Chapter 7
BUS SERVICE THROUGH THE EXPRESSWAY

CHAPTER 7 BUS SERVICE THROUGH THE EXPRESSWAY

7.1 General

A study of normal bus operation on the Expressway which would supplement the feasibility study on the Second Stage Expressway System was conducted in Phase II of the Study. The objectives of the bus study are stated as follows:

- To determine bus routes, bus service and passenger volume which may divert to the Expressway;
- To find alternative plans of bus service through the Expressway;
- To identify effects and consequences associated with these alternative plans; and
- To present a conclusion whether or not a better result is found in the bus operation on the Expressway and recommendations based on the findings

With full support of BMTA, field surveys were conducted in February 23 and 24, 1983 in the corridors along the routes of the recommended Second Stage Expressway (SES). The surveys were the passenger interviewing, the counting of the passengers, and the counting of bus trips, etc. Since the opening of Port-Bang Na Section in mid-January, 1983 some private mini buses and air conditioned buses of BMTA has been operating through the Expressway. Passengers on these buses were interviewed on March 17, 1983. These results are summarized in this Chapter also.

The current bus operation route map, the bus passengers' origin-destination matrices on selected routes in 1980 and the bus passenger statistical data in 1982 were provided by BMTA. These data are utilized in the estimate of bus diversion on the SES.

In this study it was assumed not to reorganize the bus routes of BMTA because a study on bus route redevelopment would require extensive surveys and analysis. This kind of the study is considered better to be implemented by a separate feasibility study. The study of public buses on the SES is a case study exploring the viability of public bus service on the Expressway. Under this understanding the current BMTA bus routes (i.e. the origin and terminal points) are assumed not to change but their trips will increase and some will divert to the Expressway.

The statistical data of the bus operation in the proposed corridors are studied through which bus trips diverting to the Expressway are estimated. The number of bus trips is forecasted for each of the selected bus use plans.

Alternative plans of public bus service through the Expressway are studied. Among these plans, a few plans are selected by traffic analysis and engineering viewpoints. Preparatory technical studies are conducted and the cost of construction of necessary facilities is estimated.

A comparative study of the selected plans is conducted in terms of cost, benefits, operation and other aspects. Recommendations regarding the public bus service on the Expressway are stated together with the conclusion of the study.

7.2 Field Survey

7.2.1 Passenger Interview and Bus Trip Counting

Interview survey was conducted for sampled passengers on air conditioned buses and for those using normal buses waiting at bus stops. The purpose of the interview was to find origin and destination, on and off bus stops, access to and from bus stops, trip purpose, and their preference on the supposed bus service on the expressway. Simultaneously, bus passengers and bus trips were counted at these locations.

The result of the surveys are used together with the survey data of BMTA in recent years for the forecast of the buses on the Second Stage Expressway. Figs. 7–1 and 7–2 indicate the routes and locations of the surveys of the study. The field survey conducted for the bus study is stated in Appendix 7.1.

7.2.2 The Survey Result

(1) Car Ownership and Bus Uses

Bus users are divided into the following category by the vehicle ownership of the household. Those who have a car and/or motorcycle (MC) in the household are likely to use rather air conditioned buses.

	The family has car and/or MC	The family has no car nor MC
Persons using the air conditioned buses	(40%)	(60%)
Persons using the normal buses	(25%)	(75%)

(2) Access Time and Access Mode

Access time to and from the bus stop and its transportation modes are compared. Passengers on the normal buses have a higher percentage of using buses on access routes, resulting in a larger time on the access routes than those on the air conditioned buses. Persons using the buses through the Expressway have a higher percent of buses on their access because the routes are limited to specific areas.

	Access Time in minutes	Bus Access Mode in %
Persons using the air conditioned buses on roads in GBA	10	(30%)
Persons using the normal buses on roads in GBA	15	(38%)
Persons using the air conditioned buses through the Expressway	10	(45%)
Persons using the mini buses through the Expressway	13	(61%)

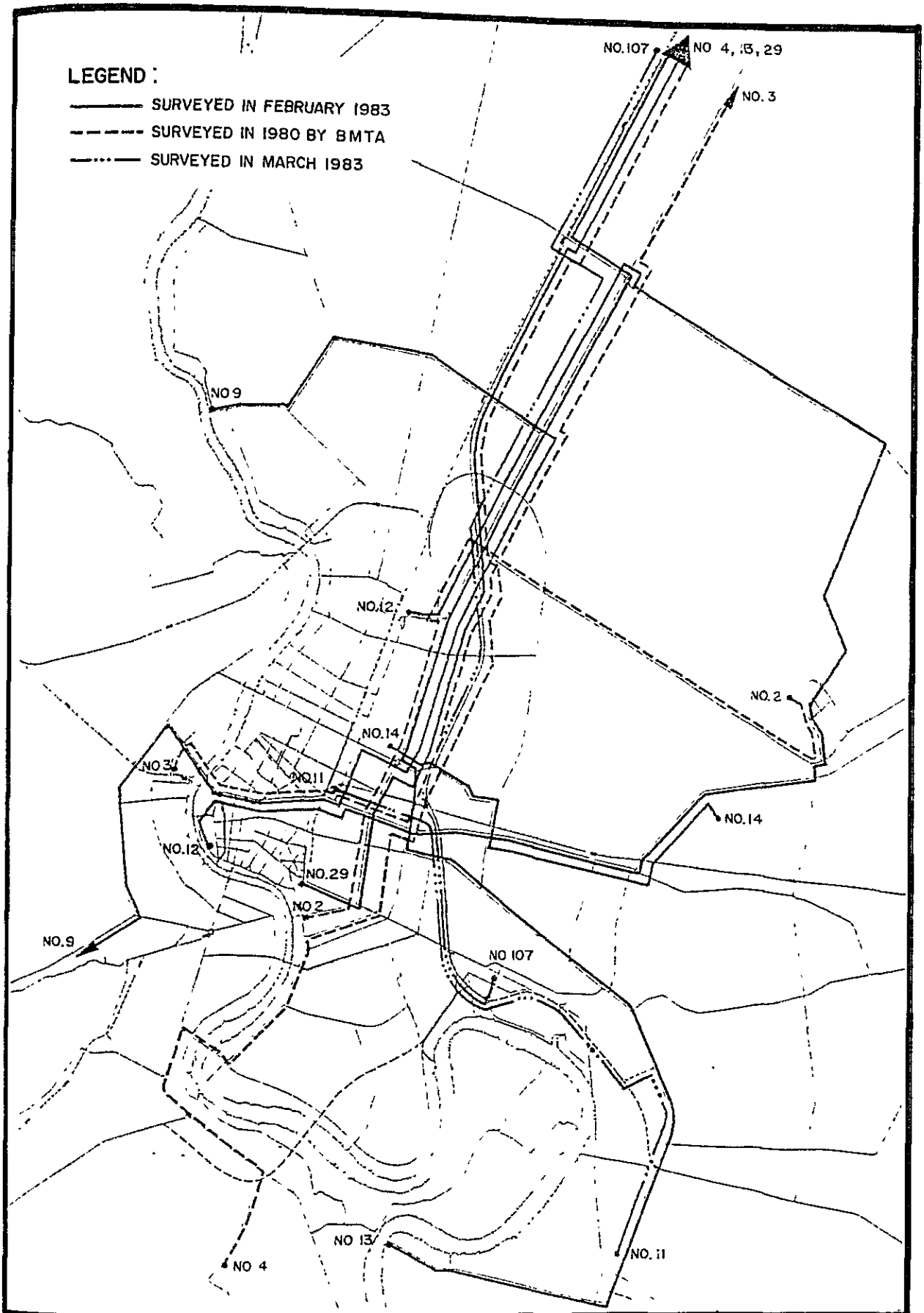


FIG. 7 - 1 AIR CONDITIONED BUS ROUTES : PASSENGERS INTERVIEWED

THE SECOND STAGE EXPRESSWAY SYSTEM IN THE GREATER BANGKOK

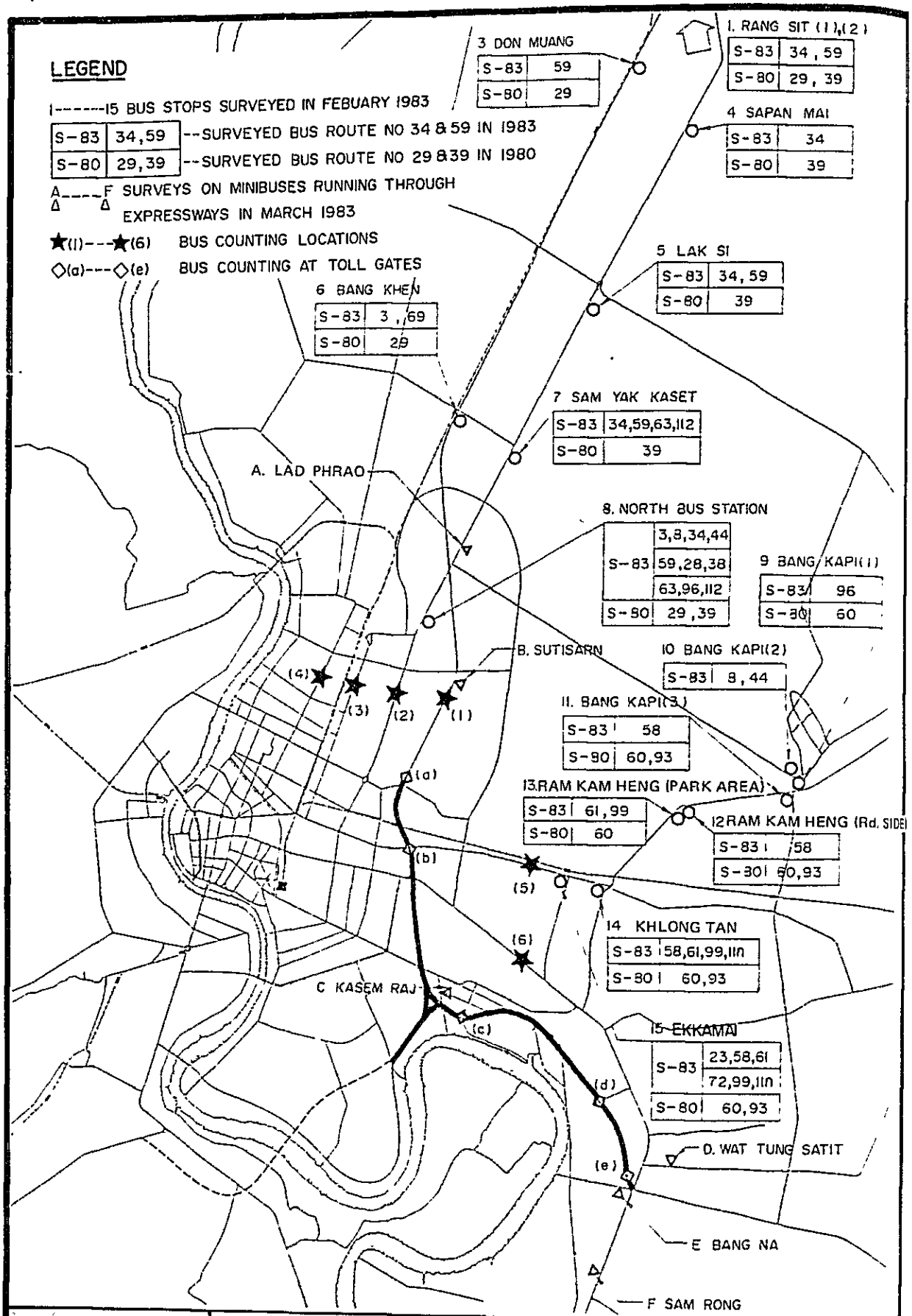


FIG. 7 – 2

NORMAL BUSES : PASSENGER INTERVIEWING AND BUS COUNTING LOCATIONS

THE SECOND STAGE EXPRESSWAY SYSTEM IN THE GREATER BANGKOK

(3) Trip Purpose

It is found that passengers on business are quite small in two or three percent both on the air conditioned and the normal buses, while students going to school have approximately the same percentage on the air conditioned buses and normal buses.

	On Business	Home to School
Persons using the air conditioned buses on roads in GBA	(3%)	(15%)
Persons using the normal buses on roads in GBA	(2%)	(16%)
Persons using the buses (air conditioned and mini buses) through the Expressway	(2.4%)	(4%)
(Persons interviewed in July 1982, who answered the use of buses)[1])	(3.4%)	(20.5%)

(4) Additional Fare

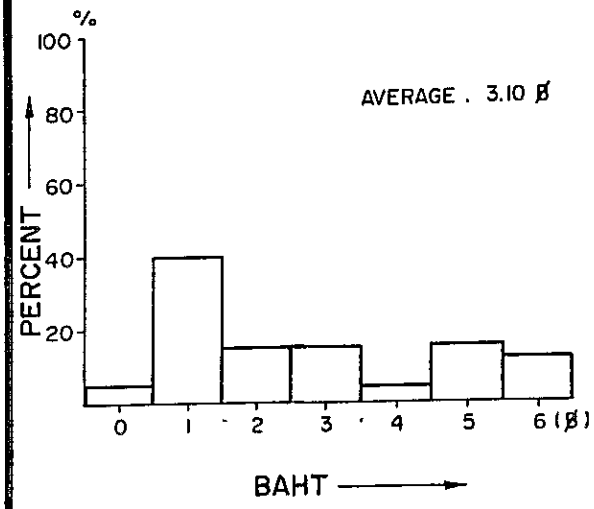
A question was asked to find the passengers' preference of time saving at the payment of additional Baht. For a supposed bus service on the Expressway which might be constructed somewhere along the existing bus route, passengers may pay additional bus fare. They will pay for comfort and savings in travel time. The average amount of additional fare for hypothetical normal buses on the Expressway is shown in Fig. 7–3 and stated as follows:

Classified	Average Additional fare they will pay
1) Persons using the air conditioned buses on roads in GBA. (Currently, they pay 5 ฿ – 7 ฿ in most cases, say 6 ฿ in average)	3.63 Baht
2) Persons using the air conditioned buses through the Expressway. (Currently, they pay 5 ฿)	1.66 Baht
3) Persons using the normal buses on roads in GBA. (Currently, they pay 1.5 ฿ in most cases)	3.10 Baht
4) Persons using the mini buses through the Expressway. (Currently, they pay 5฿ in most cases)	2.11 Baht

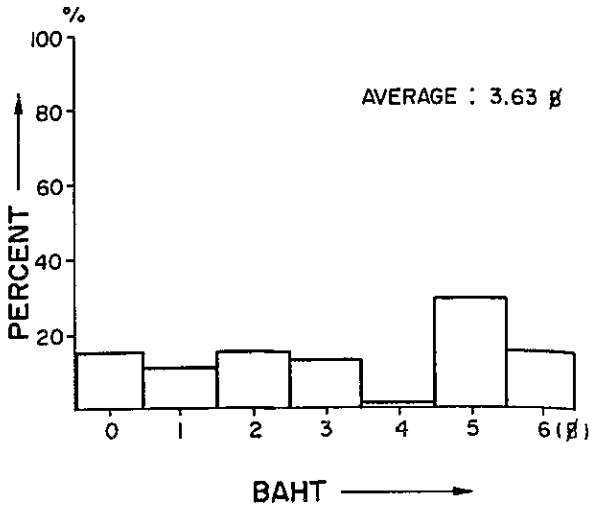
It would mean the first group shows the payable fare of 1.50 + 3.63 = 5.13 ฿ for a normal bus service through a supposed Expressway. However, actual users of the Expressway bus service in the air conditioned buses say that they will pay the fare of 1.50 + 1.66 = 3.16 ฿ on a normal bus service through the Expressway. The latter comes from the actual users and is considered to be more realistic in evaluating the service of buses via Expressway.

