45 |
| 9.00 | 10.50 | 10.10 | 11.45 | 10.15 | 11.40 | 10.40 | 11.45 |
| 9.20 | 11.30 | 10.50 | 12.10 | 10.40 | 12.30 | 11.30 | 12.10 |
| 9.40 | 12.50 | 12.10 | 1.30 | 11.00 | 2.00 | 12.00 | 12.45 |
| 10.00 | 12.50 | 12.10 | 1.30 | 11.30 | 2.40 | 12.30 | 1.30 |
| 10.20 | 1.30 | 1.00 | 2.20 | 12.00 | 3.20 | 2.00 | 2.20 |
| 10.40 | 2.00 | 1.30 | 3.00 | 12.30 | 4.00 | 2.40 | 3.00 |
| 11.00 | 2.40 | 2.00 | 3.30 | 1.45 | 4.40 | 3.10 | 3.30 |
| 11.20 | 3.40 | 3.00 | 4.15 | 2.10 | 5.20 | 3.50 | 4.15 |
| 11.40 | 4.20 | 3.40 | 5.00 | 2.30 | 6.00 | 4.40 | 5.00 |
| 12.00 | 5.00 | 4.20 | 5.40 | 3.00 | 6.40pm | 5.30 | 5.40 |
| 12.20 | 5.40 | 5.00 | 6.20 | 3.30 | | 6.00 | 6.20 |
| 12.40 | 6.20 | 5.50 | 6.50pm | 4.00 | | 6.40pm | 6.20 |
| 1.00 | 7.00pm | 6.30pm | | 4.30 | | | |
| 1.20 | | | | | | | |
| 1.40 | | | | | | | |
| 2.00 | | | | | | | |
| 2.30 | | | | | | | |
| 2.50 | | | | | | | |
| 3.10 | | | | | | | |
| 3.30 | | | | | | | |
| 3.50 | | | | | | | |
| 4.10 | | | | | | | |
| 4.30 | | | | | | | |
| 4.50 | | | | | | | |
| 5.20 | | | | | | | |
| 5.40 | | | | | | | |
| 6.00pm | | | | | | | |

Source: SKMK, January, 1988

Table 4-3 Express Bus Service to Out-of-Kota Bharu Destinations

| Destination | Fare | Departure Time |
|---|---|---|
| Kuala Terengganu | 5.70* | 8:00 am, 9:30 am |
| | 6.80+ | 11:30 am, 1:00 pm, 3:00 pm, 4.30 pm |
| | | 6:30 pm (Friday and Thursday) |
| Dungun | 8.70* | 8:30 am, 2:00 pm |
| Kuantan | 13.20* | 11:00 pm, 12 midnight |
| | 16.20+ | 8:30 am, 10:00 am, 3:00 pm, 11:00 pm |
| Kuala Lumpur | 21.00/11.00* | 8.00 pm |
| | 25.00/13.00+ | 8.00 pm |
| Temerloh | 17.50* | 9:00 am, 9:00 pm |
| Rompin | 17.50* | 9:00 am, 8:00 pm |
| Segamat-Johor Baru | 25.00* | 9:00 pm, 8:00 pm |
| | 30.00+ | 8:00 pm |
| Singapore | 26.00* | 9:00 am, 8:00 pm |
| | 31.00+ | 8:00 pm |
| Butterworth-Penang | 18.00/11.00+ | 9:00 am |
| Alor Star-Sg. Petani | 16.80/11.00+ | 9:00 am |
| Grik | 10.00/5.00+ | 9:00 am |

* Not Air-Conditioned Bus +Air-Conditioned Bus

Source: SKMK

ii) generation of employment through production, operation, and maintenance. At present, SKMK has the largest workforce in the municipality and the state, outside of government services. The workforce increased from 730 in 1980 to 906 in 1987;

iii) increased property values in areas where bus services are extended, including areas where low-income groups are likely to be property owners; and

iv) an increased total supply of land accessible for low income household settlement. This will give the opportunity for these residents to afford their own homes in a better environment than the squatters in the central area, and will give them access to job opportunities.(SKMK(a), 1988, 6; P.G. Pak Poy and Yunken Alam Bina, 1981, 11 and Herbert, 1979, 147)

Issues and Problems. The major operating problem experienced by the bus company is the difficulty in obtaining permits from the Federal Road Transport.(P.G. Pak Poy establish and Yunken Alam Bina, 1981, 11) This hinders the operation of new services on new routes. It also causes problems for the company expanding service according to demand.

Cooperation from the authorities is minimal. The company has problems in getting sites for bus stops.(Wan Mohamed, 1988) MPKB seems to have other more income-generating uses, such as car parking for such sites. A conflict of interest has resulted in users not being provided with adequate facilities which could attract people to use public transport. All bus shelters in the municipality are provided by sponsors who advertise their products on the shelters, as shown in Figure 4-4. The company is responsible for finding sponsors, without any help from local government. The unavailability of lay-bys results in traffic congestion, especially on major roads leading to the central area and roads in the central area, when buses stop to load and unload passengers. No buses are allowed to stop along Jalan Temenggong in order to avoid traffic hold-ups and to provide a smooth flow of traffic.




Figure 4-4 Kota Bharu: Bus Shelters




Figure 4-5 Kota Bharu Central Area: Main Bus Terminal

The roads around the bus terminals (Figure 4-5), are mostly congested, making it hard for buses to maneuver and results in delays. At present, buses have to compete with pedestrians, trishaws, cyclists, and other motorized vehicles on the congested Jalan Doktor and Jalan Tok Hakim. Pedestrian movement in this area is quite high. This is due to the establishments surrounding the terminals which generate pedestrian traffic. A taxi terminal is located next to the bus terminal which adds to the number of vehicles using Jalan Doktor. A government office complex on Jalan Doktor also causes congestion during peak hours. All these factors slow the movement of buses going out of the terminals and cause delays. Jalan Doktor is also hazardous to pedestrians since it does not have sidewalks and pedestrian crossing facilities.

Buses have to compete with illegal taxis. At present there are about 200 illegal taxis operating in the state.(Tuan Yahya, 1988) They receive at least M$10.00 net profit per car per day.(Tuan Yahya, 1988) This is a potential profit for the bus company of about 20% of SKMK's potential profits.(Tuan Yahya, 1988) Cooperation between the bus company and the taxi service is needed in order to capture potential users.

SKMK is responsible to provide service on unprofitable routes. In order to lower losses on the routes, SKMK reduced bus frequency but they received complaints from the public and pressure from the local government, and they had to increase frequency even though they experience losses. Priorities were given to other companies for new routes to other out-of-state destinations, such as to Pulau Pinang and Alor Star. SKMK was given the routes only after the other bus company went bankrupt.

Attitudes of the employees and passengers create problems for the company. Employees do not realize that they are the public relations representatives for the company. Drivers and passenger-related workers should be polite and helpful to give a good impression to users. Users will be more attracted to use the bus service. Drivers should have good driving habits to give a feeling of safety and comfort to passengers. Users usually have a tendency to mutilate the interior and exterior of the buses. Express bus passengers often take blankets and pillows which cost

quite a bit to be replaced by the company. Passengers have the habit of wanting off the bus at unreasonable places which might cause danger to them and to other road users. Drivers sometimes start moving before passengers are safely on or off buses. Passengers sometimes avoid paying fares especially on crowded buses or, when trips made during peak hours are short, the conductors sometimes do not collect fares from passengers. The attitudes of passengers, drivers, and conductors cause losses for the bus company and lower the level of service.

