

SATHORN BRIDGE PROJECT
BANGKOK THAILAND

TRAFFIC STUDY REPORT

OVERSEAS TECHNICAL COOPERATION AGENCY

GOVERNMENT OF JAPAN

MARCH 1970

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CHAPTER 1 INTRODUCTION

The city of Bangkok, the capital of Thailand, situated on the east bank of the Mae Nam Chao Phraya, has grown remarkably in recent years. Together with the city of Thon Buri, located on the opposite bank, it forms the Bangkok-Thon Buri Metropolitan Area. As the traffic between the two cities is on a steady increase, the existing four bridges, the Memorial, the Krung Thon, the Krung Thep, and the Rama 6 Bridges, all of which link the two cities across the Mae Nam Chao Phraya, are now unable to meet the growing traffic demand. Consequently a new bridge construction project linking Bangkok to Thon Buri is being pushed vigorously. At the time of the preliminary construction of the Tha Chang Br., an earlier project, the Sathorn Br. was being planned as the second bridge construction project.

The survey team sent by the Japanese Government at the request of the Thailand Government has made field surveys on two occasions and prepared the **Feasibility Report**, which describes the feasibility of the project and the preliminary design of the bridge.

This report summarizes the results of the traffic survey made during the first field survey and at the same time deals with the details of the traffic studies which could not be covered fully in the **Feasibility Report**. Therefore, this report may be considered as a supplement to the traffic study contained in the above report.

In estimating the traffic volume in this report, the complete OD Table is compiled on the basis of the incomplete OD Table obtained from the survey. After this complete OD Table has been compiled, the future total number of trips and generated traffic volume in the survey area is estimated to obtain future traffic distribution and assignment.

The Bangkok-Thon Buri Metropolitan Area with a population of about 2,500,000 (in 1966) with a total area of about 176 km² is, as the capital of Thailand, now growing into a huge metropolis. It is not an easy task, therefore, to make a traffic survey covering the entire area of such a vast city. The OD survey, indispensable to the prediction of future traffic, requires many workers and lots of time to complete the survey itself as well as to make necessary preparation.

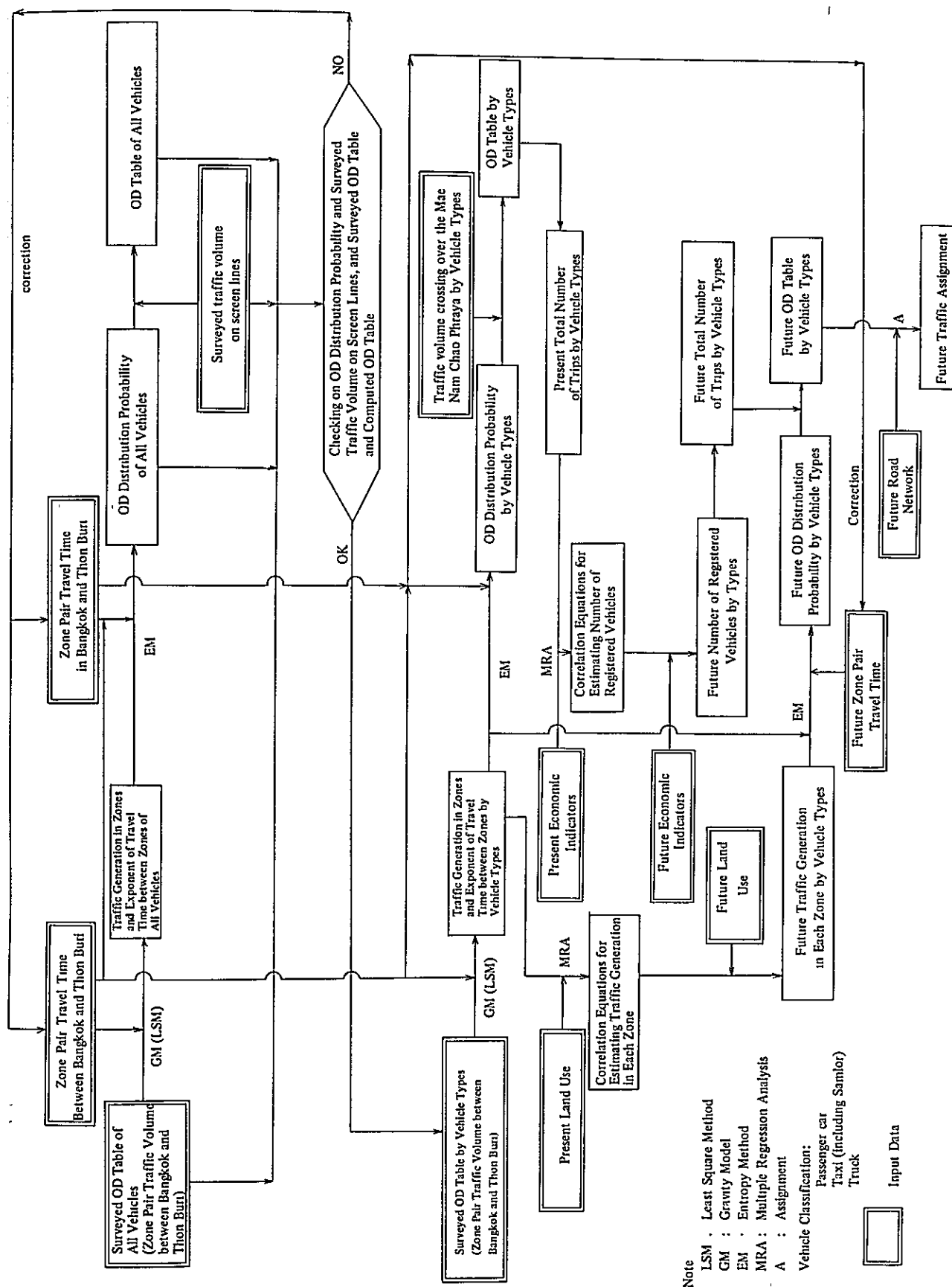
The current survey deals with just the Sathorn Br. and its connecting roads, a mere part of the whole road network of the Metropolitan Area. Despite this fact, the estimation of traffic volume on the Sathorn Br. must be preceded by the estimation of the overall traffic volume in the metropolitan area. This is due to the fact that the Sathorn Br., because of its location, is expected to have a great impact on the traffic flow of the metropolitan area and its importance and role must be evaluated in conjunction with the road network of the entire metropolitan area.