Notes: 1) From Appendix Table 4–14.

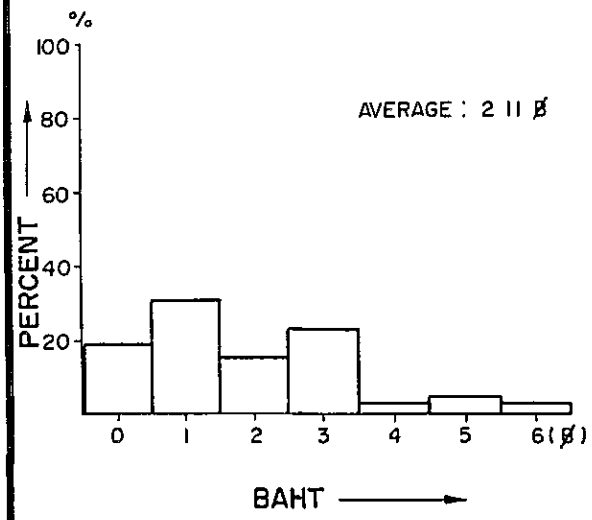
NORMAL BUSES
AT BUS STOPS



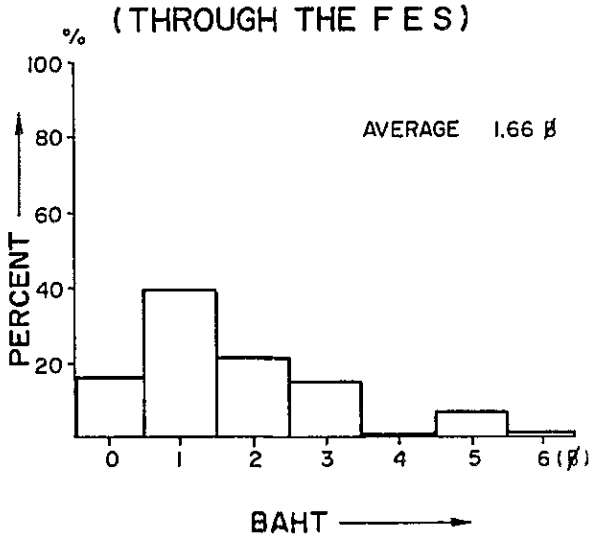
AIR CONDITIONED BUSES



MINI BUSES (THROUGH THE F E S)



AIR CONDITIONED BUSES
(THROUGH THE F E S)



LEGEND :

0: NO INCREASE
1 . 1 BAHT
2: 2.5 BAHT
3: 3.5 BAHT
4: 4.5 BAHT
5: 5.5 BAHT
6: 6.5 BAHT

FIG. 7 – 3	ADDITIONAL PAYMENT FOR NORMAL BUS SERVICE THROUGH THE EXPRESSWAY

THE SECOND STAGE EXPRESSWAY SYSTEM IN THE GREATER BANGKOK

Passengers using the normal buses 3) in the above answer the additional fare of 3.10 Baht for supposed normal buses through the Expressway. However, those on the mini buses in 4) who pay 5 Baht in most cases through the Expressway answer an average additional payment of 2.11 Baht for the normal bus service on the Expressway. It is likely that the current users assess the 5 Baht fare too high and they expect the fare should be around 1.50 + 2.11 = 3.61 Baht.

The above two figures of 3.16 and 3.61 Baht seems to indicate a range of fare of bus using the Expressway.

(5) Movement of Passengers

Inter bus-stop movement of passengers in OD matrices were produced by this survey in 1983 and by BMTA in 1980. The study of the available OD matrices of bus passengers resulted in a summarized movement of passengers in the corridor areas. The pattern is shown in Fig. 7–4.

- In the N–S corridor, of those generated from Rang Sit-Don Muang-Lak Si-Bang Khen areas, nearly 30% terminate at Lad Phrao-North Bus Terminal area and 30% go further south.
- In the East Corridor, of those generated from Bang Kapi-Ram Kam Haeng area 15% reach at Victorry Monument area and 35% in the inner city area.

The average trip lengths of passengers on selected routes were found as follow. It seems the average trip length of passengers on air conditioned buses is larger by 40% than that of those on normal buses.

N–S corridor	No. 29 (Rang Sit–Hualumpoang) (Air conditioned buses)	10.4 km
	No. 29 (Rang Sit–Hualumpoang) (normal buses)	7.3 km
East corridor	No. 12 (· · · · · Bang Kapi–Pakhlongtalad) (air conditioned buses)	8.7 km
	No. 60 (Khlongchan–Pakhlongtalad) (normal buses)	6.2 km

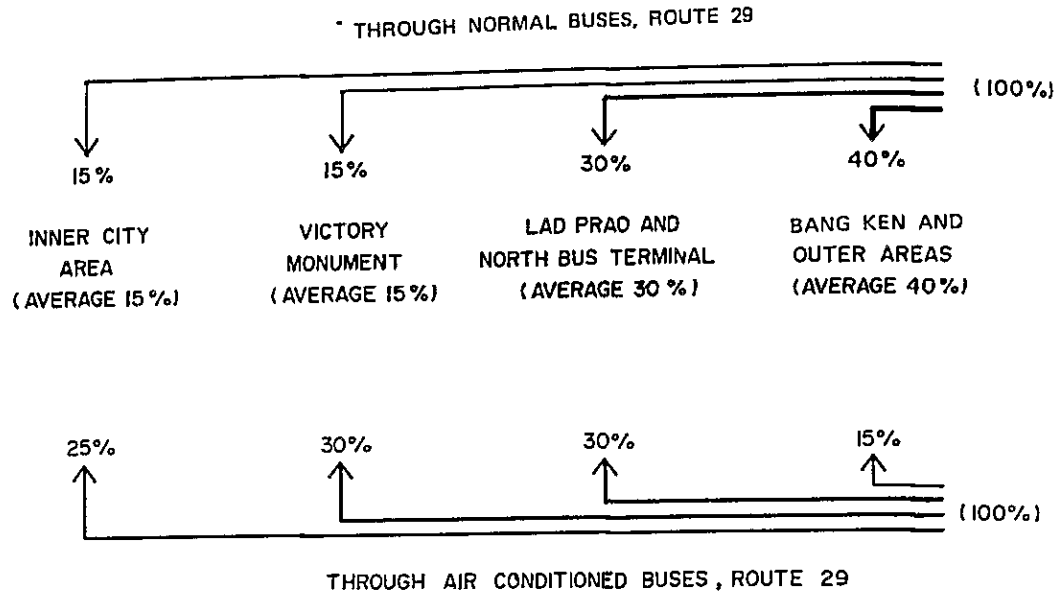
(6) Others

The other results of the survey are compiled itemwise in Appendix 7.2.

7.3 Analysis of Bus Operation on the SES

The study of public bus service through the SES is stated in this section. The study is based on the assumption that all bus trips using the Expressway will be diverted from the existing BMTA bus routes. A review on the public bus routes and their operation which should recommended new routes and operation of the public buses are not in this project study. An overall concept of the study is shown in Fig. 7–5.

NORTH – SOUTH CORRIDOR



EAST CORRIDOR

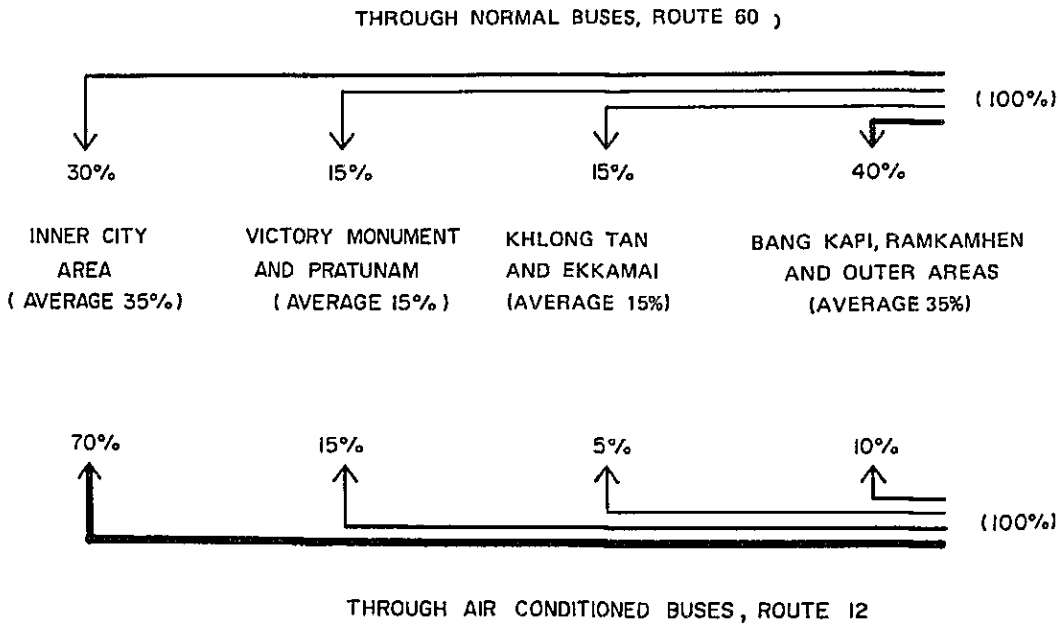


FIG. 7-4 A TYPICAL PASSENGERS FLOW FROM OUTER AREAS

THE SECOND STAGE EXPRESSWAY SYSTEM IN THE GREATER BANGKOK

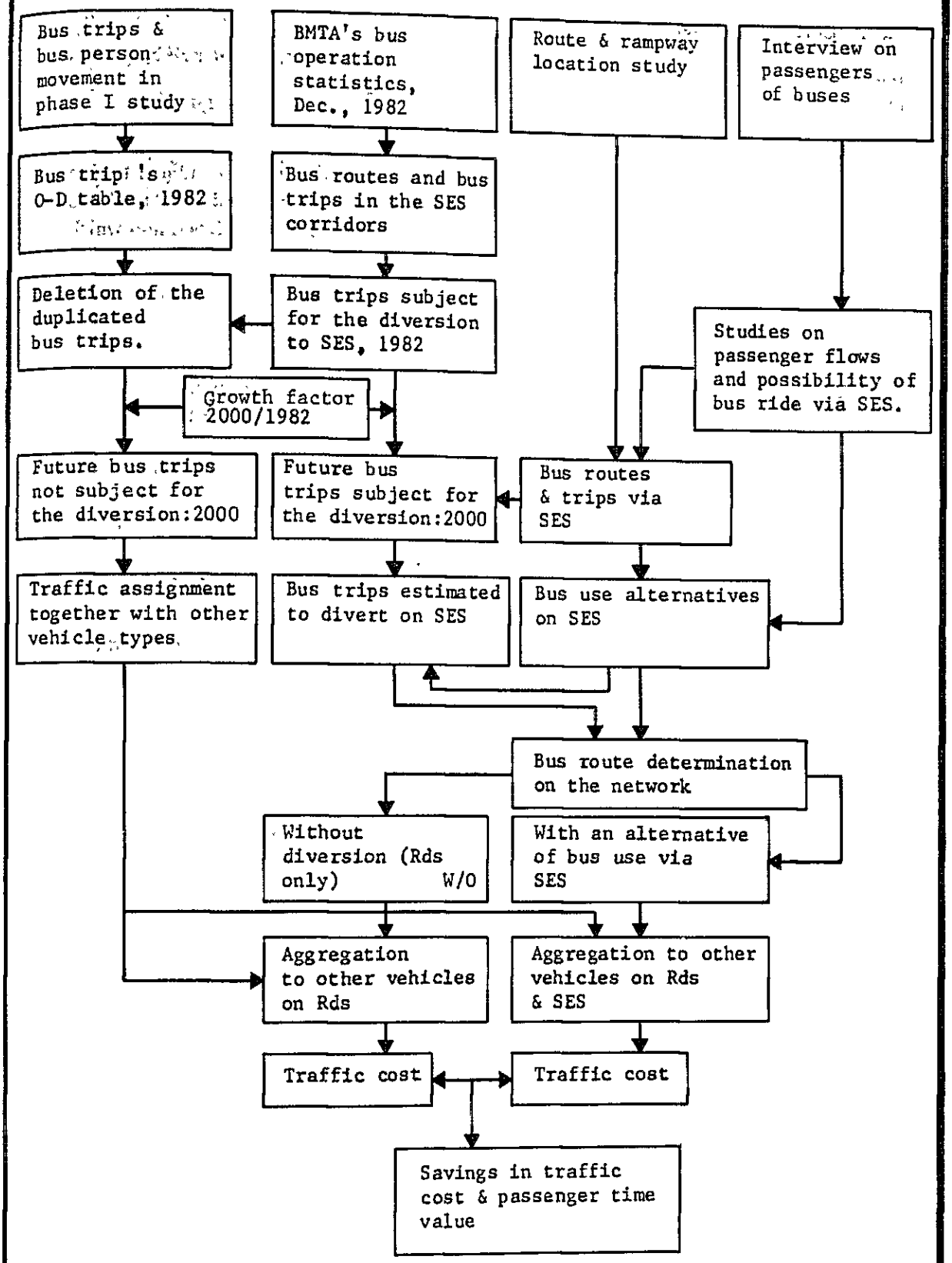


FIG. 7-5 FLOW CHART OF BUS SERVICE THROUGH THE EXPRESSWAY

THE SECOND STAGE EXPRESSWAY SYSTEM IN THE GREATER BANGKOK

7.3.1 BMTA Bus Operation Statistics

BMTA showed the following data to the Study Team. While the data covered all bus routes in the GBA, this study used those running the corridors of SES.

(1) Route Map

BMTA has provided a map indicating the existing bus routes under its administration in 1982. The map shows the bus routes of air conditioned bus and of normal bus together with the origin and destination, but not the air conditioned bus routes which began operation through the First Stage Expressway after the opening of Bang Na-Port section and all of mini buses.

(2) Operational Statistics in December 1982

MBTA has also shown the average daily operational figures in December 1982 of all routes in the map stated above in terms of total passengers carried, bus trips, revenue, etc.

(3) OD Table of Passengers among bus stops, 1980

Passengers' movement on the selected 30 bus routes was surveyed in 1980 by BMTA. The result was shown to the Study Team, from which the team selected the OD matrices of the routes which ran through the corridors of SES.

The total operational volumes of BMTA are summarized in Table 7–1. It is found that the total number of the BMTA bus routes was 136, the total operational length 3,200 km, the total buses assigned in daily operation 4,400 coaches, the total bus trips 39,000 and the total number of passengers carried was 3.8 million. The average distance of air conditioned bus routes was 38 km, while that of normal bus routes was 21 km.