Alternatives. In many cases, the bus is the only mode of transportation that can be afforded by the urban poor. Variation in bus service is important in providing public transport service that can cater to the wide range of preferences and needs of the public. Standards of service usually look at factors such as reliability, frequency, journey time, and quality of ride. (Armstrong-Wright(a), 1986, 3) Bus services should consider comfort and reliability at reasonable fare rates for the more affluent users, and lower fare for the lower income population who are willing to sacrifice comfort. Variation in bus service is the best way to provide a public transport system that will allow flexibility in services.(Armstrong-Wright(b), 1986, 27)

A mixed fleet is more adaptable to changing circumstances compared to same size bus fleet.(Armstrong-Wright(b), 1986, 25) A mixed fleet can provide more frequent service according to the demand throughout the day or the demand for each route. Bigger buses can be used for high demand periods to provide more efficient service or can be used for high demand routes. Mixed-fleet has been successful in Jakarta, Nairobi and Istanbul.(Armstrong-Wright and Thiriez, 1987, 24) In Jakarta, large buses are concentrated along the major corridors that provide high load factors at high frequency and minibuses operate on poor conditions secondary roads with lower level of demand.(Armstrong-Wright and Thiriez, 1987, 24) In Nairobi, small buses provide services between main commuter routes(which are served by large buses) and low-income areas and industrial areas.(Armstrong-Wright and Thiriez, 1987, 24) "Vehicles chosen by

operators with practical knowledge of road conditions, levels of demand, and operating costs are more likely to be cost-effective and appropriate than vehicles specified by regulations."(Armstrong-Wright, 1986, 25) In order to have a cost-effective and satisfactory bus service, the factors that should be considered include:

i) a variety of buses and services are employed to meet the different levels of demand for quality and quantity found throughout urban areas;

ii) the buses used are production-line models or low-cost conversions readily maintained by operators and local technicians; and

iii) operators have freedom of choice in the type and size of buses used.(Armstrong-Wright and Thiriez, 1987, 22)

Government plays an important part by relaxing regulations, thereby giving more opportunity to the bus company to choose the type of bus operation that can satisfy the demand of the public. Freedom to set level of service, route, and fare rates should be given to the bus company, with minimal intervention from the government.

Using larger buses will involve work on more sophisticated and non-standard equipment such as retarders, an articulation system, and remote-controlled doors which may need specially trained staff and special facilities.(Armstrong Wright(a), 1986, 3) Maintenance savings are possible for small buses compared to conventional buses or larger buses through lower costs of replacement parts, and reduced wear on some parts, such as transmission and suspension components, due to lower vehicle weight.(Meyer and Gomez-Ibanez, 1977, 107) Fuel can also be saved since fuel consumption depends on the size and weight of vehicles. Labor costs are very cheap in Malaysia, as in other developing countries. Using small buses would lower operation costs, especially in low-density areas or in old city centers with narrow right-of-ways. Small buses move more easily in this kind of road network. Small buses are preferred by bus companies because:

i) inspection requirements for smaller vehicles may be less stringent and less costly compared to larger buses;

ii) small buses may not be a significant disadvantage in Kota Bharu because labor costs are low; and

iii) fares are easier to collect on small buses than on large buses and the chances of revenue leakage are much reduced.(Armstrong-Wright and Thiriez, 1987, 27)

Variation of services should consider levels of comfort and variations of mode of operation. The middle income population in Malaysia has experienced an increase in income which makes private automobiles more affordable. Public transport service should be able to offer a level of comfort comparable to private vehicles in order to attract this segment of the population. This can be done by using more comfortable air-conditioned buses with attractive appearance. Bus service in Kota Bharu would be facing competition from the airlines. More people are using airplanes to save time even though fares are quite high compared to bus fares. In order to compete with private vehicles and other public transport mode such as taxis and airplanes, bus service needs to be frequent and according to schedule. Also bus shelters need to be attractive and weather protected. Potential users need to be assured that they do not have to worry about being late to work or about having to wait long for buses due to them not running according to schedule. Passengers should be provided with information on bus schedules and routes, so that they do not have to worry about missing buses. Bus service should give the impression that users will be benefited by using it. Using buses or other public transport can benefit the public time-wise. They can save time on car maintenance and repair; they can use travel time for reading and relaxing; the bus runs at convenient times, departs on time and waiting time is usually short.(Lovelock, 1987, 44)

In addition to regular bus and minibus service, other modes of operation that can be provided include express bus service with limited stops and shuttle service. At present, limited stop service (bas cepat) is provided for destinations to other districts. In the future, this service

could be extended for trips between development nodes in the municipality. Air-conditioned buses should be used in addition to other buses. This service can run between, for example, Kubang Kerian and Pengkalan Chepa, Kubang Kerian and Kota Bharu, or Kota Bharu and Pengkalan Chepa. Shuttle bus service could be used especially from large housing developments to major employment centers or the CBD. This service could be provided from the new housing project in Kubang Kerian to Kota Bharu, or from Kota Bharu to the industrial estate in Pengkalan Chepa. Shuttle services can be used during peak hours in the morning, afternoon, and evening. The unavailability of these kinds of service might cause a loss in a valuable slice of the market which also contributes to the rapid growth of car use, congestion, and increased delays, while the viability and quality of bus service decreases.(Armstrong-Wright and Thiriez, 1987, 28)

New bus companies should be allowed in the future. This will create healthy competition. Companies will tend to be more sensitive to public needs and will be encouraged to increase efficiency and to improve bus services.

Efforts should also be taken by the government to regulate fares so that bus service is affordable for the lower-income segment of the population. Different types and standards of service should be available at comparable levels of comfort and area coverage. Government help is needed to provide frequent services on unprofitable routes, in order for the company to keep operating without experiencing a substantial loss. Subsidies should be given to bus companies by the government to maintain levels of service at reasonable fare rates. The government is also responsible for monitoring the services to avoid misuse of subsidies and to encourage companies to reduce cost. The misuse of subsidies leads to inefficiency, greater deficits and, eventually, more subsidies.(Armstrong-Wright(b), 1986, ix) Small fare adjustments should be done routinely in order to be acceptable by the public and to avoid major political issues caused by drastic fare increases.(Armstrong-Wright and Thiriez, 1987, 41 and 42) Freedom to set fares by

the bus company in response to market factors is more likely to mean that supply and demand will balance each other.(Armstrong-Wright(a), 1986, 27)

There is a need for a new terminal site. Proper planning is needed to avoid conflicts between the bus circulation system and the road system. Bus-only lanes should be provided on roads leading to the bus terminal. A bus-only lane needs to be designated on Jalan Doktor to provide smooth movement of buses.

Trishaw.

The trishaw is a three-wheeled vehicle, pedaled the same way as a bicycle, as can be seen in Figure 4-6. It can carry up to four passenger when a stool is added in front. This is usually done by pedallers who transport students to school. It is non-polluting and has low energy requirements and easy access to the ultimate destination, all of which are desired by transport planners.(Rimmer, Drakakis-Smith and McGee, 1978, 203)It also provides flexible routes, destinations, and trip times of journey.