Such being the case, the survey limited itself to the traffic crossing the Mae Nam Chao Phraya in an attempt to reduce the scale of OD survey. From the incomplete OD Table consisting of the traffic between Bangkok and Thon Buri, obtained from the OD survey, a complete OD Table for the entire metropolitan area was estimated.

Each stage of the traffic analysis is described in detail in the relevant Chapters of this report. Fig. 1-1 is a flow diagram of the estimation of future traffic.

The traffic analysis starts with a traffic survey. Chapter 2 describes the outline of the survey conducted in Bangkok and Thon Buri, and the detailed survey results are given in the Appendix at the end of this report. Chapter 3 discusses the compilation of the present complete OD Tables based on the incomplete OD Tables obtained in the actual OD survey. In Chapter 4, the future traffic generation and the future traffic distribution in the Bangkok-Thon Buri Metropolitan Area are estimated. The assignment of the distributed traffic to the future road network is dealt within Chapter 5, the last Chapter, which also discusses the effect of the Sathorn Br. construction project on the traffic of the Metropolitan Area.

Fig. 1-1 FLOW DIAGRAM ESTIMATING FUTURE TRAFFIC IN THE BANGKOK - THON BURI METROPOLITAN AREA



CHAPTER 2 TRAFFIC SURVEY

2-1 Outline

In order to obtain an accurate picture of the traffic situation in the Bangkok-Thon Buri Metropolitan Area as the basis for estimating future traffic, the Team conducted a series of traffic surveys in the same area. At the same time, the Team made an effort to collect over-all data necessary to estimate the traffic in the future.

The survey consisted of OD surveys at 4 stations, 12 hour traffic counts at 39 stations, weekly traffic counts at 3 stations, travel time studies on 18 routes and ferry passenger surveys at 6 stations. Five members from the Team were assigned exclusively to this survey which lasted for about six weeks (March to April, 1969) including the preparatory period.

About 10 engineers from the Department of Public and Municipal Works, participated in the survey as liaison officers and supervisors at stations. In addition, two teachers and about 50 students from the Uthenthawai School of Building Construction cooperated in the management of personnel and the survey work, respectively.

Table 2-1 and Fig. 2-1 show the summary of the survey.

2-2 Zoning

As stated previously, Bangkok and Thon Buri are regarded as a united metropolitan area having the function of a single city, even though it is divided into two administrative sections. Therefore, the traffic between the two cities is characteristically urban traffic. In estimating the traffic volume on the Sathorn Br., it is necessary to understand the traffic situation in the Bangkok-Thon Buri Metropolitan Area and regard the traffic volume on the Sathorn Br. as a part of the overall traffic in the area.

Consequently, the survey area was marked off to include the Bangkok-Thon Buri Metropolitan Area with the following as boundaries: (Ref. to Fig. 2-2 and 2-3, and Table 2-2.)

Eastern portion of the Mae Nam Chao Phraya (Bangkok side)

- North — By the boundary between Cha. Phra Nakhon and Cha. Nontha Buri
- East — By Khlong Song Khathiam and Khlong Phra Khanong
- South — By the Mae Nam Chao Phraya

Western portion of the Mae Nam Chao Phraya (Thon Buri side)

- North — By the boundary between Cha. Thon Buri and Cha. Nontha Buri
- West — By the Amp. Bangkok Noi, Bangkok Yai and Thon Buri Boundaries

The area defined by the above boundaries was divided into zones using the administrative divisions called Amphoes as their basis. Amp. Dusit, a large Amp., was divided into 3 zones and also Amp. Pathum Wan was sub-divided into 2 zones according to land usage.

The above zones were used in analysing the present traffic situation for the traffic survey. However, in view of the fact that Amp. Yan Nawa and Amp. Bangkok Noi are quite large and expected to be developed in the future, and that Amp. Khlong Sarn is expected to be divided by the Sathorn Br. and by its connecting roads, the above three zones were regrouped into two zones for the future traffic estimate.