TABLE 7–1 BMTA BUS OPERATION IN DECEMBER 1982 : SUMAMRY

	Items	Air Conditioned Buses	Normal Buses	Total
1	Total number of bus routes	17 (12.5)	119 (87.5)	136 (100%)
2	Total length of routes in km	645.1 (20.3)	2,533.72 (79.7)	3,178.82 (100%)
3	Bus coaches in operation – vehicles –	462 (10.5)	3,942 (89.5)	4,404 (100%)
4	Numbers of bus trips – bus trips/day –	2,152 (5.6)	36,376 (94.4)	38,528 (100%)
5	Numbers of bus passengers – persons/day –	165,492 (4.4)	3,609,703 (95.6)	3,775,195 (100%)
6	Average distance of bus routes – km/route – (2/1)	37.9	21.3	23.4
7	Average number of bus trips – bus trips/day route – (4/1)	126	306	283
8	Average number of passengers per route – persons/day route – (5/1)	9,734	30,334	27,758
9	Average number of passengers per bus trips – persons/day bus trip – (5/4)	76.9	99.2	98.0

Source : BMTA, February, 1983
Remarks: ( ) in percentage
(/) an item-wise calculation

7.3.2 Bus Routes and Trips in the SES Corridors

(1) Selected Bus Routes Subject for the Diversion to the Expressway

Bus routes running the corridors of the SES were studied to find a possibility of bus trip diversion to the Expressway. The bus routes subject for the diversion analysis were determined by the following criteria:

- The bus route ran in parallel and close to the proposed Expressway, the N-S route and E route.
- The section in parallel to the proposed Expressway should have a length enough to cover three or more rampways. If the section ran in parallel for a short distance of 3 km, 2 km, or less or only crossing the corridor, this bus route was deleted.

Selected bus routes were 40 in total (12 air conditioned and 28 normal bus routes), being classified by screening section as in Appendix Table 7–20. It presents the origin-destination of the route, distance, bus coaches, bus trips, and passengers per route.

Table 7–2 presents the summarized figures of the operated buses crossing at the screen sections in 1982. Fig. 7–6 shows the location of the screen sections placed in the SES corridors. Buses passing the A-A' section of the N-S route was 5,175, the B-B' section of the E route 2,828 and the C-C' section of FES 3,514 trips. These trips are formulated in Bus Trip OD matrices in the following subsection (2).

TABLE 7–2 SELECTED BUS ROUTES IN THE CORRIDORS

		Air Conditioned Buses	Normal Buses	Total
A-A'	1)	7	13	20
(Super Highway	2)	43.3	27.8	33.2
Phahol Yothin	3)	191	566	757
Rama VI)	4)	125	331	259
	5)	10,602	45,527	33,303
B-B'	1)	2	8	10
(New Petchaburi)	2)	30.5	21.8	23.5
	3)	38	290	328
	4)	129	198	141
	5)	9,173	23,877	16,437
C-C'	1)	4	8	12
(Sukhumvit	2)	37.3	24.1	28.5
Rama IV)	3)	143	364	507
	4)	155	362	293
	5)	12,946	46,832	35,537
Total	1)	12[6)]	28[6)]	40[6)]
	2)	38.5	25.0	29.0
	3)	315	1,168	1,483
	4)	130	334	273
	5)	10,220	43,413	33,455

Source : BMTA, February 1983

Notes : 1) The number of the bus routes
2) The average distance of the bus routes
3) The number of bus coaches in operation
4) The average bus trips per route
5) The average passengers per route
6) Routes Nos.13 and 38 are counted both in A-A' and C-C'

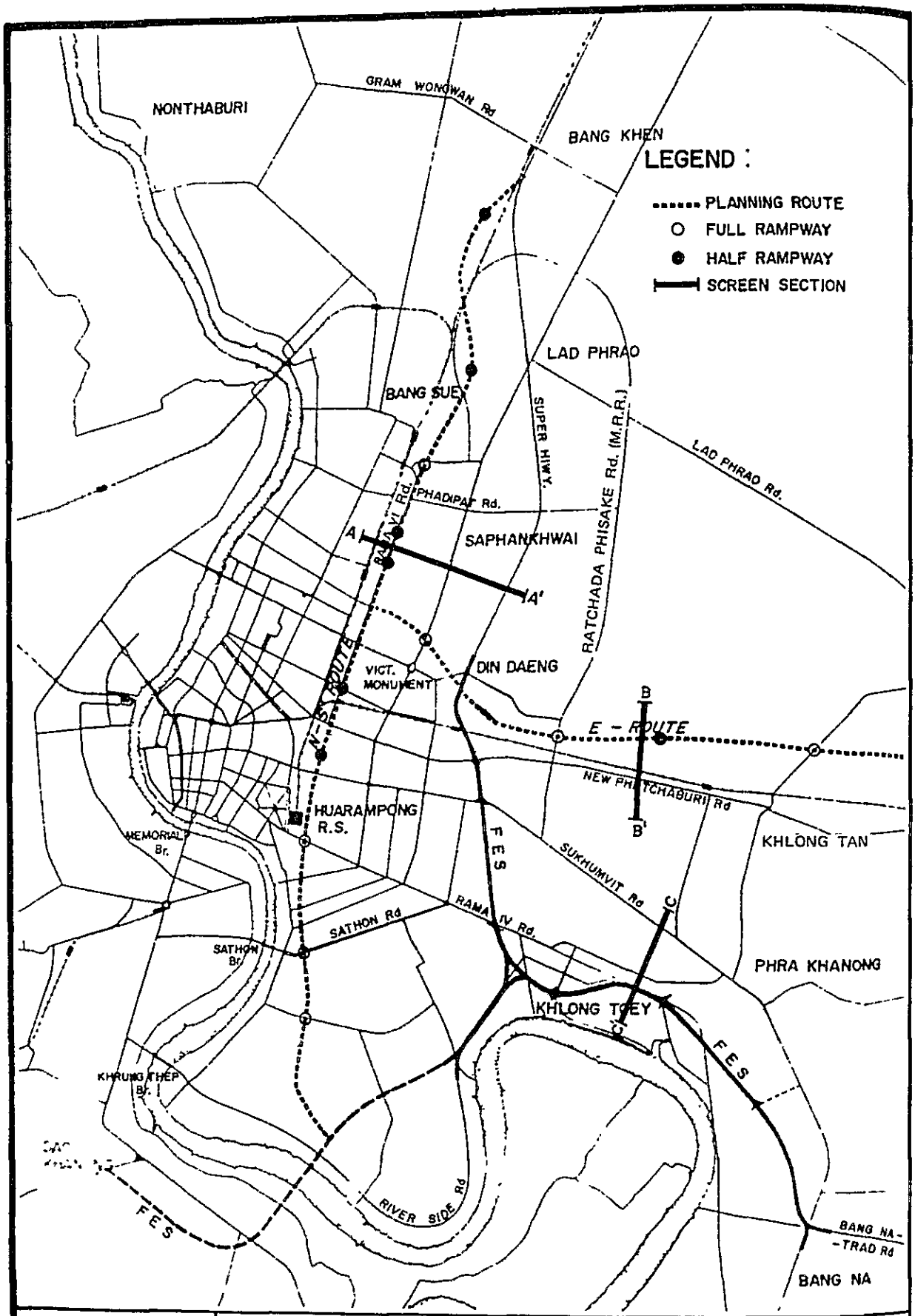


FIG. 7 – 6

LOCATION OF THE SCREEN SECTIONS

THE SECOND STAGE EXPRESSWAY SYSTEM IN THE GREATER BANGKOK

It is to be noticed that the bus routes in the corridor of FES, particularly along the Port-Bang Na corridor cannot be excluded from the study, since buses and other traffic would use the integrated network of FES and SES. Buses running along the Port-Bang Na section was studied simultaneously in this analysis.

(2) Bus Trip Origin-Destination Matrices

a) Bus Trip O-D Matrices in 1982 Subject for Expressway Diversion

Bus trip O-D matrices produced as in Chapter 4 were one for private buses and the other for public services. Both were a straight conversion from the person trip matrix originated from the BTS of 1972 using an average occupant figure and adjusted for 1982 using the BMTA statistical data and the registered buses.

The private bus trip matrix remained untouched. However, the public bus trips were divided into two matrices: one not related to the estimate of the Expressway buses (i.e. The bus trips developed from the person trip matrix mentioned above. They served only on the ordinary roads and not subject for diversion) and the other related to the estimate of the bus service on the Expressway.

The bus trip matrix of the above latter case is developed by the analysis stated in Appendix 7.3. The matrix is limited to those bus trips which run through the corridors of SES and is further classifiable to those serving through the Expressway (diverted buses) and those remaining on the ordinary roads.

b) Bus Trip Matrices in Future Years Subject for Diversion

Growth factors for the future years in bus passenger volume were determined by using the overall growth factors of bus passengers in the GBA referring to Chapter 5. Average occupant per bus was assumed as 47 persons in 1982 and 40 persons in 1990, 2000 and 2010. Total Bus Trips subject for diversion to the Expressway are summarized in Table 7–3 and the details are in Appendix 7.3 and Appendix Table 7–20.

TABLE 7–3 BUS TRIPS SUBJECT FOR DIVERSION IN THE CORRIDORS OF SES

	1982	1990	2000	2010
A–A'	5,175	7,210	8,630	9,430
B–B'	2,828	3,940	4,710	5,150
C–C'	3,514	4,900	5,860	6,400
TOTAL	11,517	16,050	19,200	20,980
(Growth Factor)	(1.000)	(1.394)	(1.667)	(1.822)

7.3.3 Alternative Bus Service Plans

When the public bus trips use the tolled expressway, a number of bus service systems should be taken up as alternative plans, among which the most viable plan is to be selected. In the SES study four plans were studied and assessed from traffic and engineering view points. The first two alternatives were considered as realistic approaches, while the latter two plans were extensive in scale and found better to be studied in a separate project.

(1) Passing Through Service

This plan proposes the operation of bus trips running through the Expressway in mixture with other vehicles. No stopping on the Expressway is assumed. On and off of the passengers are at bus stops on the ordinary roads. No capital investment is necessary on the Expressway.

Studying the movement of passengers on the bus routes in the corridor, certain bus trips can be assigned to use the Expressway. The diverted bus trips will use relatively longer distances on the Expressway and serve the passengers in shorter travel time than the route on ordinary roads. The buses will be for those from the stops before coming in the Expressway to the stops beyond the off-rampway.

The plan can be implemented when Land Transport Department, BMTA and ETA agree on the routes, service, fare etc. It is a conventional and realistic approach in the improvement of the mass transit system. The plan is selected for the comparative study.

(2) Bus Stopping Bay

It proposes the construction of bus stopping bay on certain points on the Expressway. Public buses using the Expressway are able to stop at these bays letting passengers off and on. Compared with the case (1) above, this system will increase the passenger volume because of the availability of on-off points of passengers on the midway of the Expressway, while the travelling speed on the Expressway will be lower than the case (1) because of the stopping. If the bus bay is constructed just close to a main ordinary road or a transport core, the serviceability will increase. The concept is shown in Fig. 7–7.

There are two types of the bus bay proposed: one is the bus bay installed at the same level of the Expressway through-lanes and the other is on the rampway between the Expressway and a ordinary road. Typical patterns of these types are shown in Fig. 7–8.

a) Bus Bay Beside the Through-Lane

The bus bay is proposed at the side of through-lane of the Expressway. Passengers have to step up or down the foot steps of 8 m to 9 m height or to use an elevator from the ground to the surface level of the Expressway. The area of a bus bay would be a width of 10 m and a length of 400 m. It should be located away from the rampway since the stopping buses can not conflict with the weaving traffic which use the on and off rampways.

b) Bus Bay on the Rampway

It is to be constructed on off-rampway or on entering rampway before or after passing the toll gate. Passengers would not need to move up or down the height of the Expressway as in the case of a). The bay area can be smaller because the traffic speed on the rampway is substantially low and require shorter decelerate/accelerate approaches. The buses travel time would be longer because they have to come out, stop at the bay and after passing the toll gate come again on the Expressway. The construction cost will be quite less than the case (a). The rampway should be wide and long enough to minimize the effect of bus movement at

FIG. 7-7 THE BUS BAY AND THE SERVICEABILITY

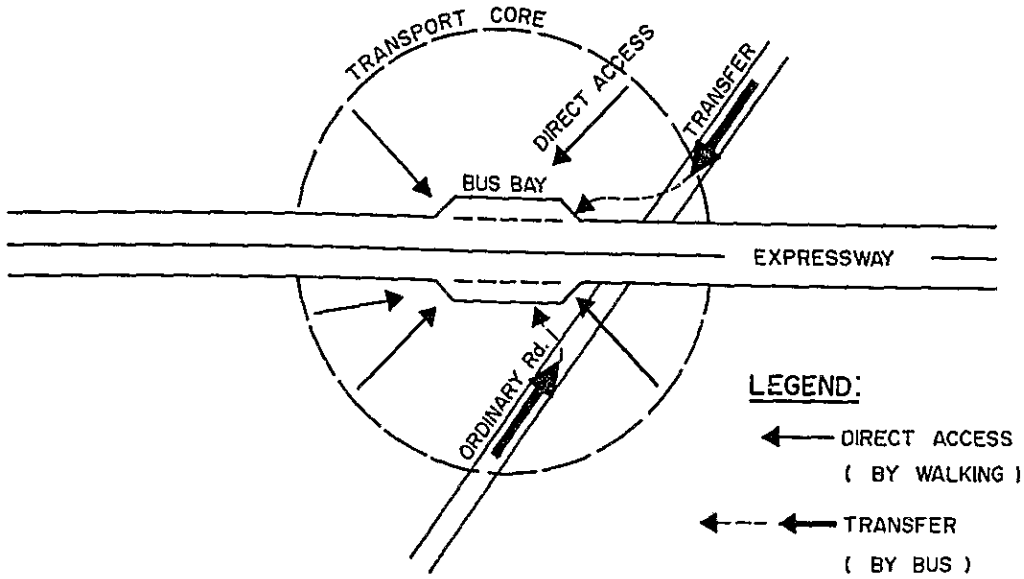
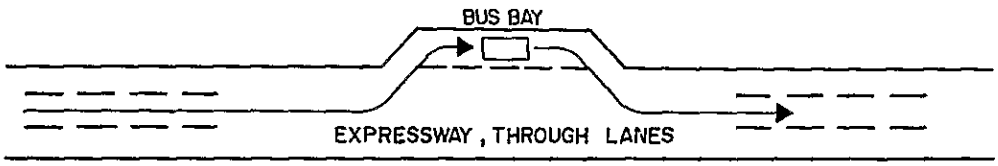
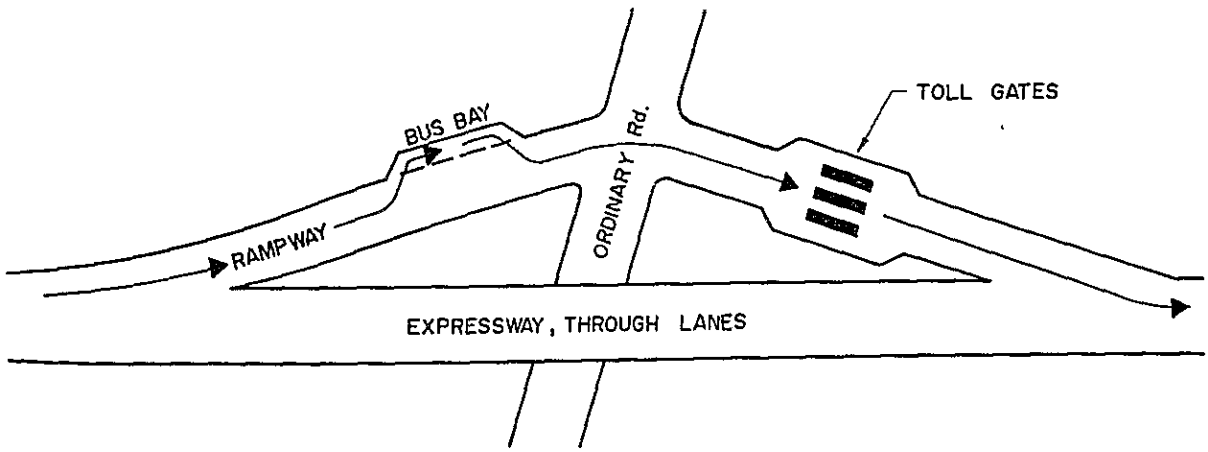


FIG. 7-8 BUS BAY ALTERNATIVES

1. BESIDE THE THROUGH LANE



2. ON THE RAMPWAY



the bus bay. Fig. 7–8 presents the feature of a bus stop along the rampway and the section of 7.4 compiles a preliminary study.