The number of trishaws operating in the municipality is about 2,700. They provide service in the built-up areas and are a major source of employment in the urban private sector. The production, maintenance, operation and repair of trishaw vehicles provides useful sources of relatively low-skilled employment.(Herbert, 1979, 143) Even though the total pedaller household monthly income of M$170.00 per month is low compared to the national and the municipality average income level, it is better than 20% of households in the municipality which earn less than M$200.00 per month.(P.G. Pak Poy and Yunken Alam Bina, 1981, 16)

According to the survey done by the State Economic Planning Unit(SERU), 62% of the public prefers to see the trishaw operation maintained as it is and only 3% wants them abolished. The importance of the trishaw as a public transport mode in Kelantan can be seen in the term that is used for trishaw. The trishaw is referred to as a taxi in Kelantan, and the taxicab is referred to as a hired car (kereta sewa). Trishaws are licensed as three-wheeled taxis ( teksi roda tiga) by the



Figure 4-6 Kota Bharu: Trishaw

Municipal Council. Users prefer the trishaw due to its door-to-door service that is not offered by other forms of public transport in the municipality. Trishaws are able to penetrate the high-density residential areas that are served by narrow roads or areas served by unpaved or poorly paved lanes. This is especially important when a lot of goods need to be carried. The average fare in 1980 was M85¢ per trip. Trishaws are more adaptable to the demand of users than any other transport mode.

Eighty two percent of full time pedallers own their own trishaws; 18% of them rent trishaws for M$1.50 per day and they spend only M$7.24 per month for maintenance.(Prime Minister Department and State Economic Planning Department, 1980, ix) Seven percent of the pedallers are seasonal pedallers who work on a full-time basis during certain season, such as padi farmers after harvesting season; and 11% are part-time pedallers, pedaling in conjunction with another full-time occupation. Of the part-time pedallers, 78.3% own their own trishaws, and 21.7% rent trishaws.(Prime Minister Department and State Economic Planning Unit, 1980, ix) Ninety three percent of users feel safe while traveling by trishaw.(P.G. Pak Poy and Yunken Alam Bina, 1981, 25) As motorized vehicles increase, it becomes more hazardous for trishaws to operate, especially on roads where motorized vehicles can travel at high speeds. If proper provision for trishaws is provided in major roads and in the central area, such as provided on Jalan Ibrahim, trishaw service can maintain its safety and can operate in a more appropriate manner without causing congestion or delays to other vehicles on the road. Interference of trishaws to other forms of public transport can be reduced and if this is done, trishaws should be encouraged rather than discouraged.

Issues and Problems. One of the issues concerning trishaw operation is the low income of operators. It is believed that an increase in the number of trishaws will result in increasing the number of the population at the poverty level.(Prime Minister Department and State Economic Planning Unit, 1980, xii) Ten percent of the municipality population depend on trishaw pedaling

for income and live mainly in the inner portion of the municipality.(P.G. Pak Poy and Yunken Alam Bina, 1981, 15) Ninety seven percent of all pedallers are household heads with an average family size of 6.3 people.(P.G. Pak Poy and Yunken Alam Bina, 1981, 25) Even though they receive low income, they are not among the lowest income earners in the municipality, and they are not provided with assistance from the government as are other low income groups such as fisherman and padi farmers.(P.G. Pak Poy and Yunken Alam Bina, 1981, 24)

Trishaws are also responsible for the congestion in the central area since they have to share the roads with motorized vehicles. Separate lanes for trishaws will avoid this problem, especially in the central area. Their low speed hinders the movements of other road users. They also have low acceleration speed from a standing start at intersections.(Rimmer, Drakakis-Smith, and McGee, 1978, 203) The attitude of some pedallers is a problem since they always assume that motorized vehicles will yield to them and should any accidents happen, they will not be charged the full amount since drivers know pedallers cannot afford the payment. Pedallers are also being accused of being accident-prone due to pedaling habits which pose a threat to passengers and other vehicles, but there is little statistical evidence to suggest this.

Fare rates set up by the Municipal Council are not used and the driving test for pedallers is not enforced. Unfortunate users will be charged higher than the normal fare when a pedaller does not earn enough money for the day. A pedaller knows how much he needs for a day for his family, and he usually will try to earn as much as he can. A trip that usually costs M$2.00 may be doubled to M$4.00. Tourists will be charged more. Chargers will be higher if additional goods are carried with passengers.

Fifty percent of all traffic on roads is non-motorized traffic, and 50% of it is trishaws, constituting 20-30% of the total vehicle flow.(P.G. Pak Poy and Yunken Alam Bina, 1981, 25) The cruising speed of trishaws is 10 to 15 kilometers per hour.(Rimmer, Drakakis-Smith, and McGee, 1978, 203)

Many people view the trishaw as an inappropriate form of transportation considering the wealth of the country. In the long-term, trishaw usage will decrease due to an increase in income and growth of car ownership; decentralization of population, jobs and services; restrictive regulations; and inflation.(Rimmer, Drakakis-Smith, and McGee, 1978, 215) Another reason is that the mode of travel used reflects the status of a person. The trishaw gives the image of underdevelopment and poverty.

The implication of banning or substituting trishaws has a social and economic impact on the pedallers who will be unemployed. They are not trained, or they do not have skill to do other kinds of jobs. Most of the pedallers have low levels of education. It would also have an impact on lower class people who cannot afford private vehicles because trishaws gave them service comparable to having private vehicles.

Alternatives. As recommended by a couple of consultants working for the Municipal Council, state and federal government, a good alternative for the trishaw is the motorized trishaw. The problem facing this alternative is that under the Road Traffic Ordinance in Malaysia, this kind of vehicle is an illegal public transport carrier.(P.G. Pak Poy and Yunken Alam Bina, 1981, 34) The motorized trishaw is not accepted by the Federal Ministry of Transport. Immediate implementation of motorized trishaws would be impossible. This option is in principle economically viable and financially robust.(P.G. Pak Poy and Yunken Alam Bina, 1981, 34) The financial aspect of a motorized trishaw scheme is in appendix C. The scheme is based on the cooperative model. A cooperative will rent vehicles to members. Vehicles will be rented on shift basis such as from 6am to 2pm, and from 2pm to 10pm. Referring to appendix C, with the assumption that operator earned M$11.00 per shift, the operators would only need to work 15 shifts per month to earn the average income currently obtained by trishaw pedallers. The motorized trishaw would also provide a reasonably effective process for largely phasing out

pedallers over a 5-10 year period in a socially acceptable manner, while also improving travel conditions for the public.(P.G. Pak Poy and Yunken Alam Bina, 1981, 35)

Pedallers should be given priority in obtaining licences for the motorized trishaws. Testing for operators should be enforced and new regulations set up for this mode to operate safely and efficiently. Support from the government is important in helping the pedallers to finance the motorized trishaw. Training should also be available for new operators.

Taxi Service. Taxis can provide services that cannot be provided by bus service. They can be available upon demand and can access areas that cannot be accessed by bus service. Compared to other type of mass transit, the taxi is more similar to private cars.(Levinson and Weant, 1982, 322) It can also decrease the need for parking.

Taxi service does not play an important role in providing public transport service in the municipality. Most of the service is to destinations out of the municipality or out of the state. There is no metered town service for the central area or other development nodes. The illegal taxi, referred to as the private taxi in Kelantan, provides services in the municipality. The services are to rural areas, Pengkalan Chepa, and Kubang Kerian. According to the Taxi Association's Treasurer, Mr. Wan, it is not profitable to provide metered taxi service in the municipality.