Table 2-1 Traffic Survey Summary

Type of Survey	Purpose	Method	Coverage	Items	Location of Survey Stations	Date (1969)	Remarks
OD Survey	To obtain basic data for forecasting the future traffic volume on the Sathorn Br.	Roadside interviews by random sampling	12 hour vehicular traffic across the Mae Nam Chao Phraya with the exception of regular buses and motorcycles	Direction of passing vehicle, time of passing, type of vehicle, purpose of use, origin and destination	Memorial Br.	March 12 (Wednesday) ~ 13 (Thursday) ~ 14 (Friday)	Number surveyed (Sampling ratio) 14,682 vehicles (8.29%)
	The purpose is to determine traffic generation by zones and their OD distribution				Krung Thon Br	March 11 (Tuesday)	5,794 vehicles (23.55%)
					Krung Thiep Br	March 18 (Tuesday)	3,098 vehicles (20.61%)
					Rama 6 Br.	March 19 (Wednesday)	1,649 vehicles (28.09%)
						From 7 00 to 19 00	Total 25,223 (Average 11.28)
12 Hour Traffic Count	To collect basic data to determine the traffic flow in the area covered by the survey as well as the traffic volume on each route and at each intersection	Manual counting	12 hour vehicular traffic at key points in the area covered for estimation	Hourly traffic by vehicle types and direction of passing vehicles	11 stations including OD survey stations	Tuesday, Wednesday, Thursday and Friday between March 11 and March 25, from 7 00 to 19 00	
	Data obtained at the survey stations on the screen lines was used as the correcting value in the estimation of the complete OD Table			Hourly traffic of all vehicle types by direction of passing vehicles (motorcycles not included)	26 stations	Tuesday, Wednesday, Thursday and Friday between March 20 and March 26, from 7 00 to 19 00	