The bus bay plan attracts more users than the case (1) of "Passing Through", since the bus bay on certain points of the SES gives them more accessibility. The problem is the construction of additional bus bay on the Expressway. However, if it is realized it will serve in the improvement of the transport system in the GBA. The plan is selected as an alternative to be compared in 7.5 of this Chapter.

(3) Bus Lane

The plan proposes to separate a lane with a fence or marking, on which only public service buses are designated to use. It can be operated with either (1) or (2) above. Two plans in this category are considered:

a) Construction of an Additional Lane

The plan would raise serious difficulty in obtaining ROW, because it is considered the ROW acquisition larger than the ongoing Expressway plan is not realistic because of locations of many control points. Particularly, the urbanized area in Bangkok is densely developed and seems very difficult to acquire additional land for the construction.

b) Designate One Lane for Bus Use

Currently the SES proposes three through-lanes on the Expressway as similar to the FES. If one lane is used exclusively for public buses, the capacity of the remaining two through-lanes will be too small to the forecasted traffic in the coming years. The buses using the lane monopolistically, on the other hand, would be less than the capacity level. There will be heavy conflict with other vehicles in high speed traffic flow since the vehicles using on and off ramps, at 2 km interval in average on the SES, have to cross the designated bus lane.

The bus lane plan is not taken in this study. It should be studied from a different view point such as a monopolistic-bus-using-expressway plan.

(4) Bus Terminal

The plan proposes the construction of new bus terminal areas which directly link with the Expressway, giving public bus service through the Expressway a major role in the mass transit service particularly between the central area and suburban residential areas. It may require review of the bus system in the corridors or the GBA because the use of the new terminal will improve the bus service on the ordinary roads simultaneously.

Review on bus routes, passengers' movement and field investigation have resulted in some preferable sites for the bus terminnal facilities. Of which two candidate locations are found in the inner area of GBA in association with SES. They are Hualumpong Railway Station area and Victory Monument areas. Both areas have been developed well. The location of new bus terminal will require an extensive study and a redevelopment program of the areas.

The bus terminal plan will require preparatory studies on approach ways, platform and passengers' movement, traffic operational system, other facilities and economic-financial consequences. It should be prepared together with an overall bus service development plan in the GBA. It is out of the scope of this project study.

(5) Selection

The alternative plan (3) of Bus Lane is found unrealistic from engineering viewpoint and ROW acquisition problem. The plan (4) Terminal is also unrealistic because the plan is better studied through a comprehensive bus system development plan and a urban renewal plan, in addition to the reasons stated in (3).

It is recommended these two plans should be studied in a separate approach which would explore a solution towards a better mass transit transportion service.

The alternatives (1) and (2) are modest in the scale of investment. However, they can be a realistic and conventional solution in the sense that the original feature of the SES would not be altered. This proposal is considered to enhance the contribution of the Expressway on the over all transport system of the GBA.

It is found these plans (1) and (2) are worthy for further study. Associated with the plan (2), the location of bus bays is studied in the following sub-section of 7.3.4. At each location, the suitable type of the bus bay is selected as stated in Section 7.4 of this chapter.

7.3.4 Location of Bus Bays

The favorable locations for bus stop bay were studied from the view points of passenger demand, engineering view points and ROW acquisition. These studies were stated in Appendix 7.4. The resultant locations were three in total as shown in Fig. 7–9.

a) Location 1, km 7.0 on N–S Route

Bus stop bays on the rampways to Rama IV Road. It will serve as a transfer point to other buses passing ordinary roads and a transport core point of the Hualumpong Railway Station as well.

b) Location 2, km 12.5 on N–S Route

Bus stop bays beside the through-lanes of the Expressway near Pradipat Road. It was determined because the bus stop would serve as a transfer point for those to and from the large commercial area of Saphan Kwai, 2 km away along the Pradipat Road.

c) Location 3, km 5.5 on East Route

Bus stop bays beside the rampways on and off the Expressway. The buses should turn off the through-lane of the Expressway, stop at the bay, cross the Middle Ring Road, pass the toll gate and re-enter the Expressway. The bus bay and the middle ring road will develop as a transport core or a transfer point.

The type of a bus bay at each location was studied whether it should be constructed at the through-lane level or on the on-off rampway. The study is shown in 7.4 of this Chapter.

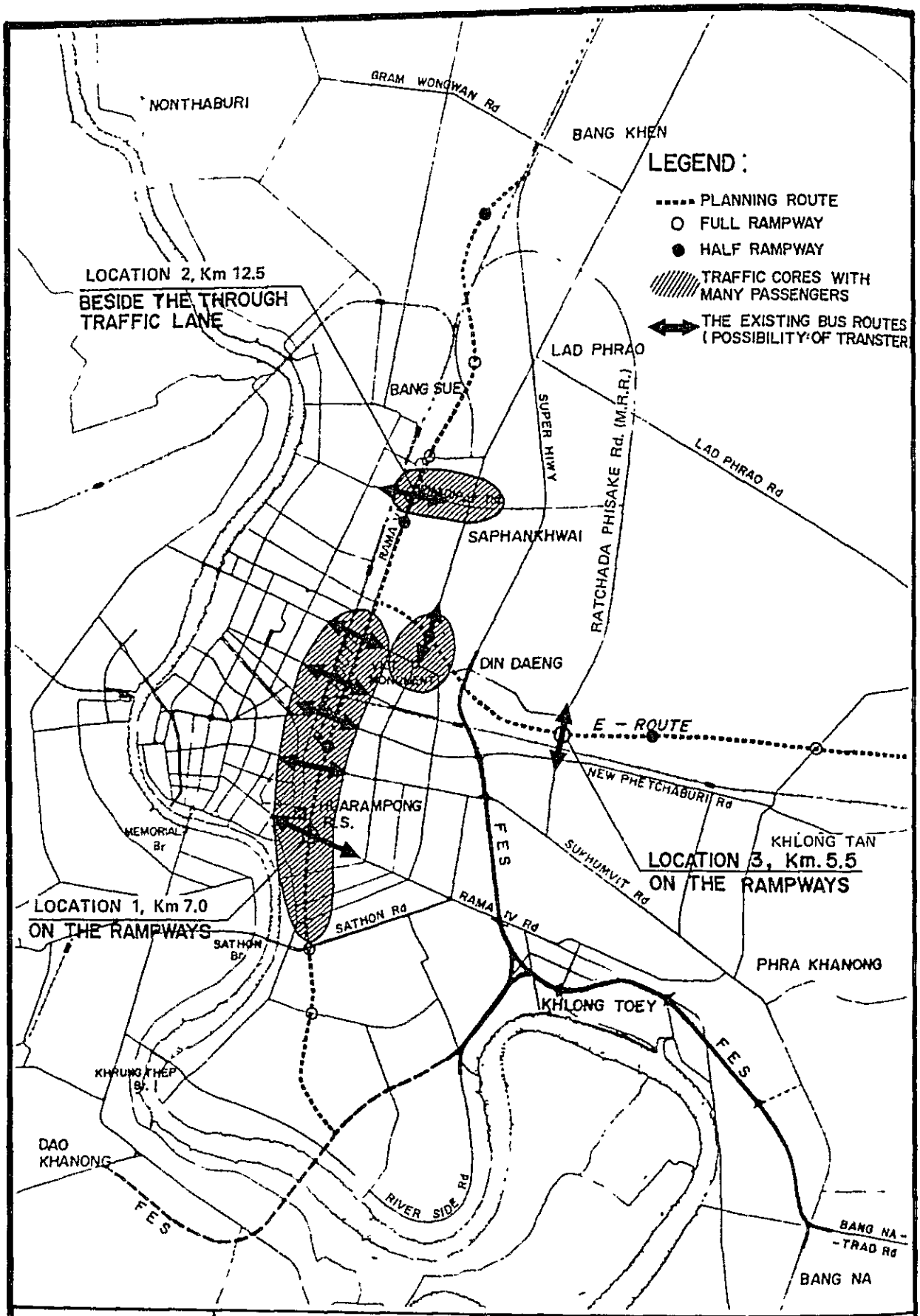


FIG. 7 – 9 LOCATION OF BUS BAYS ON THE SES

THE SECOND STAGE EXPRESSWAY SYSTEM IN THE GREATER BANGKOK

7.3.5 Forecast Public Bus Trips Using the Expressway

Bus routes and trips subject for diversion to the Expressway were determined as in Tables 7–4 and 7–5, respectively of this Chapter. The most likely diverted routes via the Expressway were studied for each route. No different diversion routes were assumed between the cases of the "passing through" and the "bus bay use". The difference of the two cases was measured by different volumes of bus trips.

In estimating the diversion volume, it is necessary to explore a relationship between the bus fares and passenger volumes just as that in a demand curve. Appendix 7.5 indicates an approach toward the estimate of optimal additional bus fare which would result in the maximum revenue on BMTA. The research on this relationship requires an extensive field survey and review on the BMTA's operation and pricing policies.

In this study, the influence of additional bus fare is not explicitly taken in the diversion estimate. Additional bus fare charge would reduce the users of the buses through the Expressway, however, the high speed buses would increase more passengers by attracting those who own and use the private vehicles and non-car persons as well. Thus, it is considered the diversion ratio assumed in this analysis will not change substantially, if the effect of additional fare is explicitly taken into account.

(1) Route Diversion

In determining the diversion routes to the Expressway, the following points were taken into account.

- Long distance use of the Expressway;
- No double entry into the Expressway; and
- The maximum number in diversion routes were three for an original bus route. In most cases, one route via the Expressway was quite common.

Typical cases of the Expressway use were classified as: Bang Khen–Victory Monument and Bang Khen-Rampways in the inner city area on the N–S route (Fig. 7–10), Khlong Tan-Victory Monument and Khlong Tan-Rampways in the inner city area on the N–S route (Fig. 7–11) and Bang Na-Rama IV Road, Bang Na-Victory Monument and Bang Na-Bang Khen via the FES route (Fig. 7–12).

(2) Bus Trip Diversion

Total trips of the original route subject for diversion were divided into those diverted trips with the route defined as in (1) above and those trips remaining on the original route. The diverted trips were estimated by the following formula:

(Diverted bus trips) = (Total bus trips subject for diversion)
x (The percent ratio of the passengers moving long distances on the total passengers of the route)[1])
x (The percent ratio of the diversion to the Expressway buses)[2])

where 1) came from the study on OD matrices of the BMTA referring to 7.3.1 of this Chpater. A representative figure was shown in Fig. 7–4.