In 1980, there were 987 taxis operating in Kelantan and 273 of them operating in the district of Kota Bharu.(Majlis Perbandaran Kota Bharu, 1984, 16) Service to the airport and to the Pantai Cinta Berahi Beach resort is provided at a flat rate of M$10.00 per car. Service to and from the airport is according to flight schedule. Taxi service does not have a fixed departure time. Taxis will leave the terminal as soon as there are enough passengers, 3 or 4 passengers per car. The operation of the terminal is operated by the Taxi Association, which charges operators for the use of the terminal. Not all operators are members of the association. At present, there are 1,300 taxis operating in the state and about 3% of the taxis are owned by non-Malays.(Wan, 1988) The fare rate for a taxi is M70¢ for the first mile and M10¢ for additional miles. Flat rate

short a distance trip is M$5.00 per car. Table 4-4 shows the fares for service to other states and other districts.

Issues and Problems. The taxi service is facing problems in competing with buses and the illegal taxi service. The Taxi Association claimed that bus service is stealing their passengers. The bus is cheaper and service has improved. People are switching to buses. There are 200 illegal taxis operating in this state, and they also pose a threat to the taxi operation. Illegal taxis often will find passengers who are waiting for taxis or buses at bus stops or shelters. The existing taxi terminal at Jalan Suara Muda and Jalan Dato' Pati is congested. It creates environmental problems to the surrounding area. The location is not suitable for efficient operation, movement is restricted, and the site cannot handle an expansion in service. Facilities for passengers waiting for departure are not available. They have to wait on the footway adjacent to shophouses. Figure 4-6 shows the taxi terminal at Jalan Dato' Pati, near the bus terminal.

Alternatives. The existence of illegal taxis indicates that taxi service is inadequate. Illegal taxis need to be abolished and with proper enforcement, more taxi permits should be issued to increase service. Metered taxis can be introduced in the future for services in the central area and to other development nodes. Taxis can also be used for taxipools, shared-rides and dial-a-ride. Taxi pooling has been provided by illegal taxis. Taxi pooling can provide service on a regular basis by a small group of travelers with similar origins and destinations, and similar time schedules.(Levinson and Weant, 1982, 328) This service can reduce the number of automobiles in the central area and on major arterial roads. At present, illegal taxis provide services for school children and teachers for trips to school. The authorities can legalize this service with proper regulation to ensure safety to passengers and to compete with other public transport service. Vehicle and driver testing should be enforced for the individual operators. In order to keep fares at a rate agreeable to the passengers and the operators, authorities should give freedom for them

Table 4-4 Taxi Fare Rate for Services to Out-of-Kota Bharu Destinations.

| Out-of-State Service | | Out-of-Municipality Service | |
|---|---|---|---|
| Destination | Fare(M$) | Destination | Fare(M$) |
| Johor Baru | 57.00 | Wakaf Baru | 7.00* |
| Kuala Lumpur | 30.00 | PCB | 10.00* |
| Kuantan | 25.00 | Gua Musang | 15.00 |
| Dungun | 18.00 | Kuala Krai | 5.00 |
| K.Terengganu | 12.00 | Machang | 3.00 |
| Jertih | 4.80 | Pulai Chondong | 2.50 |
| Besut | 5.00 | Kem Desa | 2.50 |
| Alor Star | 33.00 | Batu Melintang | 9.00 |
| Kangar | 36.00 | Jeli | 8.00 |
| Taiping | 28.00 | Air Lanas | 6.50 |
| Kuala Kangsar | 26.00 | Tanah Merah | 4.00 |
| Ipoh | 30.00 | Beris/Kubur Besar | 2.00 |
| Butterworth | 30.00 | Gunung/Pauh Lima | 1.50 |
| Grik | 18.00 | Jelawat | 2.00 |
| Kemaman | 22.00 | Bukit Marak | 1.50 |
| | | Pasir Mas | 1.80 |
| | | Rantau Panjang | 3.50 |
| | | Pengkalan Kubur | 2.30 |
| | | Tumpat | 1.80 |

* Per car fare.

Source: Taxi Association




Figure 4-7 Kota Bharu Central Area: Taxi Terminal at Jalan Dato' Pati

to set the fares, routes, and times of operation. The operation should be monitored by the local authorities to ensure that service does not create congestion due to an increase in the number of taxis in service and to ensure that vehicles are in good condition and are safe but standards should not be too high so that service can be kept at a reasonable price. The shared-ride or group-ride concept means that several passengers are picked up at a single destination or enroute at several points rather than by prearrangement.(Levinson and Weant, 1982, 328)

Services offered by the taxi service should be efficient and convenient, and comparable to private cars to attract more people to use it.(Levinson and Weant, 1982, 203) These services will help to reduce the social gap between car-owners and the carless, with physically comparable equipment.(Fouracre, 1977, 4) It also provides services where demand is low and higher- capacity vehicles are not profitable to use. Taxis can move more easily on narrow streets compared to buses. Even though the bus company can provide cheaper service, it cannot compete with the flexibility and convenience of the various taxi services.

The various taxi services can help to attract more people to use public transport rather than using private vehicles. This can reduce parking requirements, lower gasoline consumption, and in the long run can reduce multiple car ownership.(Levinson and Weant, 1982, 328) Regulations can be reduced to have wider application of taxis and can increase potential productivity gains in the future.(Levinson and Weant, 328)

Another flexible and demand responsive mode of transportation is jitney. The types of vehicles that can be used for this service include car, jeep or vans. The ideal vehicle for jitney service would be vans with a seating capacity of about 12 passengers.(Roschlau, 1982, 62) An advantage of jitney is the operating speed, which is quite high since there are fewer stops compared to buses.(Roschlau, 1982, 62 and Gakenheimer, 1976, 322) Jitneys can operate at a profit and can provide frequent, fast, and cheap service.(Bonilla, 1984, 35) Services of 100,000 private cars could be accomplished with 6,600 jitneys.(Gakenheimer, 1976, 323) Governments need to enforce minimal regulations.

Jitneys operate in a fixed route but allow deviation under certain circumstances. A jitney can be individually owned or owned by an association or cooperative. Types of service that can be provided by jitneys are:

i) cruising. The jitneys travel continuously on an authorized route to serve the public having trip origins and destinations along the corridor;

ii) stand-dispatched. Jitneys depart from a stand in the CBD after a desired passenger load has been reached. This reduces the number of stops in the CBD since passengers have to go to the stand to take jitneys. Drivers will wait in the vehicle waiting line. Cruising jitneys cannot pick up passengers at the stand;

iii) stand-dispatched jitneys sometime operate by cruising during morning peak and change to semi-cruising after that.(Bonilla, 1984, 36)

Coordination and cooperation from the various public transport operators is needed in order to have an efficient public transport service that can serve the different segments of the population.

# CHAPTER 5

## CONCLUSION

A good public transport system is one of solutions to decrease the problem of congestion in cities. It is an efficient mode of moving a large numbers of people. Cities are looking for public transportation systems that are efficient user of road space, that can reduce road congestions, noise and pollution problems, and that are able to economize decentralization of city form.(Fouracre, 1977, 5) Since it is costly and difficult to change a decision to build substantial infrastructures, it is vital for local governments to consider various options before becoming committed to any particular transit system.(Armstrong-Wright(b), 1986, x) Public transport services work most efficiently with a minimum of government intervention or control.(Armstrong-Wright(b), 1986, 27)

The federal and local government needs to develop a clear policy for public transport service for the municipality. At present, decisions are made in an ad hoc manner which may cause problems in the long run. A policy for trishaw service is important due to the conflicting interest of the public and the government. An increase in trishaw's fares will encourage users to use the bus or taxi. In the long run the number of trishaws will decrease as ridership declines, and if steps are not taken to keep trishaw services affordable and profitable, they will disappear in several years.