				Hourly traffic at intersections by direction of passing vehicles	2 stations	March 26 (Wednesday) March 27 (Thursday) From 7 00 to 19 00	
Weekly Traffic Count	To collect data on the traffic volume during weekly and 24 hour periods. The average daily traffic volume was calculated from this data	Traffic count was made by portable, rubber-tire automatic traffic counters by the Dept. of Public and Municipal Works at the request of the Team	Vehicular traffic across the Mae Nam Chao Phraya.	Hourly traffic by direction of passing vehicles	Memorial Br. Krung Thon Br. Krung Thiep Br	June 3 ~ June 9 July 1 ~ July 7 June 20 ~ June 26	
				Travel time between inter-sections and stoppage time at intersections	18 routes	April 1 ~ April 10	9
				The number of passengers and their direction and the hourly number of ferry services	6 ferry stations between the Memorial Br and the Krung Thiep Br	April 1 From 7 00 to 19 00	
Ferry Passenger Survey	To determine the possibility of passengers now using ferries to cross the Mae Nam Chao Phraya shifting to automobiles upon completion of the bridge.	Manual counting	Passengers using ferry service in the vicinity of proposed Sathorn Br site	Type of land transportation used by ferry passengers on both banks			Passengers interviewed totaled 4,463
		Interview on board					

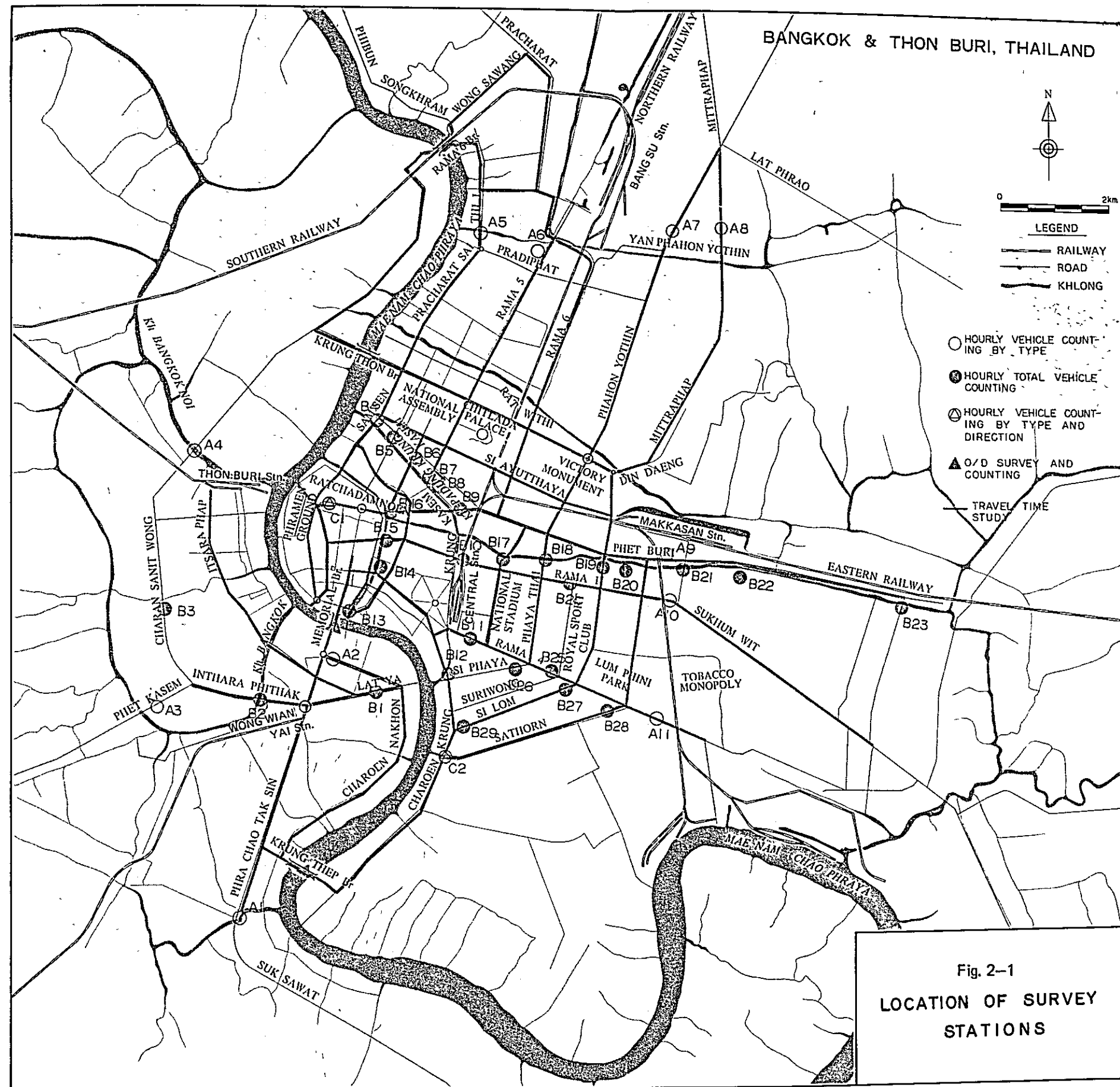
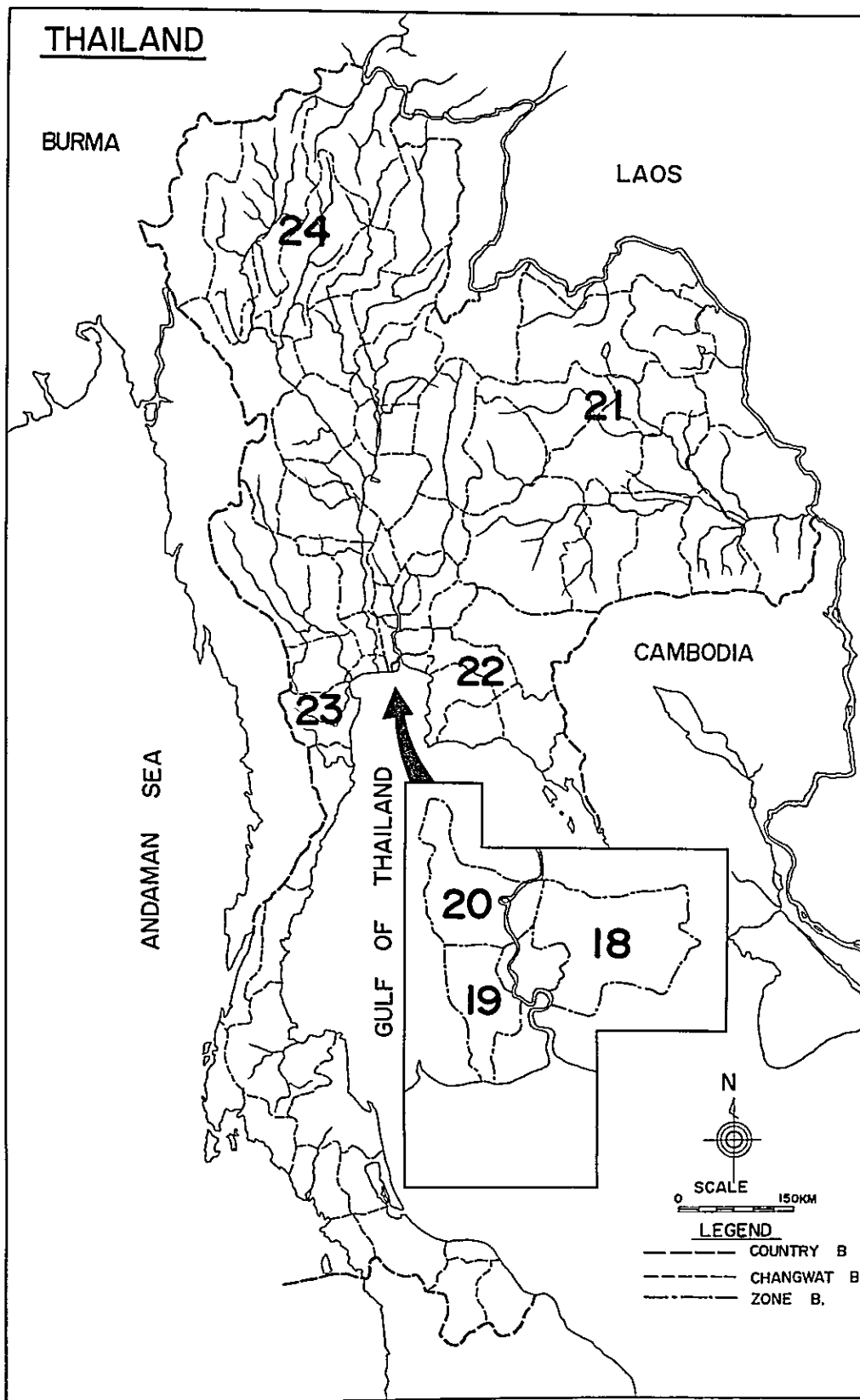