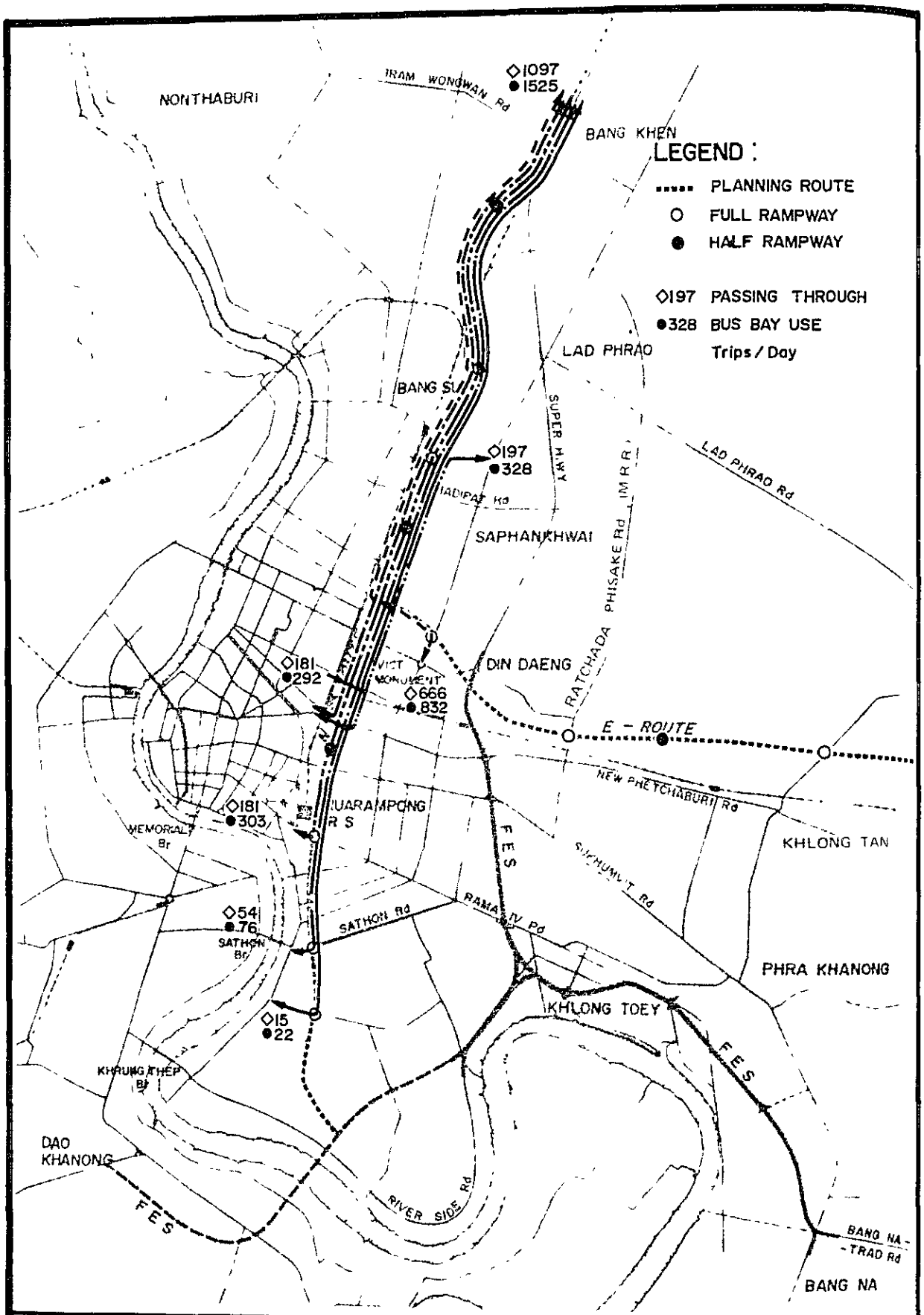


FIG. 7 – 10

DIVERTED BUS ROUTES AND TRIPS :
N – S ROUTE ; 2000

THE SECOND STAGE EXPRESSWAY SYSTEM IN THE GREATER BANGKOK

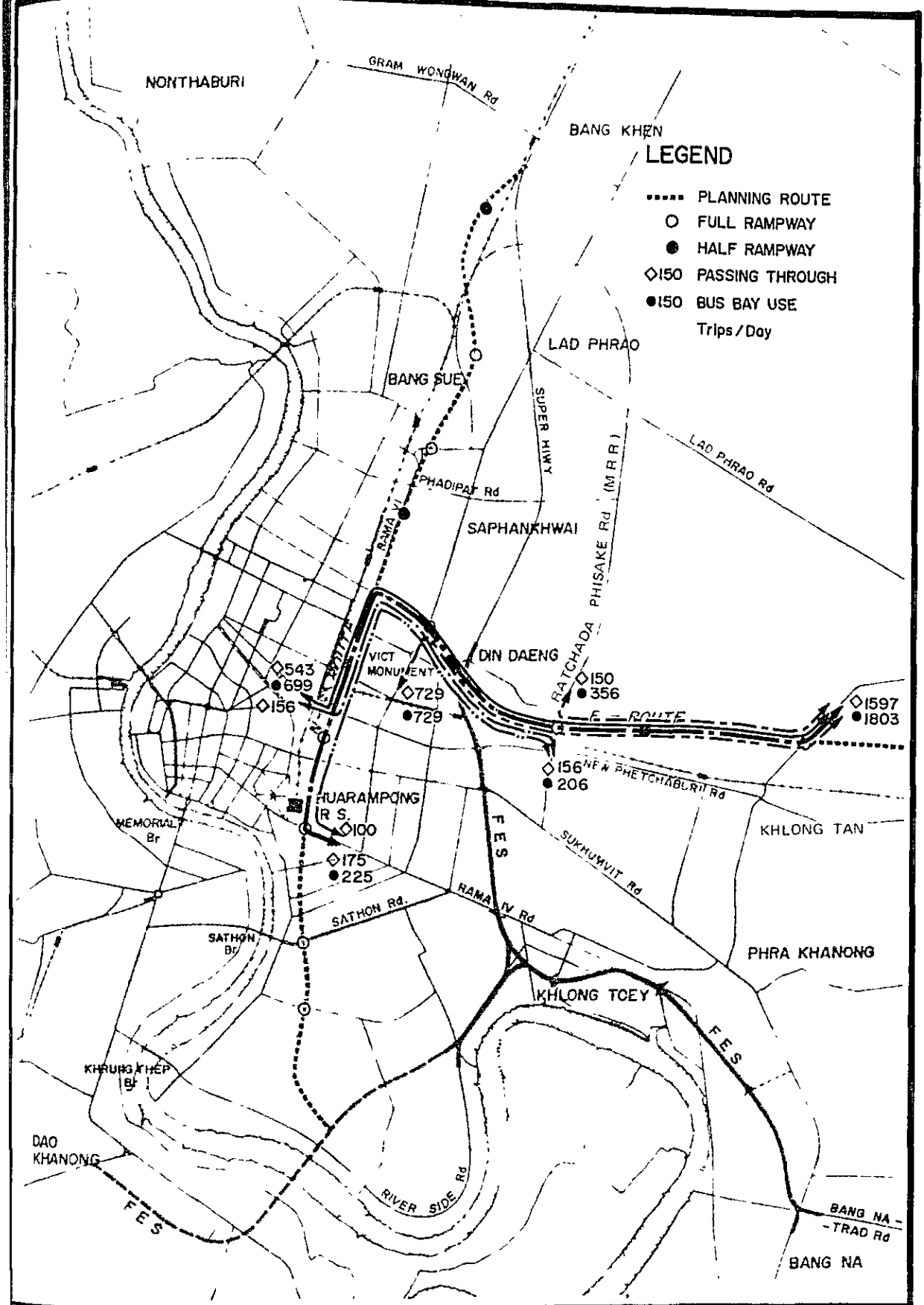


FIG. 7 – 11 DIVERTED BUS ROUTES AND TRIPS : EAST ROUTE ; 2000

THE SECOND STAGE EXPRESSWAY SYSTEM IN THE GREATER BANGKOK

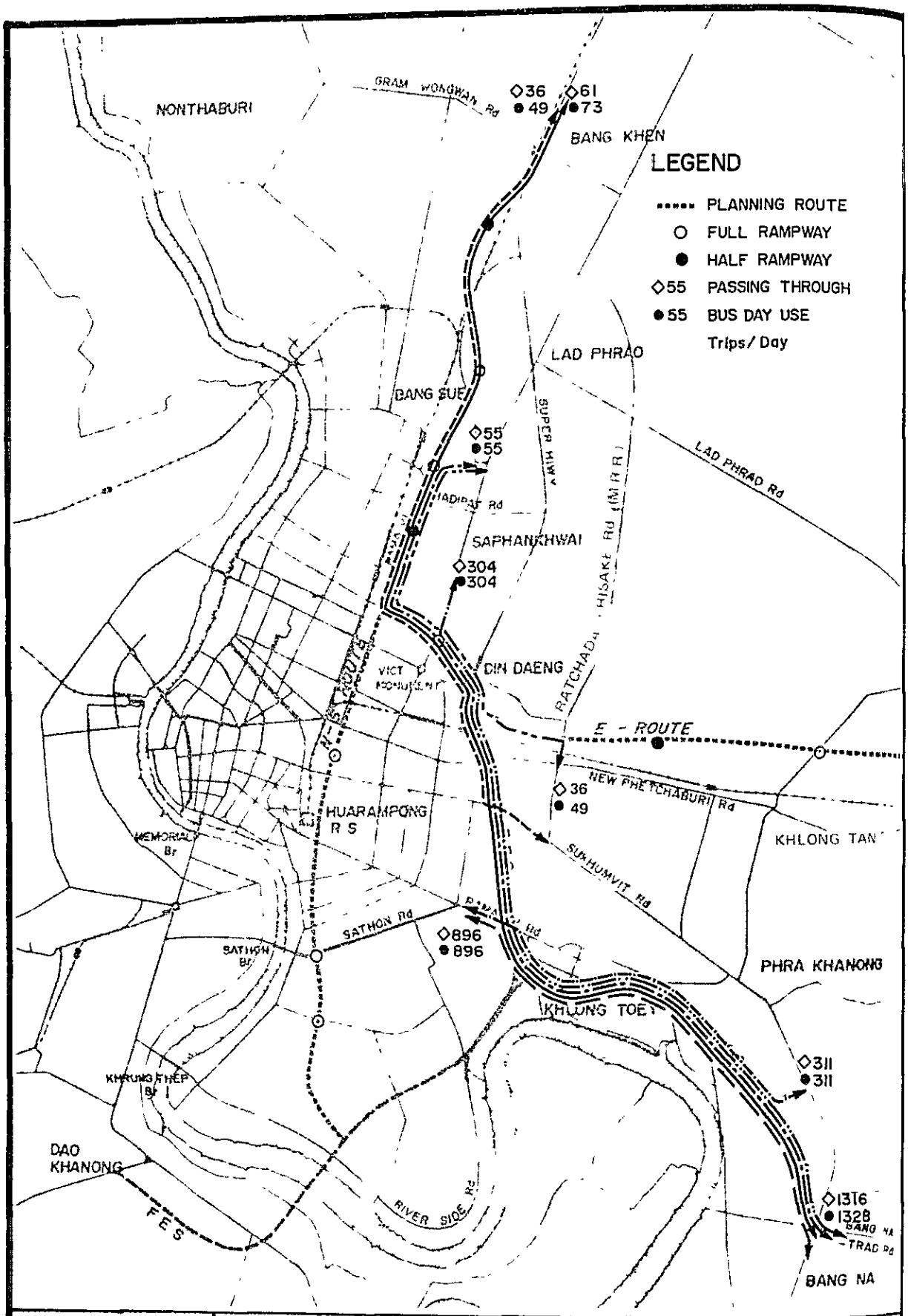


FIG. 7 - 12	DIVERTED BUS ROUTES AND TRIPS : FES ROUTES ; 2000

THE SECOND STAGE EXPRESSWAY SYSTEM IN THE GREATER BANGKOK

2) the percent ratio was determined by the result of the passenger interview as shown in Appendix Table 7–15. At the survey, 22.4% of those answered they would not use the buses through the Expressway regardless of the additional amount of bus fare. Accordingly, 1 – 0.224 = 0.776, 77.6% was used in this study.

The result is shown in Tables 7–4∿5 and Fig. 7–13, with the details in Appendix Table 7–21 to 7–23 and Appendix Fig. 7–10. Figs. 7–10∿12 also present the selected results. It would be 4,773 trips in the case of "passing through" and 5,744 trips in the case of "bus bay use". It was estimated that 21% of the buses crossing the screen section of A–A' would use the N–S route in the case of "passing through", while it increased to 28% in the case of "additional bus bay use". On the screen section of B–B' of the East route, 35% of the buses would use the Expressway in the "passing through" and increased to 40% in the "bus bay use".

In the case of FES, difference in trips was quite modest between the cases of "passing through" and "bus bay use", since the bus bay was not studied on the sections of FES.

TABLE 7–4 ESTIMATED TOTAL BUS TRIPS (1982)

(trips/day)

Section	Road Kind	Operation System		
		(A) Passing through	(B) Bus Bay use	(A) + (B) Total
A-A' (N-S Corridor Super Highway Phahol Yothin Rama VI)	Expressway	999 (20.5)	+350	1,349 (27.7)
	Ordinary Road	3,879 (79.5)	-350	3,529 (72.3)
	TOTAL	4,878 (100%)	-	4,878 (100%)
B-B' (E Corridor New Petchaburi)	Expressway	958 (35.0)	+124	1,082 (39.5)
	Ordinary Road	1,782 (65.0)	-124	1,658 (60.5)
	TOTAL	2,740 (100%)	-	2,740 (100%)
C-C' (FES Sukhumvit Rama IV)	Expressway	976 (27.1)	+7	983 (27.3)
	Ordinary Road	2,624 (72.9)	-7	2,617 (72.7)
	TOTAL	3,600 (100%)	-	3,600 (100%)

TABLE 7–5 ESTIMATED TOTAL BUS TRIPS (2000)

(trips/day)

Section	Road Kind	Operation System		
		(A) Passing through	(B) Bus Bay use	(A) + (B) Total
A-A' (N-S Corridor Super Highway Phahol Yothin Rama VI)	Expressway	1,665 (20.5)	+584	2,249 (27.7)
	Ordinary Road	6,467 (79.5)	-584	5,883 (72.3)
	TOTAL	8,132 (100%)	-	8,132 (100%)
B-B' (E Corridor New Petchaburi)	Expressway	1,597 (35.0)	+206	1,803 (39.5)
	Ordinary Road	2,970 (65.0)	-206	2,764 (60.5)
	TOTAL	4,567 (100%)	-	4,567 (100%)
C-C' (FES Sukhumvit Rama IV)	Expressway	1,627 (27.1)	+12	1,639 (27.3)
	Ordinary Road	4,375 (72.9)	-12	4,363 (72.7)
	TOTAL	6,002 (100%)	-	6,002 (100%)

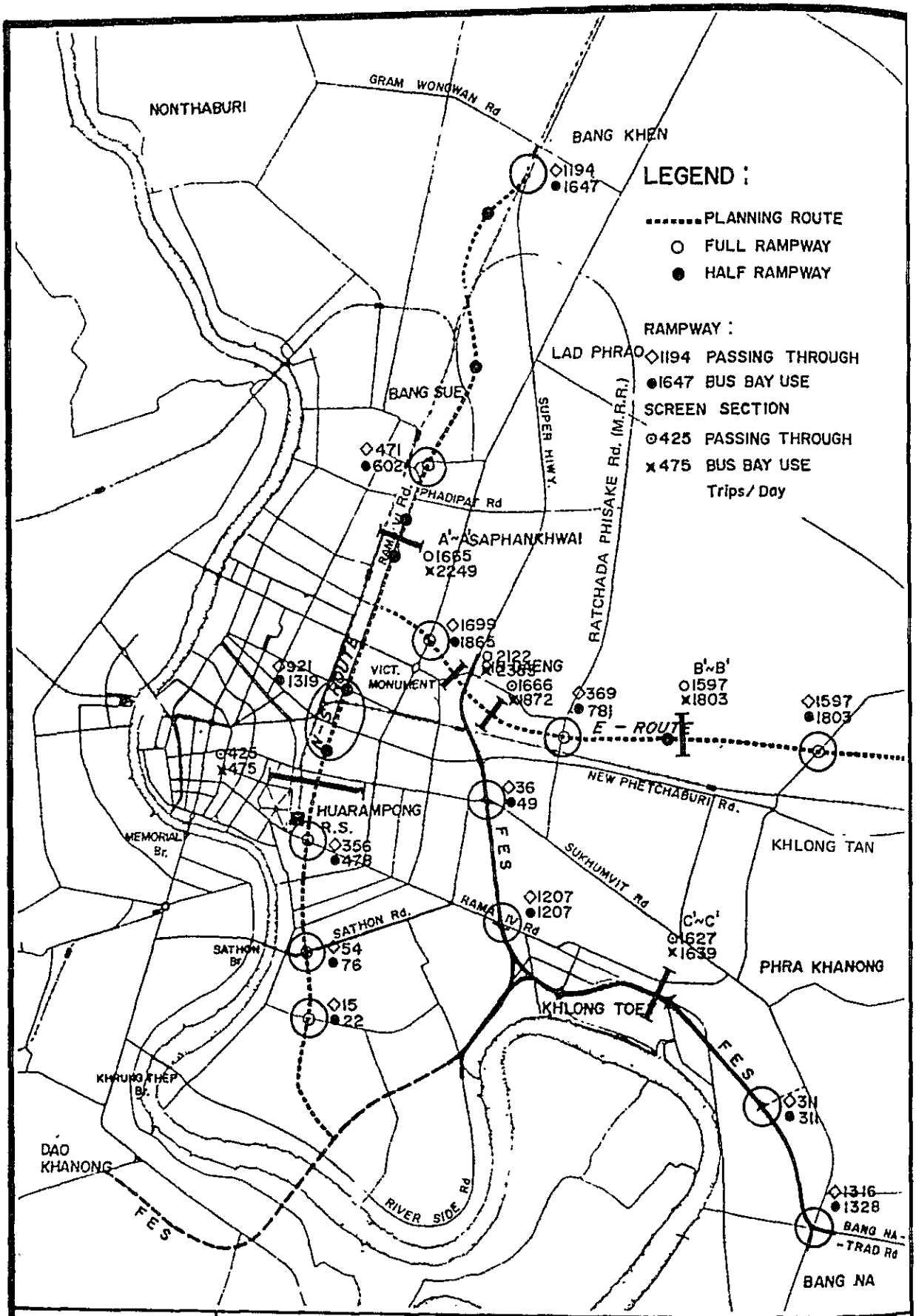


FIG. 7 - 13 DIVERTED BUS TRIPS AT EACH RAMPWAY AND AT SCREEN SECTION : 2000

THE SECOND STAGE EXPRESSWAY SYSTEM IN THE GREATER BANGKOK

7.4 Bus Bay Design

7.4.1 Background

Design and cost estimates of bus bays for the SES were conducted in this Section.