Approaches that can be taken by the government to improve the public transport system include:

i) measures to improve movement of pedestrians and buses in high density, low income areas;

ii) improvements of pedestrian facilities;

iii) construction of bus-ways and reserved bus lanes in the central area or the CBD;

iv) a high-speed express bus network by constructing new road links;

v) upgrading of bus terminals and bus shelter/stops and construction of bus terminals;

vi) construction of primary roads to improve public transport access to low income areas; and

vii) traffic improvements such as installation of integrated traffic signals, signs, and road markings in the CBD and extension of traffic management progress throughout the city.(Armstrong-Wright(b), 1986, x)

Buses offer the cheapest and most flexible way of meeting a wide range of demands throughout the municipality. New bus service within the urban areas could include shuttle and express or limited stop services, in addition to conventional and mini buses. Bus companies should be given the freedom to introduce new services that provide access to all segments of the public. New services are also needed for the development nodes of Kubang Kerian and Pengkalan Chepa. Government agencies should have direct interaction with the bus company to create new and improved public transport services through route planning, scheduling, and provision of required infrastructure such as terminals, bus shelters, bus stops, and lay-bys.

A multi purpose public transport terminal would be appropriate to serve both buses and taxis. The terminal should provide facilities such as waiting area for passengers, rest-rooms, eating areas, and praying rooms. The location of the terminal should not cause further congestion to the surrounding area and should not cause environmental problems as does the present terminal. The design and traffic flow of buses and taxis should be compatible with adjacent development. The present bus terminal could be used for taxi and bus service in the municipality. The site for the new terminal, as proposed by the Municipal Council, is across from the present terminal. The new terminal could be used for service outside of the municipality. Both terminals could be connected by a pedestrian bridge across Jalan Tok Hakim. Separate lanes for buses and taxis should be used on roads for entering and exiting the terminal.

Taxi services can be expanded to include metered town service, fixed route service, shared-ride, and dial-a-ride. The authorities should eliminate illegal taxis from operating in the state. Taxi permits should be increased to provide more service to the public. New services can be developed by looking at the services provided by illegal taxis. Jitneys could be introduced as another mode of public transport. It provides a flexible and demand-responsive service, and it is affordable to the lower-income population. With minimum regulations, the jitney can provide service at quite low fares.

In order to decrease or maintain the present number of trishaws operating in the municipality, the government should freeze new licences. Control of sale and transfer of licences is also needed to reduce the number of operating trishaws. Areas designated for trishaw operation should have separate carriageways for trishaws and other non-motorized vehicles. Introduction of new public transport service to replace trishaws should be done gradually to avoid political and social problems.

Trishaws can be used in the tourism industry. They can be included in a tour package. Cooperation from the Tourist Development Corporation (TDC) and hotels in the municipality is needed to create a plan to use trishaws for tourists to tour the central city and historical structures. This has been done in Melaka and Pulau Pinang. Routes, fares, and times of operation can be set up by the hotel owners with approval from the local authorities. Routes used should avoid congested roads in the CBD. Maintenance of trishaws should be routinely checked for safety and the comfort of passengers.

In the long run, motorized trishaws can be introduced with approval from the federal government. This service is important to serve high-density low income areas. It can penetrate areas that cannot be accessed by buses and taxis and can provide individualized service for low income residents.

New residential area should be provided with employment, education facilities, community facilities, and open spaces in accordance with local planning requirement.(Majlis

Perbandaran Kota Bharu, 1984, 88) Kota Bharu will be experiencing equal employment and population growth in the three development nodes(Kota Bharu, Pengkalan Chepa and Kubang Kerian) with basically no commuting between nodes.(Majlis Perbandaran Kota Bharu, 1984, 102) This will decrease the volume of traffic in the central area and on major roads leading to the central area.

Coordination should exist between transportation and other sectors, among government units, and among transport modes. This is to avoid unnecessary duplication or misallocation of resources. "An organization is more successful when it has its own human resources to control the planning, implementation and operation of the transport system."(Mahayni, 1977, 364)

It is important to coordinate transportation plans and economic plans. This can be done by having engineers and economists work together. A national staff of experienced professionals which will coordinate all planning activities and programs to meet national goals should be established.(Carter, Chadda and Schoenfeld, 1984, 83) Government organizations should be working closely with the consultants in order to be able to select suitable techniques that can be successfully adapted to cities' needs.

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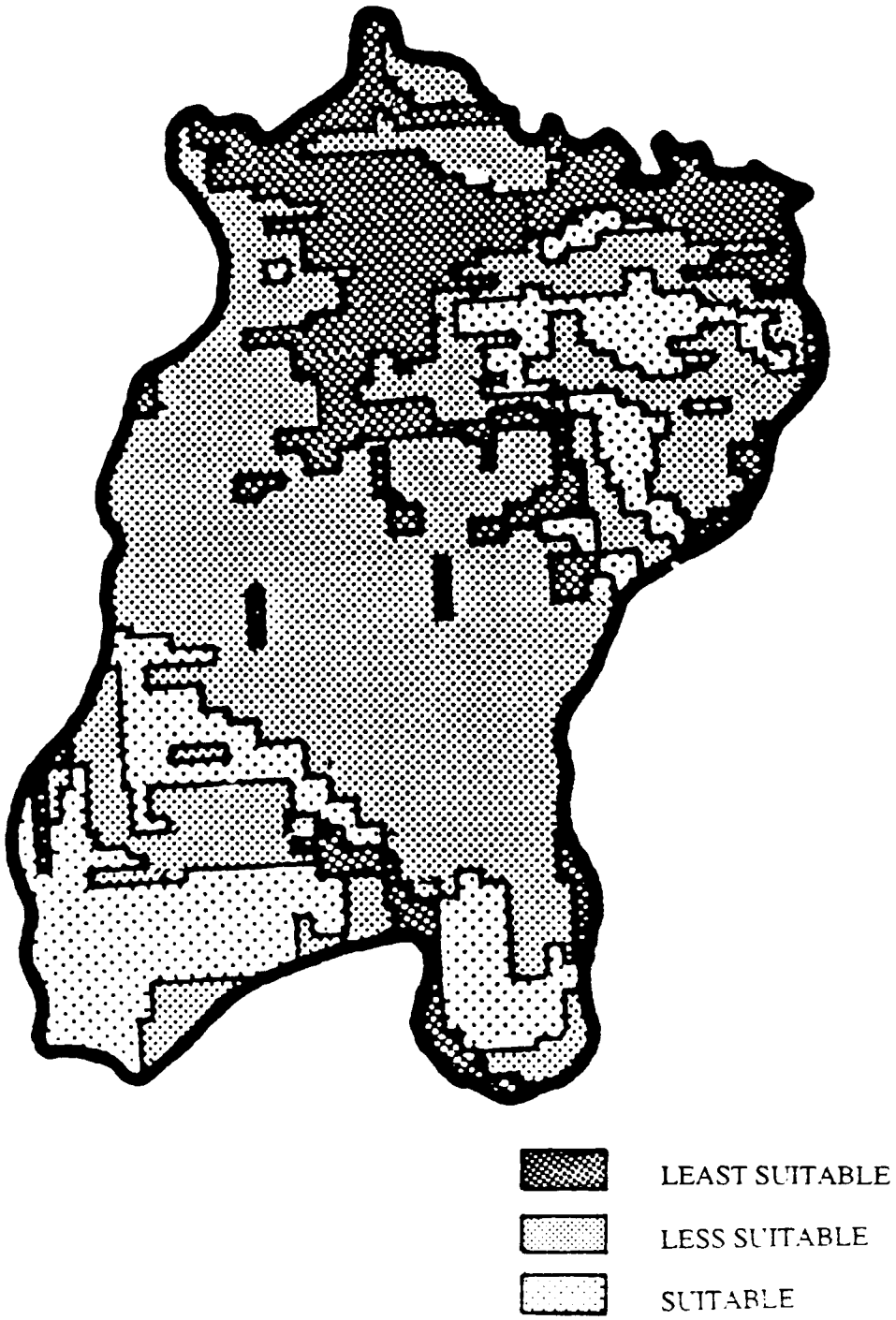
# APPENDICES