Fig. 2-2 ZONING



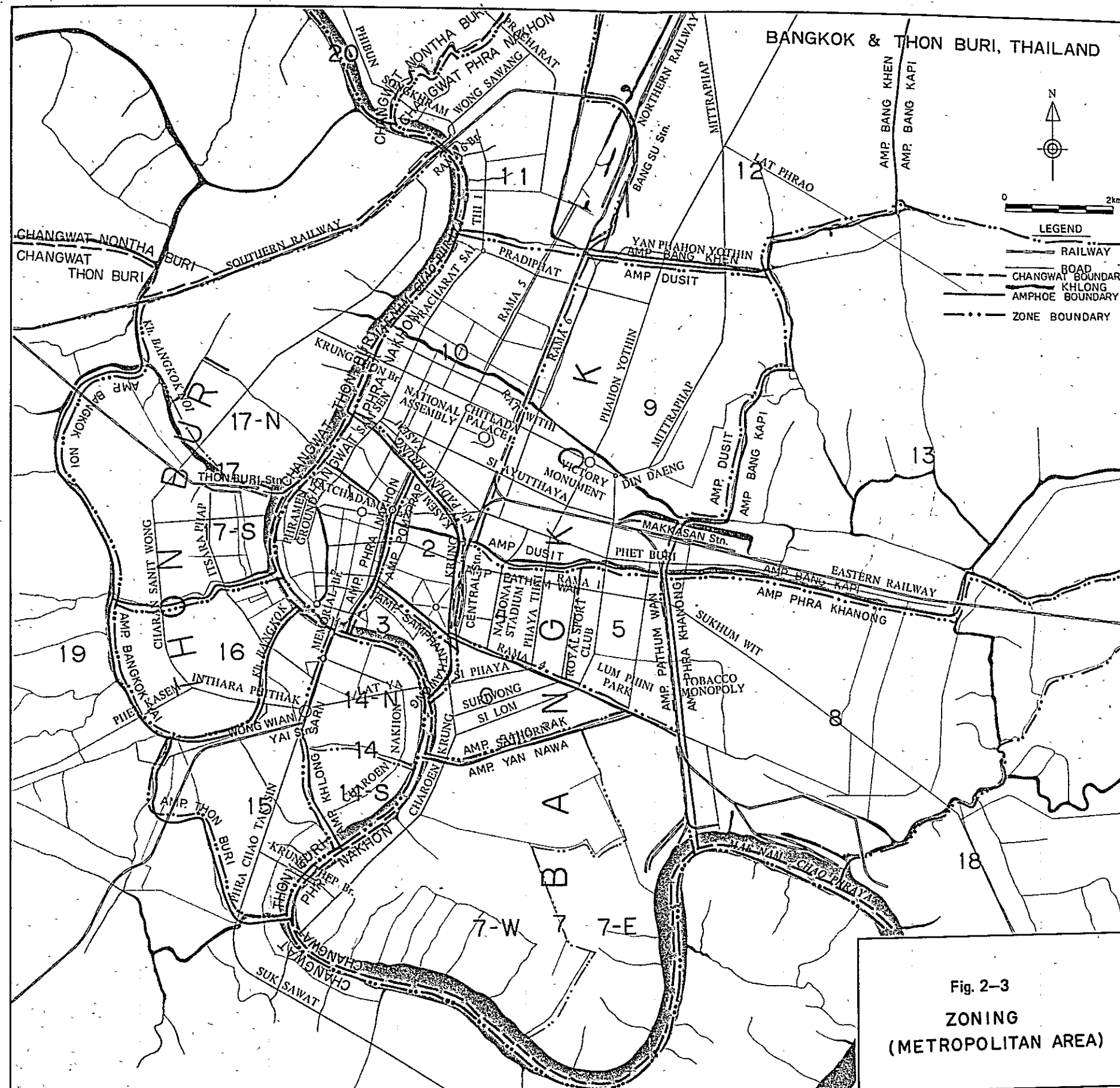
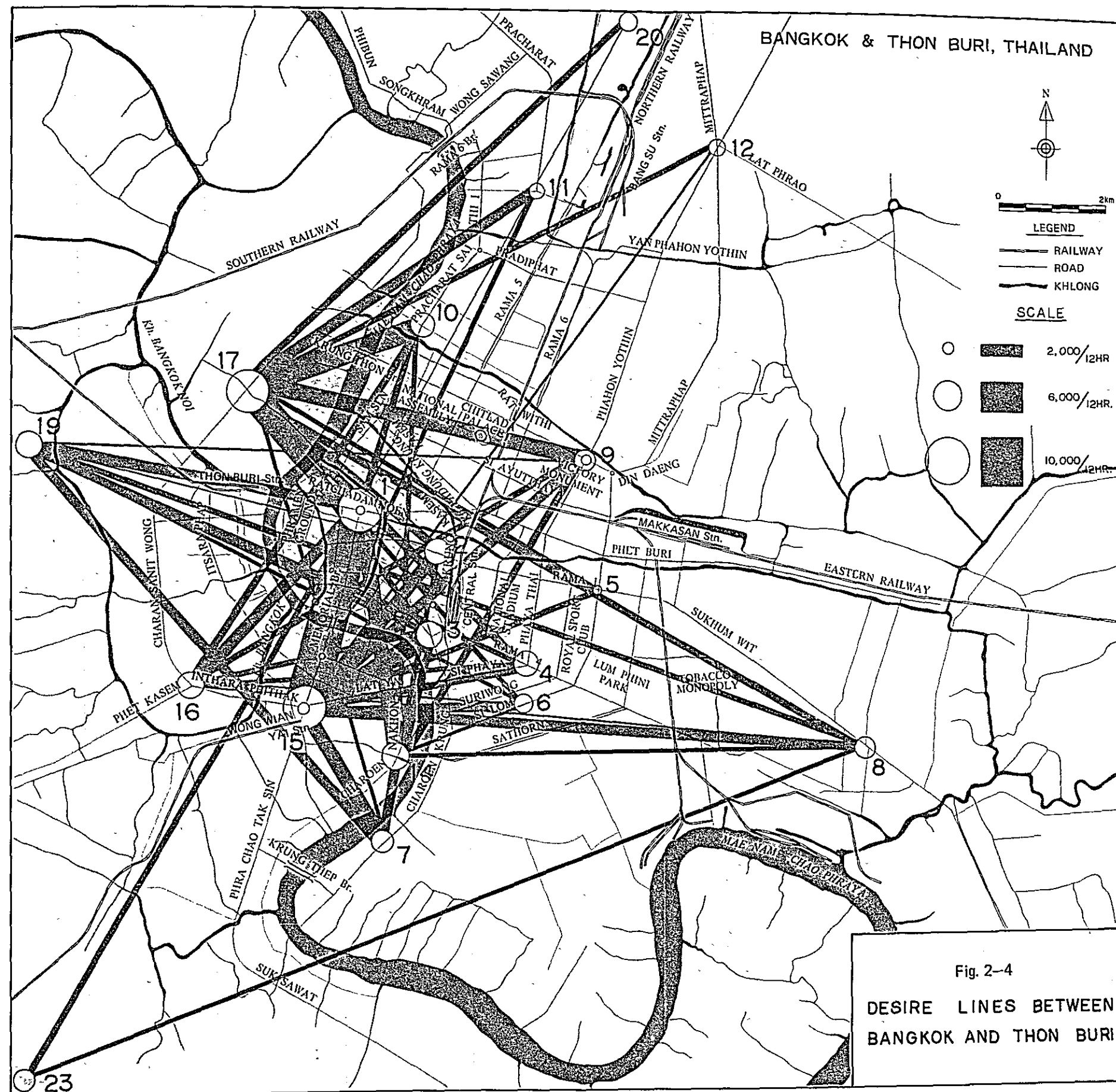