Three candidate locations were selected suitable for the bus bay construction. For these bus bays tow types were studied; Type A on the section of on/off rampway and Type B along the elevated Expressway.

Considering the characteristics of the above locations and the geometric feature of the Expressway, it was determined to apply Type A at Locations 1 and 3 and Type B at Location 2. The location with the selected type of bus bay is shown belows:

Location 1: N–S Route approx. sta. 7.0 km (2 bays .. Ground level structure)
Location 2: N–S Route approx. sta. 12.5 km (2 bays .. Elevated structure)
Location 3: E Route approx. sta. 5.5 km (2 bays .. Ground level structure)

7.4.2 Engineering Considerations

(1) Design Standards of Bus Bay

There are two types of bus bays due to the pattern of on-off ramps:

- One is A-type bus bay located at end of on or off ramp which is a diagonal pattern (Diamond Type); and
- The other is B-Type bus bay located at ramp between noses of on-off ramps of a loop pattern.

Design standards of A and B types, which are ground level and elevated structures respectively, were proposed as shown in Table 7–6.

TABLE 7–6 DESIGN STANDARDS OF BUS BAY

Item	A–Type (Ground Level)	B–Type (Elevated Level)
Length of Deceleration Lane	15 m	30
Length of Platform	30 m	30
Length of Acceleration Lane	20 m	20
Width of Bus Lane	3.5 m	5.5
Width of Platform	3.0 m	2.5

(2) Design of Bus Bay

Both types of the bus bay were designed by using the above design standards and shown in Figs. 7–14 and 7–15.

(3) Other Consideration

In the case of B-type bus bay at the elevated expressway level, stairways and escalators were considered for passengers' access between the expressway and arterial roads on

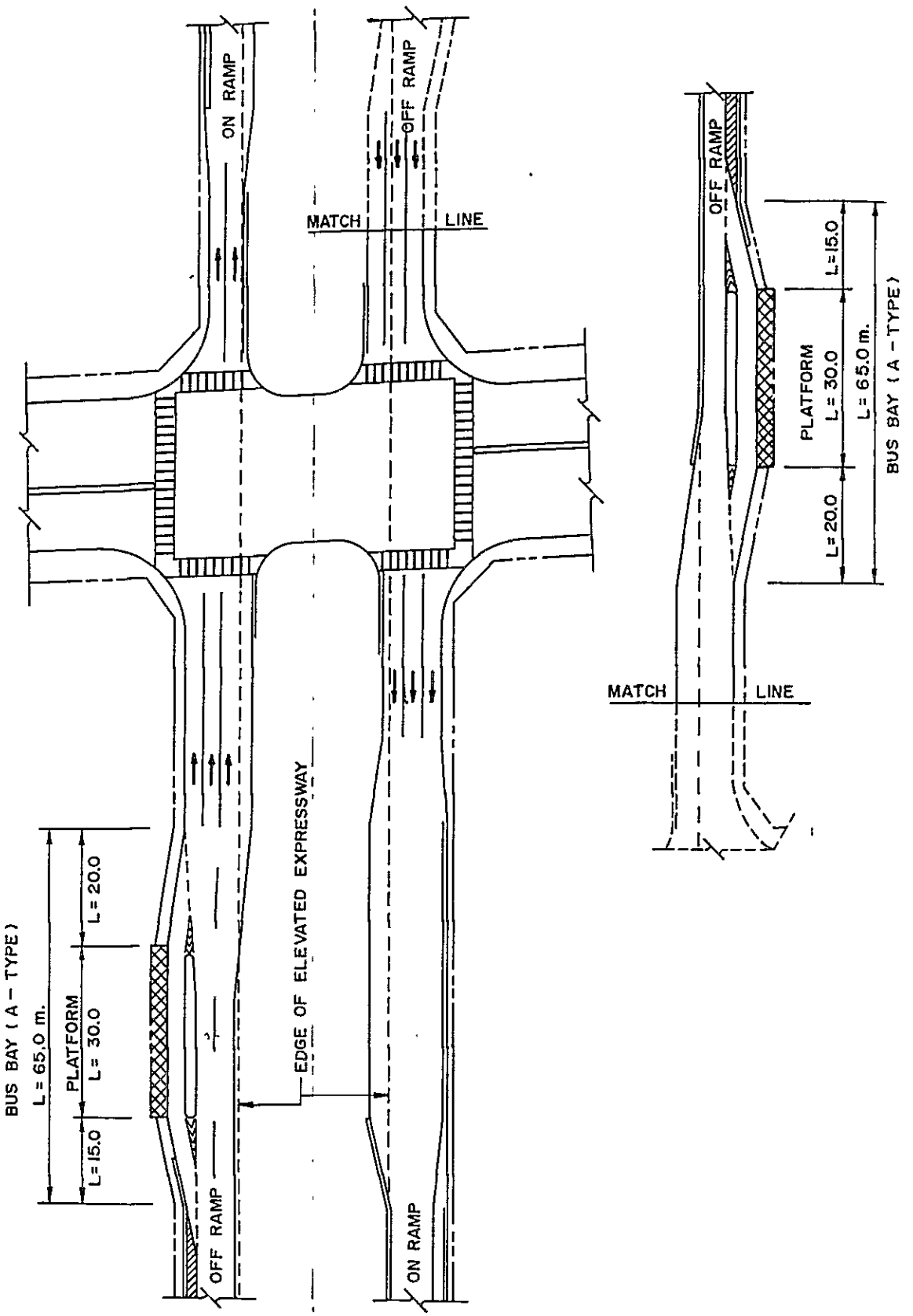


FIG. 7-14

S = 1 : 2000

BUS BAY A-TYPE (GROUND LEVEL)

THE SECOND STAGE EXPRESSWAY SYSTEM IN THE GREATER BANGKOK

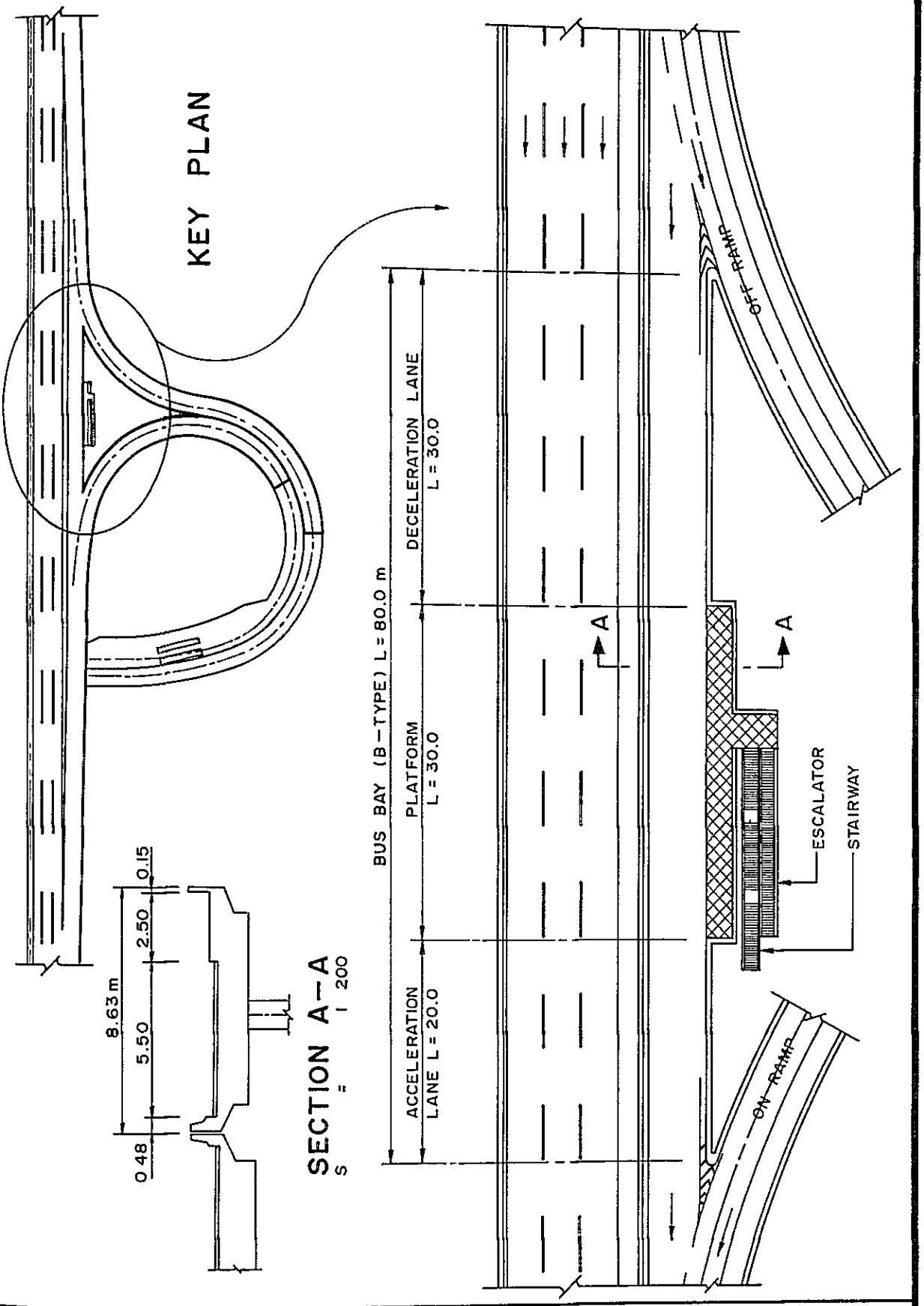


FIG. 7-15
S = 1.500

BUS BAY B-TYPE (ELEVATED LEVEL)

THE SECOND STAGE EXPRESSWAY SYSTEM IN THE GREATER BANGKOK

the ground level, since the bus bay would be located at elevated structures above the ground level by more than 9 meters.

The stairways and escalators as well as platform should be accomplished by providing hand railing and ample lighting.

7.4.3 Cost Estimates of Bus Bay

Cost estimates of six (6) bus bays in three locations were conducted based on the updated price data and unit costs analyzed in Chapter 11, Estimated Construction and Maintenance Costs. The summary of the financial bus bay cost is shown in Table 7–7.

TABLE 7–7 SUMMARY OF BUS BAY COST

(In million Baht of financial cost, 1983 prices)

Type of Bus Bay	A–Type (4 Bus Bays)	B–Type (2 Bus Bays)	Total
Viaduct Structure	–	14.6	14.6
Pavement	1.1	(included in viaduct)	1.1
Escalator and stairways	–	25.1	25.1
Platform and its roof	0.7	0.7	1.4
Lighting and miscellaneous	1.4	4.6	6.0
SUB-TOTAL	3.2	45.0	48.2
ROW Cost	12.1	–	12.1
Contingency (10%)	0.3	4.5	4.8
Engineering (10.0%)	0.3	4.5	4.8
TOTAL	15.9	54.0	69.9

7.5 Assessment

7.5.1 The Alternatives

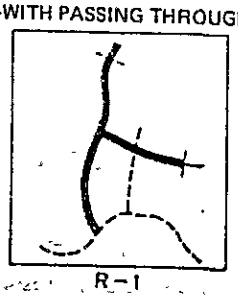
The alternative plans subject to economic and financial analysis, have been determined in the previous sections. They are presented as follow:

A. Passing through bus service without bus bay construction.

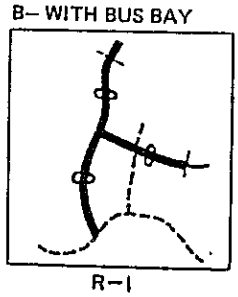
B. Passing through and bus bay use service with the construction of the three bus stopping bays.

C. Without bus services on the SES. In this case the R–1 plan of the SES is used as the base from which the net benefit is estimated.

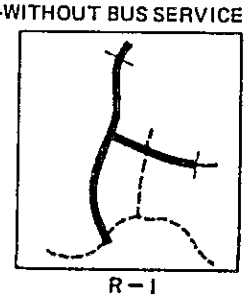
A–WITH PASSING THROUGH



B– WITH BUS BAY



C–WITHOUT BUS SERVICE



Benefit is estimated by the savings in the overall traffic cost and also in the traffic cost of buses: that is, the savings between A and C and between B and C. Details of the vehicle operating cost and the passenger time value used in the analysis are stated in Chapter 12.

7.5.2 Economic Analysis

The economic benefit and cost have been estimated for the year 2000, using the traffic cost of R–1 as in the case C above. The result is shown in Table 7–8.

Table 7–8 ECONOMIC COST AND BENEFIT OF NORMAL BUS SERVICE ON THE SES, 2000

Description			Passing through	With bus bay use
(1)	Economic Cost			
	Construction of bus bays in 1983 prices (million ฿)		–	61.8
(2)	Economic Benefit in 2000			
	Savings in traffic cost ('000฿/day)[1]		132	273
(3)	Economic B.C. Figures	(R–1)[2]		
	– B/C ratio	(1.65)	1.67	1.68
	– PW. in Mil. Baht	(6,094.2)	6,282.4	6,410.8
	– IRR. in %	(17.0)	17.1	17.2

Notes: 1) Estimated traffic cost are shown in Appendix Table 7–24.

2) Benefit cost figures are estimated by adding the above (1) and (2) to the cost and benefit streams of R–1 which was assumed as the basic case. Refer to Chapter 12 for the B.C analysis of R–1.

It is found from the Table that if the normal public buses of BMTA operate through the Expressway, it will bring about savings of 132,000฿ per day to the buses and passengers. No investment is necessary in this case.

If the bus bay cost is added to the project of the SES, it will lead to increased benefit. In this case, there will be more savings in the traffic cost. The additional benefit is sufficiently large to offset the bus bay cost.

Both A and B are economically viable, but A is advantageous since it is applicable without investment.

7.5.3 Financial Analysis

The bus trips diverted to the expressway will raise the toll revenue. The amount in the year 2000 is estimated as follows:

	A Passing through	B With bus bay use
Normal bus trips/day	4,773	5,563
Revenue, Baht/day (30 Baht per bus)	143,190	166,890
Revenue in year (million ฿/year)	52.26	60.91
(Percentage of total Expressway revenue)	(+1.3%)	(+1.5%)

The addition to the gross revenue of the Expressway in 2000 is approximately 1.3% and

1.5%, while use of these buses would result in increases to 0.8% and 0.9% of the total 594,000 trips on the Expressway per day, respectively in year 2000.

7.5.4 Conclusion and Recommendations

It is concluded that the normal bus service using the Expressway for "passing through" would result in substantial economic savings in the overall traffic cost as well as the traffic cost of buses. It will not disturb the traffic flow of other vehicles since the addition of 4700 bus trips over the 594,000 vehicles trips on the Expressway is quite modest. Also it would raise additional revenue to ETA without causing specific expenditure or investment on the Expressway.

The construction of bus stopping bays on the Expressway is also to be recommended since more buses and users would realize economic benefit. It is too optimistic to conclude that bus bays should be constructed at the three locations since that conclusion was derived from a somewhat simplified case study. However, it is strongly felt that the bus bay plan will bring about better results in economic, financial and transport aspects if it is prepared appropriately.