# APPENDIX A

APPENDIX A




Source: Kota Bharu Municipal Council

Land Suitability Map (Flooding)

# APPENDIX B

# APPENDIX B

LEVEL OF SERVICE CHARACTERISTICS BY HIGHWAY TYPE

| Level of Service | Urban and Sub-Urban Arterials | Controlled Access Highways |
|---|---|---|
| A | Average over-all travel speed of 30 mph or more. Free flowing with volume-capacity ratio of 0.60. Load factor at intersections near the limit of the 0.0 range. Peak-hour factor at about 0.70. | Free flow. Operating speeds at or greater than 60 mph. Service volume of 1400 passenger cars per hour on 2-lanes, on direction. Each additional lane serves volume of 1000 vph lane. |
| B | Average over-all speeds drop due to intersection delay and inter-vehicular conflicts, but remain at 25 mph or above. Delay is not unreasonable. Volumes at 0.70 of capacity and peak-hour factor approximately 0.80. Load factor at intersections approx. 0.1. | Higher speed range of stable flow. Operating speed at or greater than 55 mph. Service volume on 2-lanes in one direction not greater than 2000 passenger vehicles per hour. Each additional lane above two in one direction can serve 1500 vph. |
| C | Service volumes about 0.80 of capacity. Average over-all travel speeds of 20 mph. Operating conditions at most intersections approximate load factor of 0.3. Peak hour factor approximately 0.85. Traffic flow still stable with acceptable delays. | Operation still stable, but becoming more critical. Operating speed of 50 mph and service flow on two-lanes in one direction at 75% of capacity or not more than 5 min. flow rate of 3000 passenger cars per hour. Under ideal conditions each additional lane above two in one direction would serve 1800 vph. |
| D | beginning to tax capabilities of street section. Approaching unstable flow. Service volumes approach 0.90 of capacity. Average over-all speeds down to 15 mph. Delays at intersections may become extensive with some cars waiting two or more cycles. Peak hour factor approx. 0.90, load factor of 0.7. | Lower speed range of stable flow. Operation approaches instability and is susceptible to changing conditions. Operating speeds approx. 40 mph & service flow rates at 90% of capacity. Peak 5 min. flow under ideal conditions cannot exceed 3600 vph for 2-lanes 1 direction, 1800 vph each added lane. |
| E | Service volumes at capacity. Average over-all traffic variable but in area of 15 mph. Unstable flow. Continuous back-up on approaches to intersections. Load factor at intersections in range between 0.7 and 1.0. Peak hour factor likely to be 0.95. | Unstable flow. Over-all operating speeds of 30-35 mph. Volumes at capacity or about 2000 vph lane under ideal conditions. Traffic flow metered by design constrictions and bottlenecks but long back-ups do not normally develop upstream. |
| F | Forced flow. Average over-all traffic speed below 15 mph. All intersections handling traffic in excess of capacity with storage distributed throughout the section. Vehicular back-ups extend back from signalized intersections, through unsignalized intersections. | Forced flow. Freeway acts as a storage for vehicles backed-up from downstream bottleneck. Operating speeds range from near 30 mph to stop-and-go operation. |

Levels of Service Characteristics

Source: US Highway Capacity Manual, 1979

# APPENDIX C

# APPENDIX C

## FINANCIAL ASPECTS OF MOTORIZED TRISHAW SCHEME

The content of appendix C is copied directly from Kota Bharu Urban Development Study: Project Identification Briefs, a report done by P.G. Pak Poy and Yunken Alam Bina consultants.(P.G. Pak Poy and Yunken Alam Bina, 1981, 164) This annex considers the various financial implications of introducing motorized trishaws as a means of improving the urban public transport situation in Kota Bharu. The analysis is by its nature tentative and more detailed studies on the structure, rules and regulations of the proposed co-operation and the implementation timing of the scheme would have to be done.

The fact that a similar scheme proposed for Terengganu has recently been reported to have been accepted in principle, further strengthens the case for its introductions in Kota Bharu.

### CONCEPTUAL FRAMEWORK OF THE SCHEME

This analysis is based on the cooperative model, wherein a central cooperative is responsible for obtaining finance and purchasing vehicles for the scheme. Vehicles are then rented out for use by cooperative members, and rents are set at a level to cover scheme costs in addition to providing a financial surplus for distribution (in one form or another) to all cooperative members (including those not renting and operating motorized trishaws).

Since the scheme is intended to benefit the maximum number of pedlars, it is proposed that the scheme be operated on a shift basis wherein the trishaws would be rented to the operators on an 8 hourly shift basis i.e. 6 AM to 2 PM constituting the first shift, and 2 PM to 10 PM the second shift.

The cooperative would be responsible for working out some equitable roster system for use of vehicles by members.

BASIC CONCEPT OF THE COOPERATIVE

A cooperative would be established to initiate and implement the proposed scheme. All present trishaw pedlars would be ligible to become members of this cooperative. It will be responsible for:-

- obtaining the necessary finance to purchase the vehicles,
- obtaining the permits to operate the motorized trishaws,
- initiating a driver training program for potential operators amongst its members, and
- distribution of the surplus over expenditure to all its members through dividend and/or through subsidized cooperative services to its members.

CAPITAL STRUCTURE OF COOPERATIVE

It is anticipated that the cooperative would be made up of about 2,000 members. Each member would be required to subscribe $200.00 with an initial payment of $20.00. The balance of $180.00 would be collected in 9 monthly instalments, each of $20.00 per month. The total project would cost and estimated $500,000.00 initially. This would be required to purchase 100 motorized trishaws at an approximate cost of $4,800.00 each and to provide ancillary office requirements and equipment.

There are several alternative sources for this finance. It could merit an interest free loan from either the State or Federal Government because of its socio-economic implications, or come from a statutory financial institution such as MARA (with preferential interest rates). However, it may have to be financed through loans form financial institutions at commercial interest rates. In assessing the viability of the proposed scheme, the Consultant has considered the extreme view-point of having to service the total loan requirement at a commercial rate of 10% per annum.

SOURCE OF INITIAL COOPERATIVE FUNDS

It is suggested that the initial capital structure of the cooperative be as follows:-

Members contribution:-

| | | | |
|---|---|---|---|
| - | Entrance fees | $4,000 | |
| - | Initial subscriptions | $40,000 | $44,000 |

| | |
|---|---|
| Loan from Financial Institution | $456,000 |
| | $500,000 |

During the subsequent 9 months the cooperative would receive cash injections of $40,000 per month from subscription instalments by members. These instalments may be utilized by the cooperative for the yearly repayment of the loan or alternatively be placed on fixed deposits to earn sufficient revenue to repay both the capital and interest accrued on the loan. The second of the two alternatives is preferred since it generates benefits to the members.