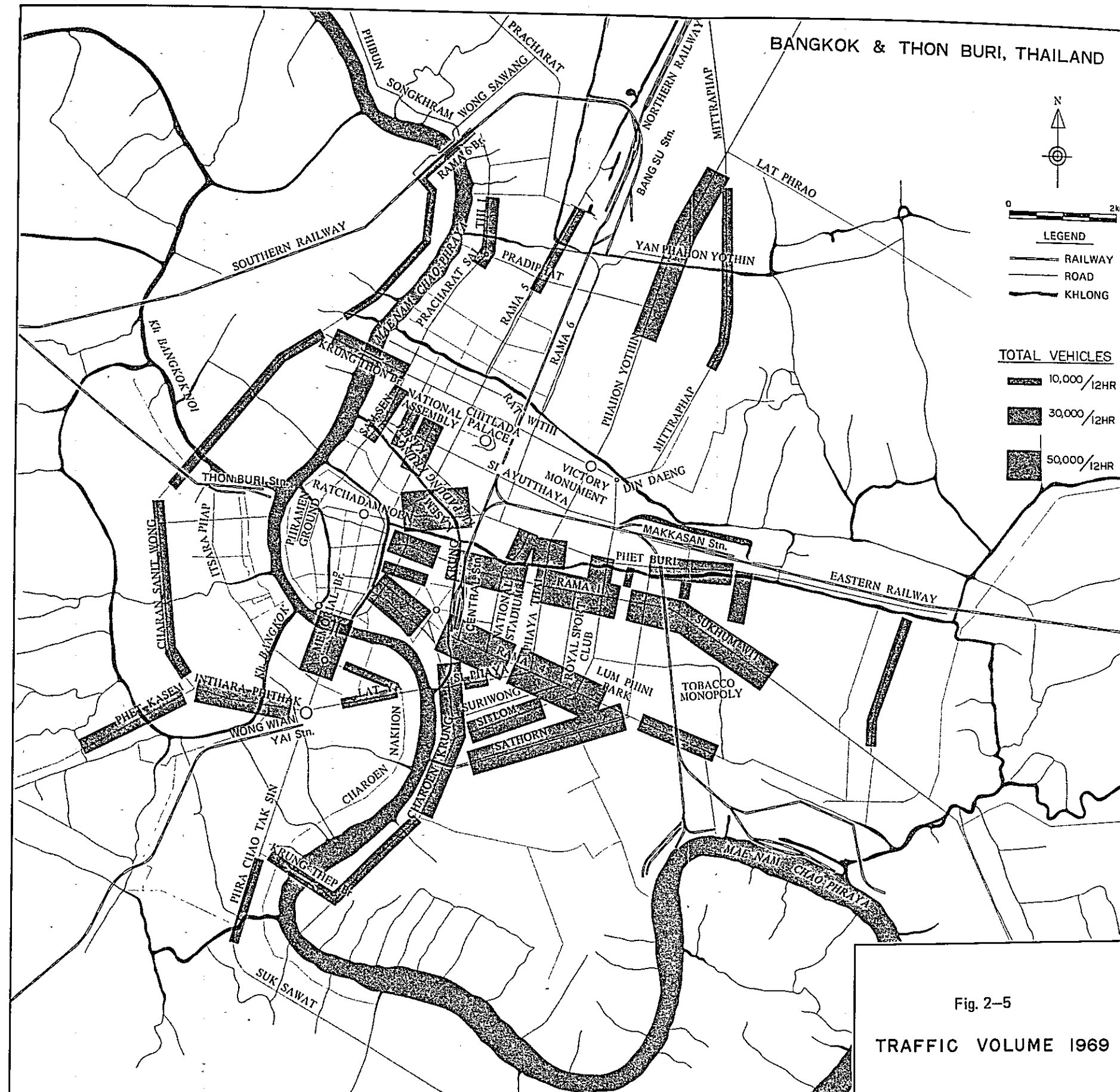
Table 2-2 Zoning

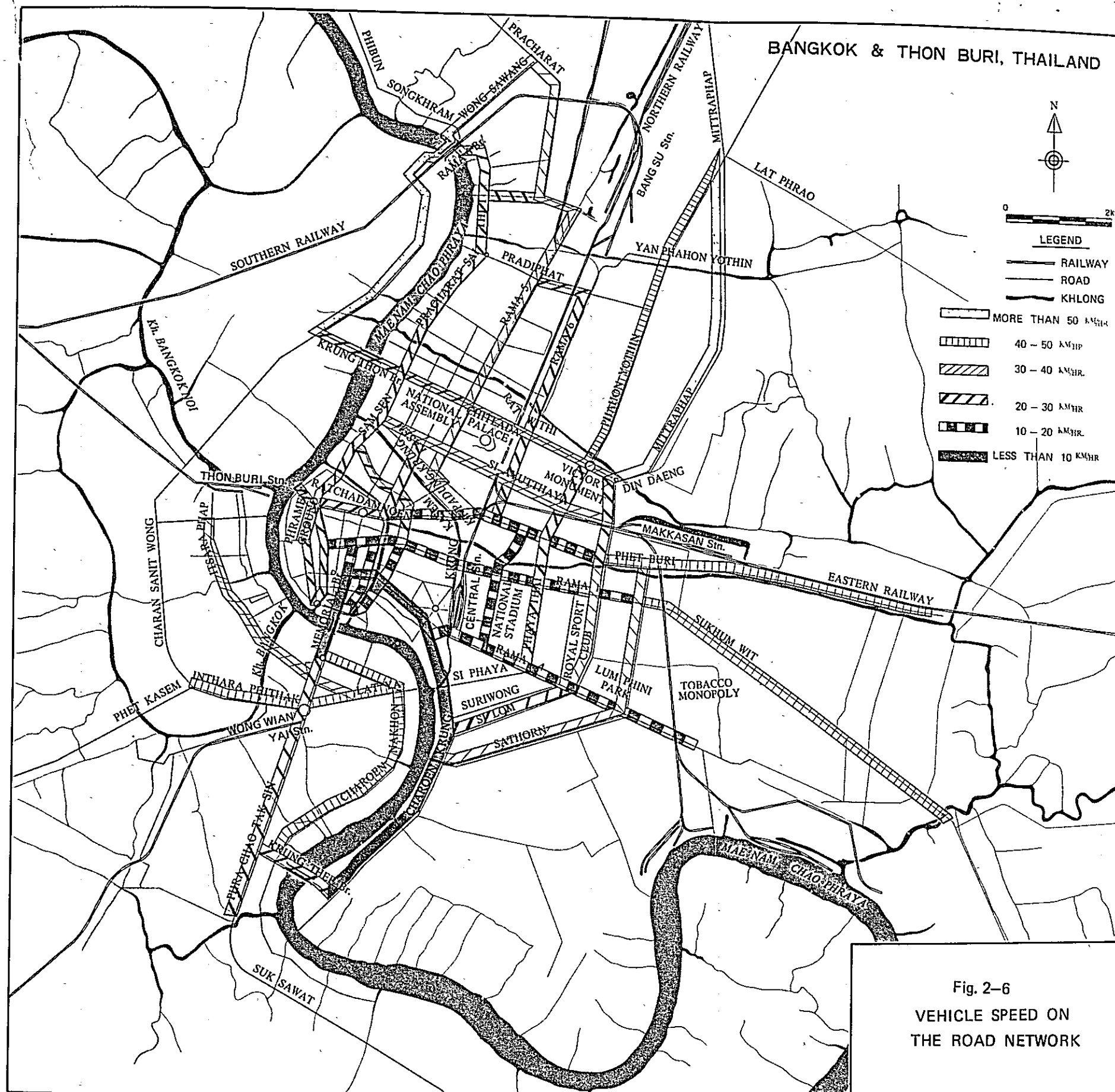
Zone No. in Area covered for Estimation	Changwat	Amphoe	Tambol
1	Phra Nakhon	Phra Nakhon	—
2		Pom Prap	—
3		Samphanthawong	—
4		The part to the west of Sanam Ma Rd in Pathum Wan	Rong Muang, Wang Mai and a part of Pathum Wan
5		The part to the east of Sanam Ma Rd. in Pathum Wan	Suanlumpini and a part of Pathum Wan
6		Bang Rak	—
7E		The parts to the east and south of Soi Suan Phlu Rd , Nang Linchi Rd., Chan Rd. and Sathu Pradit Rd. in Yan Nawa	Tung Mahamek, Chongnonsi and a part of Bang Pongpang
7W		The parts to the west and north of Soi Suan Phlu Rd., Nang Linchi Rd., Chan Rd. and Sathu Pradit Rd. in Yan Nawa	Yan Nawa, Wat Prayakrai, Bon Korlum, Tung Watdorn and a part of Bong Pongpang
8		A part of Phra Khanong	Khlong Toey, Khlong Ton and Phra Khanong
9		The part to the east of Northern Railway in Dusit	Tanon Petchburi, Tung Payathai, Tanon Payathai, Maggason and a part of Samsen Nai
10		The part to the west of Northern Railway and to the south of Khlong Bang Su in Dusit	Wachira Payaban, Dusit, Suan Chitlada, Tanon Nakhonchaisri and a part of Samsen Nai
11		The part to the north of Khlong Bang Su in Dusit	Bang Su and a part of Samsen Nai
12		A part of Bang Khen	Lad Yao
13		A part of Bang Kapi	Samsen Nork, Wang Tong Lang, Khlong Chang and Hua Mark
14N		A part of Khlong Sarn	Samdaj Chao Phraya, Khlong Sarn and Khlong Tonsai
14S		A part of Khlong Sarn	Bang Lumpoo Lang
15		Thon Buri	—
16		Bangkok Yai	—
17S		The part to the south of Khlong Bangkok Noi in Bangkok Noi	Sirraj, Bang Chang Lor, Bang Kunsri and Bang Kunnon
17N		The part to the north of Khlong Bangkok Noi in Bangkok Noi	Bang Yikan, Bang Suanra, Bang Plad and Bang Or
Zone No. outside of Area covered for Estimation	Changwat		
18	The rest of Phra Nakhon		
19	The rest of Thon Buri		
20	Nontha Buri		