The study conducted in this chapter is a case study which clarifies the basic effects of normal bus service through the SES. A systematic approach is necessary in optimizing the bus service not only from the viewpoint of the Expressway network, but of the bus route network which is operated by BMTA. The following points should be studied in developing a system of Expressway with normal public bus service.

(1) Passenger Demand on the New Bus Service

A survey should be conducted to obtain sufficient data which would show the percentage distribution of passengers among alternative routes which differ in travel time and fare between the same OD zone pair. Just as the diversion model determination of vehicles on the Expressway was made, so can a bus passenger diversion model be developed from this data.

The study carried out a bus passengers interview survey as stated in 7.2 of this chapter. The survey was to find rather general characteristics of bus users and was not sufficient to find a diversion trend to the buses through Expressway.

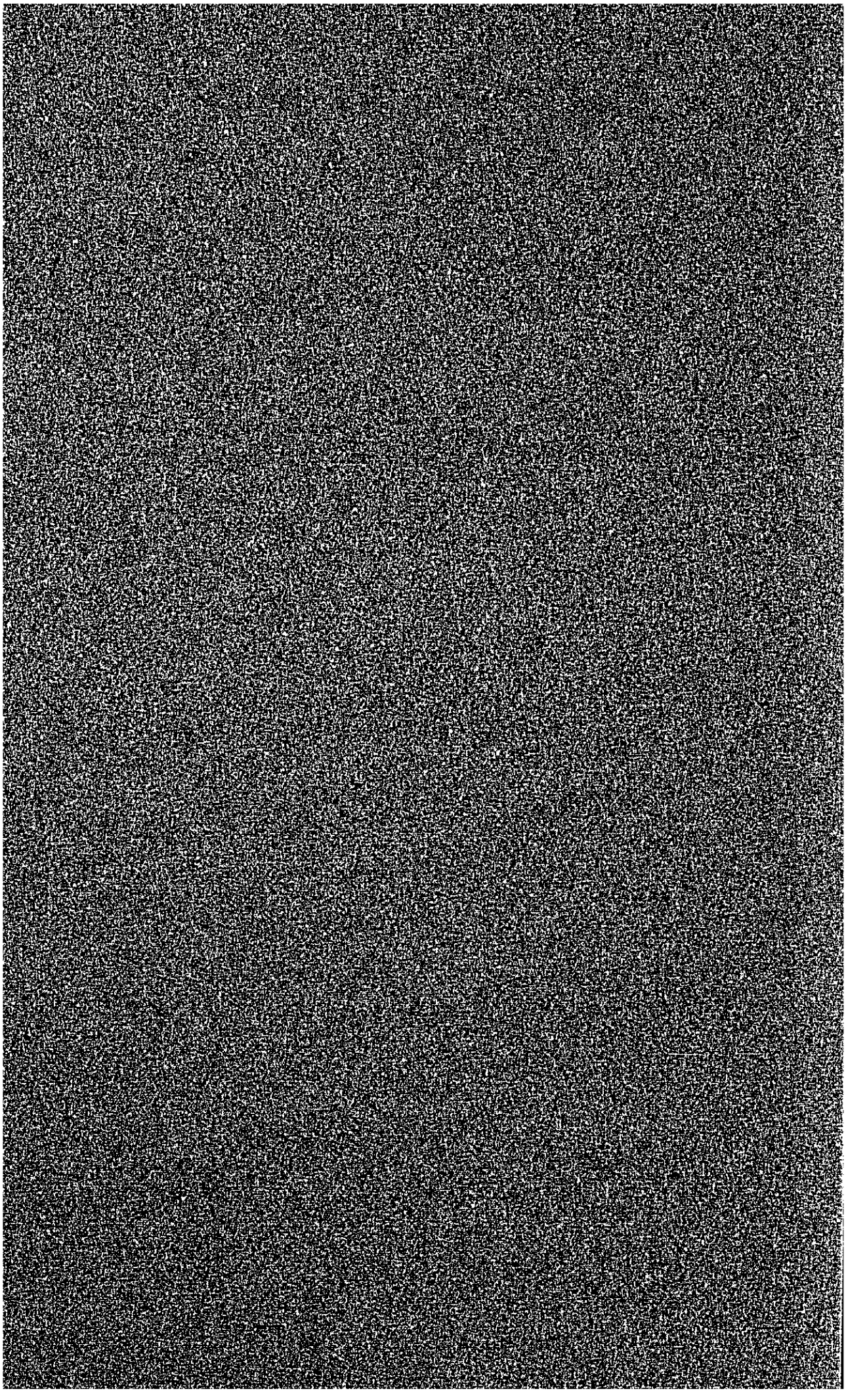
(2) Mini Buses and Soi Buses

Route, trip frequency and fare of mini bus and soi bus have not been studied. Passengers' use of these short distance services is also not been studied. These matters should be investigated in proposing a plan to improve the overall bus service in the GBA.

(3) Redevelopment of Bus Routes and Service

If the Expressway is opened for normal public bus service, a comprehensive review of route, frequency, fare and regulation is necessary. If the routes and service are reorganized well, more people will be attracted to use the new service.

Chapter 8
FINALIZATION OF THE ROUTE LOCATION



CHAPTER 8 FINALIZATION OF THE ROUTE LOCATION

8.1 General

The expressway corridors which should compose the Second Stage Expressway System (SES) are selected in Phase I Study through the study of expressway network planning as well as subsequent inception engineering studies and provisional economic evaluations.

However, further study for the finalization of the route locations was necessary based on the careful investigations and study of the right-of-way (ROW) and other constraints to ascertain the possibility of the project execution.

The finalization of the locationing of the objective routes was completed in the earlier stage of the Phase II Study and the results were reflected to the consecutive work activities such as on-the-ground survey, soils and materials survey, various engineering studies, traffic assignment, etc.

8.2 Objective Routes

The expressway system for the feasibility study consists of the following two routes :

- N-S Route from the national road No.31 to the planned Dao Khanong-Port section of the First Stage Expressway System (FES); and
- East Route from the N-S Route to the national road No.3344.

These expressway corridors are located in the core area of the Greater Bangkok, and these routes will be added to the FES network as to provide the radial expressways or as to compose an integral part of the expressway ring.

8.3 Methodology of the Study

Based on the information gathered through the site investigations and the examination of the maps and aerial photo mosaics, all possible alternative subcorridors (routes) are studied for the N-S Route and East Route, paying special attention to the social, environmental, economic and technical points of view. Among others, the study has been focussed to the main check items described below :

- Land acquisition and compensation;
- Control points;
- Location of interchange;
- Land use;
- Topography;
- Horizontal and vertical alignments; and
- Length of route.

(1) Land Acquisition and Compensation

The optimum route having regard to land acquisition and compensation was taken up,

avoiding passing through existing commercial centers and with the least intervention to existing roads and railways.

(2) Control Points

The following were considered as the primary control points in the route selection and the locationing of interchanges and on/off ramps :

- Location of interchange with the First Stage Expressway System;
- Palaces, temples, religious facilities and cultural assets;
- Public facilities and buildings;
- Military facilities;
- Permanent building with more than 4 storeys;
- Important buildings and valuable residential areas;
- Major roads, railways, and planned mass rapid transit system;
- Existing/planned railways, canals, important underground public utilities, power transmission pylons, etc.; and
- Rivers and major channels (Khlong)

(3) Location of Interchange

A larger area is needed for an interchange. A sparsely populated area with fewer control points is considered as the most suitable location without sacrificing the function of interchange.

Generally, the priority given to each of interchange design factors depends on the inherent environment of each interchange. For an interchange between high speed expressways, weaving lengths and geometry will be significant factors owing to the need to maintain a high level of traffic safety.

(4) Land use

Weaving through the commercial and residential areas having proper regard to effective land use and environmental problems is the best way to select the route. Due attention was paid to the present and future land use of the area and possible environmental impacts to select each alternative route.

(5) Topography

In setting alternative subcorridors attention was paid to the following :

- Effective use of water ways; and
- Avoidance of the river crossing at an acute angle.

(6) Horizontal and Vertical Alignments

Horizontal and vertical alignments were determined so as to satisfy the established geometric design standard for the safety and comfort of users. Highway aesthetics was also considered.

(7) Length of Route.

The shortest possible route was considered to be preferable.

8.4 Salient Features of the Objective Routes

(1) N-S Route.

Study is carried out by recognizing that this route must serve the CBD and its fringe areas and will connect the said areas with the Wiphawaderungsit Road (i.e. Super Highway) which is the nation's vital trunk highway to extend the north. The N-S route is to be further connected with the planned East Route and the Port-Dao Khanong section of FES, thus composes an integral part of a ring expressway network.

(2) East Route

Study was carried out by recognizing that this route must link the central business district (CBD) with the eastern areas connecting the route with the existing Din Daeng-Port of FES and the planned N-S Route.

The traffic using the existing road network which is extending to the east (i.e. New Phetchaburi Road) is already reaching to its capacity. Therefore, the one of the basic function of this route must aim the relieving of this situation as well as the service to the undergoing urban development in the area.

(3) Traffic Conditions

In the Phase I study, provisional traffic assignment on the routes was made for the purposes of the preparation of expressway master plan and the establishment of the network of the Second Stage Expressway System. After this provisional traffic assignment, preliminary analysis of design traffic capacity was carried out in the same phase and tentatively determined the number of traffic lanes for each route as follows :

Route and Segment	Number of Lanes
N-S Route	
(Bang Khlo-Phaya Thai-Lad Yao)	
(1) Sta. 0 + 800 – Sta. 18 + 000	6
(2) Sta. 18 + 000 – Sta. 19 + 900	4
East Route	
(Phaya Thai-Hua Mak)	
(1) Sta. 0 + 810 – Sta. 9 + 750	6
(2) Sta. 9 + 750 – Sta. 15 + 050	4

Above number of lanes of the Expressways is used in this route location study, since the task is considered to be the further study of the previous route selection which was conducted in the Phase I Study.

8.5 Route Descriptions of the Alternatives

8.5.1 General

Aerial photographs of the project area flown in 1981 enlarged to a scale of 1:5,000 as well as the working aerial photo mosaics of the area to a scale of 1:15,000 (flown in 1979) were used for the identifications of the alternative routes. Extensive field investigations were conducted repeatedly in the affected areas to grasp the recent changes of the developing areas.

8.5.2 North-South Route

Seven (7) shortlisted alternative routes were considered for the following route selection process. Fig. 8–1 shows the key plan and layout plan of these alternative routes and Appendix Table 8–1 presents the list of control points which were considered in the route locationing.

(1) Alternative A–1–N

This route starts at the middle point of the Dao Khanong-Port section of the First Stage Expressway System between Sathupradit Road and Middle Ring Road in Bang Khlo, going northwards to intersect Chan Road and splits itself into two by directional traffic flows : one (A–line) is along Maha Phruettharam Road and the other (B–line) along Surasak Road. The split expressway carriageways are merged into one on the eastern side of Bangkok Railway Station. The route runs along Rama VI Road, and bends westwards to run along Khlong Prem Prachakhorn in Bang Sue, and terminates at the Wiphawaderungsit Road at Lad Yao.

Since the existing ROW of the roads and canals can be effectively utilized for the planning of the Expressway, the cost required for the land acquisition and compensation for the properties is relatively small compared with the other alternatives.

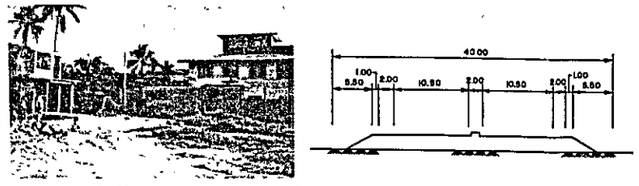
However, a problem will remain with the narrow lateral clearances between the existing buildings and the elevated structures of the Expressway. This must be criticized from the safety in the emergency case and the environmental (i.e. noise and air) and aesthetic view points. These are caused by the situation that the roads on which the Expressway is constructed have a total ROW width of 18 $\sim$ 20 meters for about 5 kilometers in the split sections, being shown in Fig. 8–1.

Near the Sta. 4 km, between Sathorn Road and Chan Road, this route has a control point (i.e. cemetery) to be treated. Other alternatives (i.e. Alternatives A–2–N, B–1–N, B–2–N and C–N) were established and discussed to avoid this cemetery as presented in the following pages.

In the vicinities of Sta. 8.3 km or 10.7 km, it is found the areas which is suitable to plan the interchange to connect with the East Route. These areas are found to be developed not densely yet and the ROW acquisition can be done with less effort compared with the other areas.

During the period of construction of the Expressway, Maha Phruettharam Road and Surasak Road must be closed to public traffic since these roads have not enough ROW width. The traffic in Rama VI Road will be handled by a half road width operation during the period of the construction.