FINANCIAL VIABILITY OF THE SCHEME

These funds will be utilized for the following purpose:-

Capital costs of Motorized Trishaws:-

| | |
|---|---|
| - 100 units at $4,800.00 per unit[1] | $480,000.00 |
| - Office establishments costs[2] | $20,000.00 |
| | $500,000.00 |

Notes

[1] Details relating to the capital cost per motorized trishaw, as obtained from a local agent for the manufacturer, is provided in Table V-4.

[2] Office establishment cost includes the fitting out of rental office space and the provision of furniture and equipment.

FINANCIAL VIABILITY OF THE SCHEME

The financial viability of the scheme has been studied in the context of:-

- the cooperative, and

- the individual operators.

The financial viability of the scheme, irrespective of whether considered from the view-point of the cooperative or the view-point of the operators hinges primarily on the establishment of a reasonable rental per shift.

The following section details the Consultant's approach to the establishment of the rental.

TABLE V-4

CAPITAL COST PER MOTORIZED TRISHAW, 1981

| A | B |
|---|---|
| | CAPITAL COST ESTIMATES($) |
| Capital Costs | |
| Capital costs of motorized trishaw (CIF) . . | 3,817.70 |
| Handling, forwarding, transport and bank charges | 330.00 |
| NET SELLING PRICE | 4,147.70 |
| Duties & Taxes | |
| Import Duty | 1,145.31 |
| Surtax (5% of CIF) | 190.89 |
| Sales Tax (5% of (CIF = Duty + Surtax) | 257.70 |
| SALE PRICE | 5,741.60 |
| Insurance | 435.80 |
| Road Tax (estimated at $9 per cwt. lwt.) | 108.00 |
| Registration Fees | 30.00 |
| Number Plate | 15.00 |
| Delivery & Handling Charge | 25.00 |
| Weighing Fee | 5.00 |
| | 6,360.40 |
| LESS IMPORT DUTY, SURTAX & SALES TAX[1] | 1,593.90 |
| | $4,766.50 |

Note: [1] It has been assumed that the cooperative would be able to obtain exemptions for these items.

Source: Malaysian agent for overseas manufacturer.

BASIS FOR RENTAL CHARGES

The rental that will be charges by the cooperative to each operator per shift is vital in determining his income level.

The basic formula used in the computation of the rental is:-

$$x = \frac{P + R + MV}{MC1}$$

$$R = x\ MC1 - (P + MV)$$

Where x= Fare per vehicle-mile

P= Expected income per shift

M= Mileage covered per shift ( see note 1)

V= Variable cost per mile ( see note 2)

C1= Utilization factor

R= Rental per shift.

Notes

1 Achieved operating mileage per shift is a crucial factor in profitability calculations. Unfortunately no detailed data are available on this, though information on motorized trishaw operations in India and Indonesia suggested that operating mileage per day may be of the order of 200 miles or more. For the purposes of this preliminary analysis, an operating mileage per shift of 66 miles has been assumed which is considered to conservative. Given fixed rentals, higher achieved mileage would of course give higher profits to operators.

2 The variable costs per mile comprises the petrol and the engine oil cost, computed as detailed below:-

Petrol Cost Per Mile

| | |
|---|---|
| Reported mileage of vehicle when new | = 70 miles/gallon |
| Assumed mileage at end of Year 5 (efficiency 80%) | = 56 miles/gallon |

Mileage used is an average of two i.e. 63 miles per gallon. Based on the cost of petrol being $5.00 per gallon, the petrol cost per mile = 7.94¢

Engine Oil Cost Per Mile

Engine oil usage amounts to 5% of engine oil per gallon of petrol i.e. o.4 pints per gallon. Assuming a mileage of 63 miles to a gallon and the cost of engine oil being $2.70 pr pint, the engine oil cost per mile = 0.22¢

Thus, the variable cost per mile = 8.16¢

Table V-4 provides alternative rentals per shift for different income levels and utilization factors. In order to enable an operator to earn an approximate net monthly income of $300 and assuming

that he is able to operate at 75% utilization factor, the rental to be charged per shift would be $5.77 ( see Table V-5). This assumes that the operator works a total of 27 shifts over a period of 1 month.

TABLE V 5

TABLE OF RENT/SHIFT WITH ASSUMED TRISHAW FARE OF 45¢ PER MILE

| A | B | C | D | E | F |
|---|---|---|---|---|---|
| INCOME/C1% | 90% | 85% | 80% | 75% | 70% |
| $9.26 | 12.07 | 10.58 | 9.10 | 7.60 | 6.13 |
| $11.11 | 10.22 | 8.74 | 7.17 | 5.77 | 4.28 |
| $12.96 | 8.37 | 6.89 | 5.4 | 3.92 | 2.43 |

Note: On the interpretation of Table V-5:-

i) The assumed average fare is 45¢ per mile. This is achieved by charging the user 60¢ for the first mile and 40¢ per mile thereafter. On average this works out to about 45¢ per mile. Table V-6 shows the average fare per mile assuming that the first mile is charged at 60¢ and every subsequent half mile 20¢.

ii) If the operator has to pay a rental of $12.07 per shift, he would have to travel 59.4 paid miles out of total of 66 miles in order to be able to obtain an income per shift of $9.26.

Source: P.G. Pak Poy and Yunken Alam Bina, 1981.

TABLE V-6

AVERAGE TRISHAW FARE PER MILE [1]

| A | B | C |
|---|---|---|
| MILES TRAVELLED | TOTAL FARE(¢) | AVERAGE FARE PER MILE |
| 1 | 60 | 60 |
| 1.5 | 80 | 53 |
| 2 | 100 | 50 |
| 2.5 | 120 | 50 |
| 3 | 140 | 46 |
| 3.5 | 160 | 45.7 |
| 4 | 180 | 45 |
| 4.5 | 200 | 44.4 |
| 5 | 220 | 44 |
| 5.5 | 240 | 43.6 |
| 6 | 260 | 43.3 |
| 7 | 300 | 42.8 |
| 7.5 | 320 | 42.6 |
| 8 | 340 | 42.5 |
| 8.5 | 360 | 42.3 |
| 9 | 380 | 42.2 |
| 9.5 | 400 | 42.1 |
| 10 | 420 | 42 |

NOTE: [1]Assume First Mile 60¢, Every Half Mile 20¢

Source: P,G, Pak Poy and Yunken Alam Bina, 1981

COOPERATIVE FINANCES

The Consultant has computed the projected income and expenditure accounts for the cooperative based on a rental of $5.77 per shift.

Revenue:-

| | | |
|---|---|---|
| Annual income from rentals (see note 1) | | 380,820 |
| Less Variable costs (note 2) | $102,204 | |
| Fixed Costs (note 3) | $246,552 | 348,756 |
| Surplus before tax | | 32,064 |
| Provision for tax (note 4) | | - |
| Distributable Surplus | | $32,064 |

Notes

1) The annual income from rentals has been computed using the following assumptions:-
   i) The rental obtained per shift per vehicle is $5.77.
   ii) The vehicle is operated for 330 days in a year.
   ii) The time allowed for maintenance would be exempted from tax for at least the first 5 years.