21	Nong Khai, Udon Thani, Sakon Nakhon, Nakhon Phanom, Chaiyaphum, Khon Kaen, Kalasin, Nakhon Ratchasima, Maha Sarakham, Roi Et, Ubon Ratchathani, Buri Ram, Surin, Si Sa Ket		
22	Samut Prakan, Chachoengsao, Prachin Buri, Chon Buri, Rayong, Chanthaburi, Trat		
23	Kanchanaburi, Ratchaburi, Nakhon Pathom, Samut Sakhon, Samut Songkhram, Phetchaburi, Prachuap Khiri Khan, Chumphon, Ranong, Surat Thani, Phang-Nga, Phuket, Krabi, Nakhon Si Thammarat, Trang, Phatthalung, Narathiwat, Yala, Pattani, Satun, Songkhla		
24	Pathum Thani, Nakhon Nayok, Suphan Buri, Saraburi, Ang Thong, Lop Buri, Sing Buri, Chai Nat, Phrae, U Thai Thani, Tak Kamphaeng Phet, Phichit, Phetchabun, Nakhon Sawan, Sukhothai, Phitsanulok, Loei, Mae Hong Son, Chiang Mai, Lamphum, Lampang, Chiang Rai, Nan, Uttaradit, Phra Nakhon Si Ayutthaya		

2-3 Summary of the Survey Results

The summary of the traffic survey results is shown in Fig. 2-4 through Fig. 2-6. Figs. 2-4, 2-5 and 2-6 show the results of the OD survey summarized in a desire line chart, the results of the traffic volume survey in a traffic flow map and the travel speed on road sections obtained by the travel time study respectively. For the details of the numerical value, the basis of the figures, please refer to the Appendix.







CHAPTER 3 PRESENT COMPLETE OD TABLE

3-1 Method of Estimation

This chapter outlines the procedures taken in the compilation of the complete OD table for the Bangkok-Thon Buri Metropolitan Area from the incomplete OD table which was obtained as the results of the traffic survey.

Vehicular traffic in the Metropolitan Area may be classified into passenger cars, taxis, trucks, buses, samlor and motorcycles, but the types covered in the survey were limited to passenger cars, taxis and trucks.

As for the regular bus service, the operating routes and schedules are available in the existing data and therefore, the estimation may be made separately.