SECTION A – A



SECTION B – B

OPTION – 1

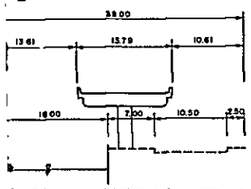
OPTION – 2

SECTION D – D

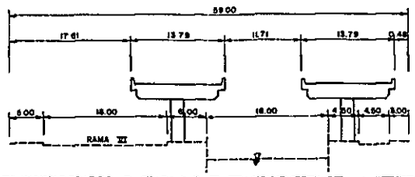
SECTION C – C

SECTION E – E

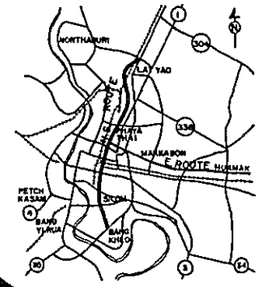
- D

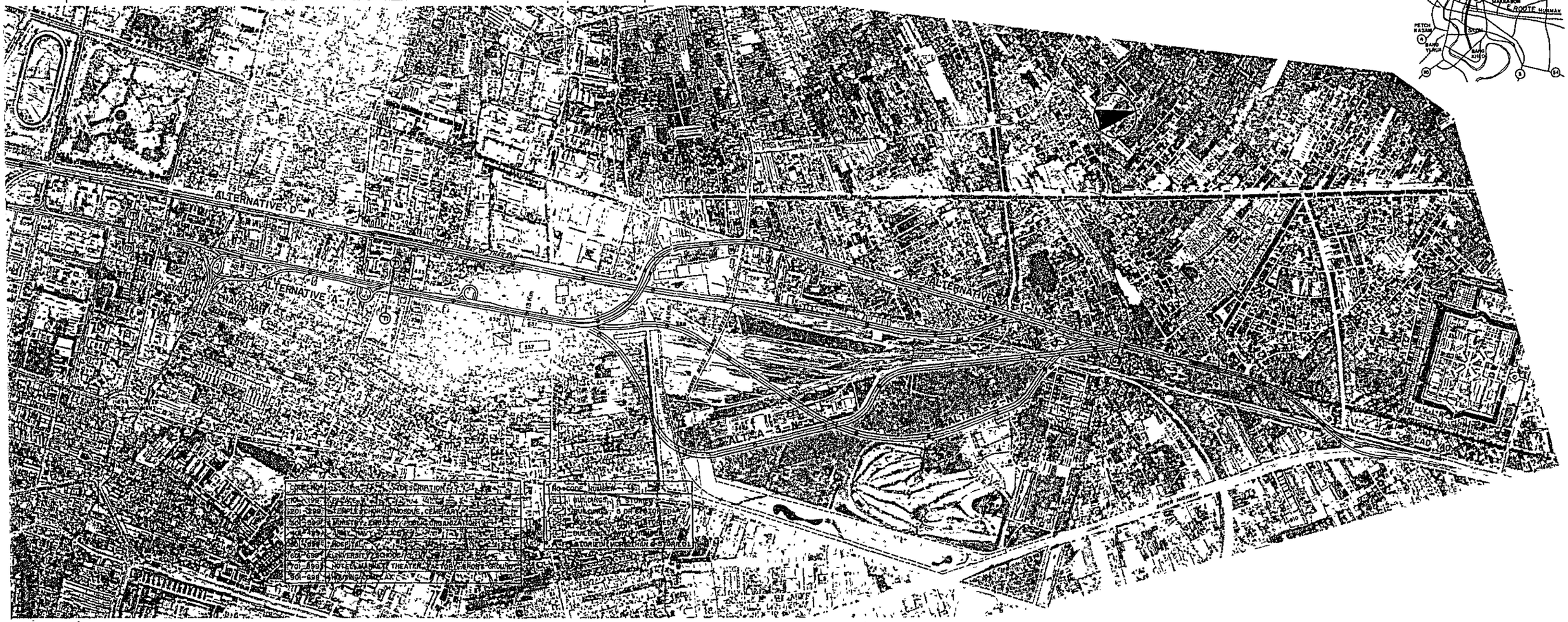


SECTION F – F



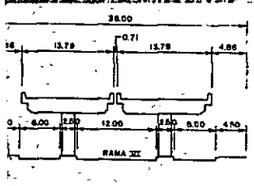
KEY MAP

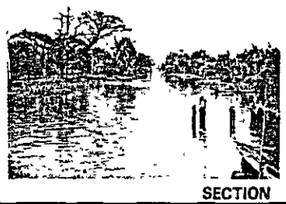




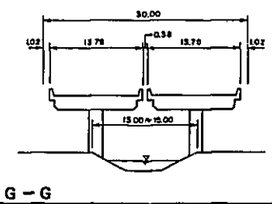
CODE NO.	DESCRIPTION
100–199	PLACES OF WORSHIP
201–299	TEMPLE (CHINESE), MOSQUE, CEMETARY
301–399	MINISTRY, EMBASSY, PUBLIC ORGANIZATION
401–499	POST OFFICE
501–599	HOSPITAL
601–699	UNIVERSITY/SCHOOL
701–799	HOTEL, MARKET, THEATER, METRO, SPORTS GROUND
801–899	HOUSING, OFFICE

No.	CODE NUMBER
1	BUILDINGS, 1 STOREY
2	BUILDINGS, 2 STOREYS
3	BUILDINGS, 3 STOREYS
4	BUILDINGS, 4 STOREYS
5	TOWERS, MORE THAN 4 STOREYS





SECTION G – G



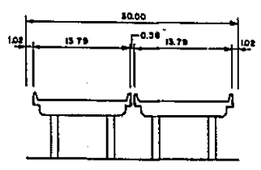
0 0.5 1.0 1.5 2.0 2.5Km

ALTERNATIVE ROUTES
(NORTH – SOUTH ROUTE)

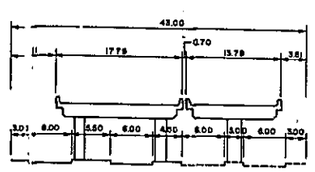
FIG. 8.i

THE SECOND STAGE EXPRESSWAY SYSTEM IN THE GREATER BANGKOK

SECTION A – A

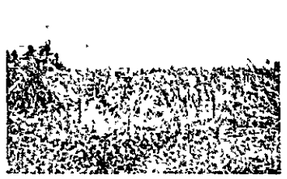


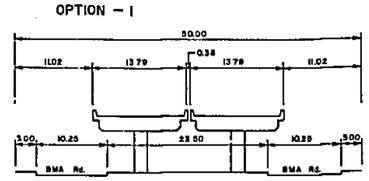
SECTION C – C



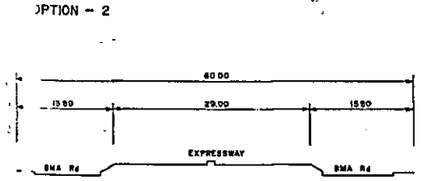
SECTION F – F

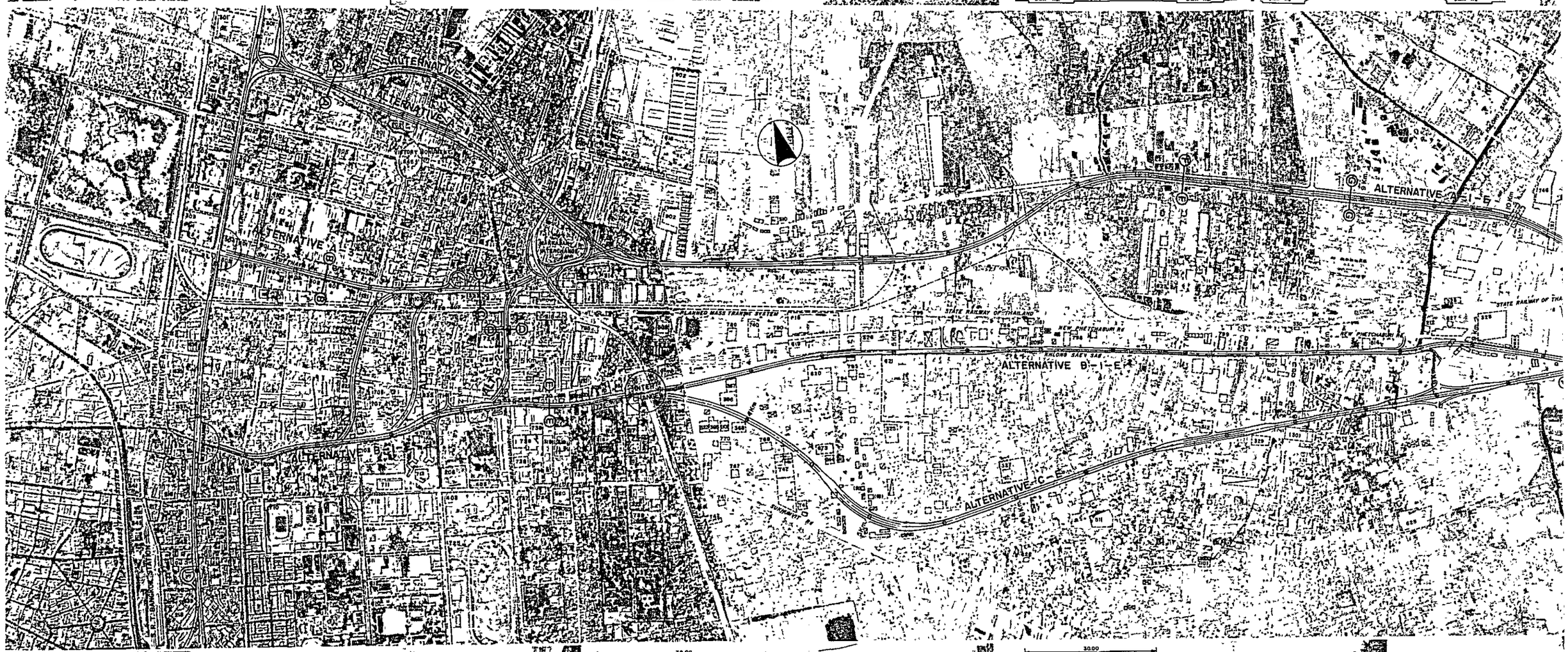
OPTION – 1

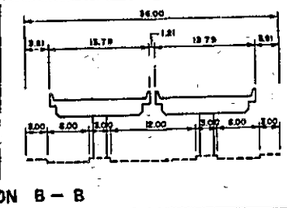




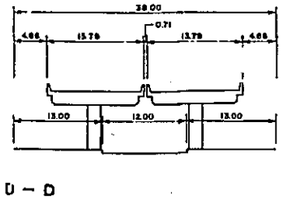
OPTION – 2



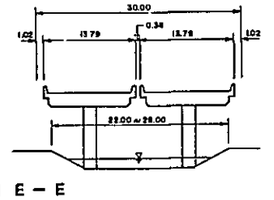




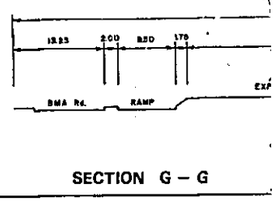
SECTION B – B



SECTION D – D



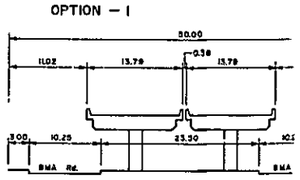
SECTION E – E



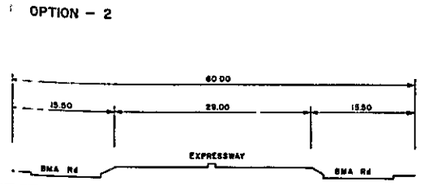
SECTION G – G

SECTION F -

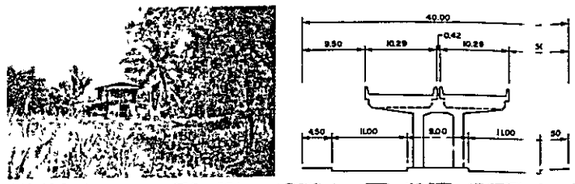
OPTION – 1



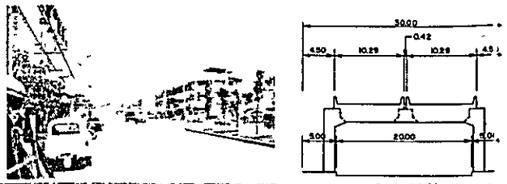
OPTION – 2



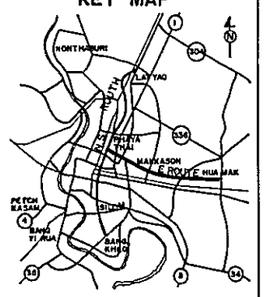
SECTION H – H



SECTION I – I

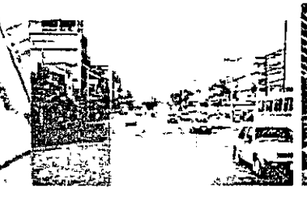


KEY MAP



A SHOT BEING 400 METERS AWAY FROM THE EXPRESSWAY OVER SU-KHUMVIT ROAD

A SHOT BEING 200 METERS AWAY FROM THE EXPRESSWAY OVER SU-KHUMVIT ROAD



A SHOT FACING THE NORTH IN FRONT OF THE VICTORY MONUMENT

A SHOT AT 500 METERS NORTH OF THE VICTORY MONUMENT

ALTERNATIVE A – 1 – E

ALTERNATIVE B – 1 – E

ALTERNATIVE C – E

HUA MAK

STATE RAILWAY OF THAILAND

NEW PHETCHABURI RD.

KHLONG SAEN SAB

PHAHONYOTHIN RD.

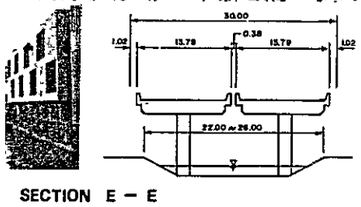
PATHUMWAN RD.

PHAYATHAI RD.

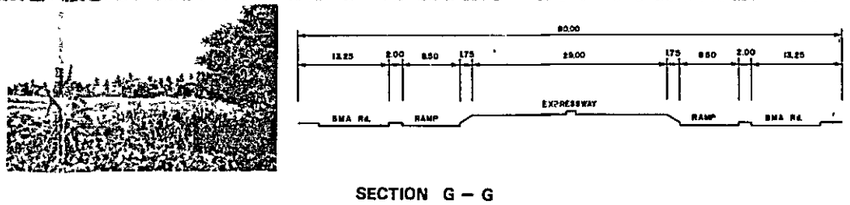
CODE NO.	DESCRIPTION
101 ~ 199	PALACE
201 ~ 299	TEMPLE, CHURCH, MOSQUE, CEMETARY
301 ~ 399	MINISTRY, EMBESSY, PUBLIC ORGANIZATION
401 ~ 499	ARMY, NAVY, POLICE
501 ~ 599	HOSPITAL
601 ~ 699	UNIVERSITY, SCHOOL
701 ~ 899	HOTEL, MARKET, THEATER, FACTORY, SPORT GROUND
901 ~ 999	HOUSING COMPLEX
NO CODE NUMBER	BUILDINGS, 4 STORIED BUILDINGS, 5 OR 6 STORIED BUILDINGS, 7 OR 8 STORIED BUILDINGS WITH NUMBER OF STORIES (MORE THAN 9 STORIED)

0 0.5 1.0 1.5 2.0 2.5 Km

SECTION E – E



SECTION G – G



ALTERNATIVE ROUTES (EAST ROUTE) — FIG. 8.2

THE SECOND STAGE EXPRESSWAY SYSTEM IN THE GREATER BANGKOK

(2) Alternative A–2–N

This route has the same alignment as alternative A–1–N up to about 1 kilometer north of Chan Road. After this point, the route shifts to the west of Alternative A–1–N (B-Line) to run between Maha Phruettharam and Mahesak Roads. It merges with Alternative A–1–N on the eastern side of Bangkok Railway Station, and has the same alignment as Alternative A–1–N up to Sta. 13.5 km on Rama VI Road, where it diverges from Alternative A-1–N, passes through the railway container freight yard at Bang Sue and joins with Alternative A–1–N on Khlong Prem Prachakhorn.

The route in the railway container freight yard was suggested by the State Railway of Thailand (SRT) through the meetings held on March 25 and April 4, 1983. By utilizing the SRT ROW area, 150 unit of properties to be demolished in the northern stretch of the Alternative A–1–N (Sta. 13.5 km – Sta. 19.5 km) can be avoided.

This alternative is intended to pass through the Silom area being occupied by residential and commercial land uses, and considered the redevelopment of the area. Thus it required much of demolition of properties and resulted in high cost in acquiring the ROW compared with other alternatives.

If this route is adopted it will not disturb the existing traffic flows on the existing adjacent roads seriously during the period of construction.

(3) Alternative A–3–N

This route has the same alignment as Alternative A–1–N up to the crossing point with Pradipat Road. Beyond this point it turns to the east to run along Yan Phahol Yothin Road and an existing road in the railway container freight yard at Bang Sue, and joins Alternative A–1–N at the northern end of the yard.

This alternative provides a variation of Alternative A–2–N in the said SRT ROW area to avoid the crossing of maintenance depot.

(4) Alternative B–1–N

This route diverges from Alternative A–1–N at about 700 meters south of Chan Road, where it bends northwestwards to run along New Road to the north and merges with Alternative A–1–N beyond Silom Road.

This route shall require the demolition of Sutthiwararam School, Yannawa Temple and Bang Rak Market by widenning the New Road, from a width of 17 m to 35 m at least in the 1.4 km long section from Sta. 3.9 km to Sta. 5.3 km.

The accessibility from Sathon Road to the Expressway is poor since the Sathon Road is already elevated at the crossing point with the planned Expressway.

(5) AlternativeB–2–N

This route is a short cut plan of Alternative B–1–N in the vicinity of western end of Chan Road to avoid a school (i.e. code No. 649 as shown in Fig. 8–1) and other properties facing to New Road. But the construction of this route would entail the removal of a number of multistoried buildings.