2) Variable costs (see Table V-7)

3) Fixed Costs (see Table V-8)

4) It is assumed that the cooperative would be exempted from tax for at least the first 5 years.

FINANCIAL CHARGES

Although the projected annual income and expenditure account would be affected by the financial charges that would have to be paid on the loan from financial institutions, the Consultant has considered the income generated from interest on fixed deposits (subscription installments) and the financial charges on the loan as a separate issue. This was done to prevent the cooperative being complicated with non-operational details.

The loan requirement for the project has been assumed to be $456,000. The terms and conditions of the loan have been assumed as follows:-

i) the loan will be repayable in 5 years on an annual basis, and

ii) the interest rate chargeable on the loan will be 10% per annum annual reducing balance.

TABLE V-7

TRISHAW COOPERATIVE VARIABLE OVERHEAD COSTS SCHEDULE

| A | B | C |
|---|---|---|
| COST ITEM | MONTHLY EXPENDITURE ($) | YEARLY EXPENDITURE ($) |
| Overhaul[1] | 5,345 | 64,152 |
| Tyres[2] | 3,171 | 38,052 |
| | $8,517 | $102,204 |

Note:-

1) It has been assumed that the life expectancy of the vehicle before overhaul is necessary is 50,000 miles. The cost of overhaul is $750.

Working on the assumption that the vehicle is used at the rate of 66 miles per shift per day for 27 days in the month, the monthly apportioned overhaul cost per vehicle is $53.46.

2) The life expectancy of a tyre has been assumed to be 20,000 miles. The monthly apportioned tyre cost per vehicle works out to $31.71. This has been based on the assumption that each tyre costs $58.00 and that vehicle is operated on the same basis as above.

Source: P.G. Pak Poy and Yunken Alam Bina, 1981.

TABLE V-8

COOPERATIVE FIXED OVERHEAD COST SCHEDULE

| A | B | C |
|---|---|---|
| COST ITEM | MONTHLY EXPENDITURE($) | YEARLY EXPENDITURE($) |
| SALARIES | 3,400 | 40,800 |
| EFP and other benefits | 510 | 6,120 |
| Office rental | 600 | 7,200 |
| Garage rental | 1,200 | 14,400 |
| Printing and stationery | 180 | 2,160 |
| Water and electricity | 90 | 1,080 |
| Insurance[1] | 4,000 | 48,000 |
| Road Tax[2] | 900 | 10,800 |
| Depreciation of vehicles[3] | 8,000 | 96,000 |
| Depreciation of office equipment | 166 | 1,992 |
| Maintenance[4] | 1,500 | 18,00 |
| | $20,546 | $246,552 |

Note:-

1) The insurance cost per vehicle per month has been estimated at $40. Based on the total fleet size of 100 vehicles, this would be $4,000 per month.

2) Road tax has been provided for at a rate of $9 per cwt. laden weight of vehicle. This works out to $108 per vehicle per year or $9 per vehicle per month.

3) Depreciation on vehicles has been provided at 20% per annum on a straight line basis. This accumulation of funds is expected to be treated on a sinking fund basis and should provide an asset base to the cooperative for the replacement of the vehicle at the end of fiscal years, or for other purposes.

4) Maintenance cost would be made up of servicing cost and general monthly mechanical check-ups. This has been taken as $15 per vehicle per month.

Source: P.G. Pak Poy and Yunken Alam Bina, 1981.

## FUNDS FLOW STATEMENT

The flow of funds has been considered from the view-point of the monthly installments from subscriptions and the annual repayment of the loan and associated interest on the loan. The following assumptions have been made in respect of the Funds Flow Statement:-

i) The monthly instalment of $40,000 will be placed in a fixed deposit account as and when collected.

ii) The interest that would accrue on the fixed deposit would be 12% per annum.

iii) For deposit periods or less than one year i.e. during the period the instalments are collected monthly, the interest accrued would be time-apportioned.

iv) No withdrawals will be made from the fixed deposit for purposes other than the annual repayment of loan and loan interest.

v) The loan repayments will commence after a grace period of 1 year.

vi) The annual depreciation charges of $96,000 has been considered as an additional cash inflow item in the Funds Flow Statement.

Based on the above assumptions, a Funds Flow Statement has been prepared as follows:-

| DESCRIPTION | YEAR 1 | YEAR 2 | YEAR 3 | YEAR 4 | YEAR 5 |
|---|---|---|---|---|---|
| CASH FLOW | | | | | |
| Opening balance of Fixed Deposit | - | 481,200 | 514,100 | 551,000 | 592,320 |
| Members subscription | 360,000 | - | - | - | - |
| Cash injections from depreciation | 96,000 | 96,000 | 96,000 | 96,000 | 96,000 |
| Interest Accrued | 25,2000 | 57,700 | 61,700 | 66,120 | 71,000 |
| SUB TOTAL | 481,200 | 634,900 | 671,800 | 713,120 | 759,320 |
| CASH OUTFLOW | | | | | |
| Capital Repayment | - | 75,000 | 82,500 | 90,800 | 99,800 |
| Interest Charges | - | 45,800 | 38,300 | 30,000 | 21,000 |
| Closing Balance of Fixed Deposit | 481,200 | 514,100 | 551,000 | 592,320 | 638,520 |

CONCLUSIONS

The above analysis is only intended to be indicative of the motorized trishaw scheme. However, the following broad conclusions may be drawn:-

i) The scheme appears to be financially robust and there are sufficient areas of flexibility (e.g. with regard to fare levels, tax charges on vehicles and the cooperative, operating mileages, rental levels) so that adjustments may be made in practice to achieve financial viability.

ii) The average fare level indicated above is about half the average fare charged by the present pedlar trishaws (i.e. 45¢ per mile, compared to about 80¢ per mile at present).

iii) Using the conservative assumption outlined above, the return to each operator per shift is about $11.00. Hence, a present trishaw pedlar would only need to work 15 shifts per month to earn the average income currently obtained by a trishaw pedlar in Kota Bharu (i.e. about $170.00). In practice, returns would probably be much higher as assumed achieved mileage per shift is considered to be low compared to what might be actually achieved.

iv) The distributable surplus indicated above ( about $30,000.000) represents a 71/2% per annum return on member's contributions ($400,000). In addition, the scheme provides for a sinking fund with annual contributions of about $100,000 (which represents assets owned by all cooperative members).

It should be stressed again that this analysis is only indicative. Precise financial operating results would depend on numerous details including:-

- actual number of pedlars joining the scheme,
- purchase prices of vehicles,
- timing of scheme,
- operating costs (e.g. fuel prices),
- loan capital and grant capital obtained, and repayment conditions,
- fare levels approved and pricing policy (such as on whether multi-fares are allowed or practised),

- taxation and subsidy policies,

- achievable operating mileage per day,

- utilization factors achieved, and

- cooperative rental policy which may favor either operators or members.

Nevertheless, the Consultant considers that the above analysis indicates the broad financial implications of the proposed motorized trishaw scheme, and the likely overall financial viability of the proposal.

# VITA

Rudaini Noor Aminuddin was born in Kota Bharu, Malaysia on April 5, 1963. She attended Sultan Yahya Petra Primary School in Kuala Krai for a year and transferred to Islah Primary School in Kota Bharu in 1971. She graduated from Kota Bharu Secondary School in December 1980. In August 1985, she graduated from Texas Tech University with a Degree in General Studies in Urban and Community Planning. In January 1986, she was accepted by the Graduate School of Planning at University of Tennessee, Knoxville and graduated in May 1989.