The Samlor is a small, unique, three-wheeled vehicle commonly seen in Bangkok. For speed and comfort it cannot equal a taxi, but economically speaking its fare is mid-way between a bus and a taxi and it is very popular among the townspeople of Bangkok. Since the operating pattern of the Samlor is almost the same as that of the taxi and it is expected to be replaced by the taxi in the future, it should be included in the category of taxi in making a traffic estimate. From here on, all references to taxis will include the Samlors unless otherwise indicated.

Since OD survey interviews have been conducted at four bridges between Bangkok and Thon Buri, the traffic volume obtained from the OD survey is the direct indication of the traffic between Bangkok and Thon Buri.

Assuming that the Gravity Model is applicable to the relationship between the traffic volume and traveling time between zones, the traffic generation in each zone and the exponent of the traveling time between zones can be estimated from the traffic volume and the assumed traveling time between the zones in Bangkok and Thon Buri.

On the OD table compiled from the traffic generation estimate in each zone and the traveling time between zones and its exponent, the following studies were made to ascertain its accuracy.

First, several screen lines were set up in the Metropolitan Area and the distribution probabilities of the OD pairs crossing these screen lines were obtained from the computed OD table. From the OD distribution probability, thus computed, and the surveyed traffic volume on these screen lines, the total number of trips in the Metropolitan Area may be calculated. If the assumption of conditions is properly made, such calculation independently carried out on each of the screen lines should give an identical total number of trips in the Metropolitan Area.

Secondly, the zone pair traffic volume between Bangkok and Thon Buri obtained from the computed OD table is compared with that obtained from the surveyed OD table.

When the OD table satisfies the above two conditions, the estimated OD table may be regarded as an accurate one.

Traveling time between zones and traffic generation by zones are determined through the above process.

Finally, the complete OD table for each vehicle type may be obtained from the determined traveling time between zones and the surveyed incomplete OD table for the types in the same manner as described before.

3-2 All Vehicle OD Table

(1) Traffic Generation in each Zone and the Exponent of the Traveling Time between Zones

The traffic volume between zones is expressed by the Gravity Model as follows:

$$X_{ij} = \alpha W_i W_j t_{ij}^{-\gamma}$$

where:

X_{ij}	:	traffic volume between zones i and j
α	:	constant
W_i	:	traffic generation in zone i
W_j	:	traffic generation in zone j
t_{ij}	:	travel time between zones i and j
γ	:	exponent of travel time between zones

Here, the portion of W_i which crosses the Mae Nam Chao Phraya is expressed by W_{bti} . In other words, since the zone numbers on the Bangkok side are 1 - 13 and those on the Thon Buri side are 14 - 17, the following equations may be set up.

$$\text{when } 1 \leq i \leq 13, W_{bti} = \sum_{j=14}^{17} X_{ij}$$

$$\text{when } 14 \leq i \leq 17, W_{bti} = \sum_{j=1}^{13} X_{ij}$$

Therefore, the following may be established.

$$W_i = W_{bti}^{k_i}$$

$$1 < k_i \quad (\because W_i > W_{bti})$$

If the foregoing Gravity Model is to be changed with the use of symbols indicating partial traffic generation or W_{bti} , the following may be said:

$$\begin{aligned} X_{ij} &= \alpha W_i W_j t_{ij}^{-\gamma} \\ &= \alpha W_{bti}^{k_i} W_{btj}^{k_j} t_{ij}^{-\gamma} \end{aligned}$$

Using logarithm, the above will be:

$$\log X_{ij} = \log \alpha + k_i \log W_{bti} + k_j \log W_{btj} - \gamma \log t_{ij}$$

Since X_{ij} or the zone pair traffic volume between Bangkok and Thon Buri, and W_{bti} , the partial traffic volume in zone i , have been obtained from the OD survey, the assumption of t_{ij} , the zone pair traveling time between Bangkok and Thon Buri, will be found in the following equations, using $\log \alpha$, k_i and γ as unknowns.

$$\log X_{1.14} = \log \alpha + k_1 \log W_{bt1} + k_{14} \log W_{bt14} - \gamma \log t_{1.14}$$

$$\log X_{1.15} = \log \alpha + k_1 \log W_{bt1} + k_{15} \log W_{bt15} - \gamma \log t_{1.15}$$

⋮

$$\log X_{1.17} = \log \alpha + k_1 \log W_{bt1} + k_{17} \log W_{bt17} - \gamma \log t_{1.17}$$

$$\log X_{2.14} = \log \alpha + k_2 \log W_{bt1} + k_{14} \log W_{bt14} - \gamma \log t_{2.14}$$

⋮

$$\log X_{13.17} = \log \alpha + k_{13} \log W_{bt13} + k_{17} \log W_{bt17} - \gamma \log t_{13.17}$$

In the above equations X_{ij} , the zone pair traffic volume between Bangkok and Thon Buri and W_{bti} , the partial traffic generation in zones are already known from the OD survey, and so appropriate determination of t_{ij} , the zone pair traveling time between Bangkok and Thon Buri will leave 19 unknowns, α , γ , k_1 , k_2 , . . . , k_{17} . Meanwhile, as the number of equations is $4 \times 13 = 52$, the value of the unknowns α , γ , k_i may be obtained by the method of least square. Once k_i is obtained, W_i may be obtained from the relationship of $W_1 = W_{bti}^{k_i}$.

Based on the above concept, the traffic generation of all vehicles in each zone and the exponent of the zone pair traveling time may be obtained from the zone pair traffic volume between Bangkok and Thon Buri, as shown in the OD table contained in the Appendix, and the estimated zone pair traveling time between Bangkok and Thon Buri. The exponent of the traveling time between zones is 1.3010, and the relative traffic generation in each zone or the ratio of the traffic generation in each zone to that of the entire area are shown in Table 3-1. The traveling time between zones in Bangkok and those in Thon Buri in that case is also shown in Table 3-2 along side of those of other zone pairs.

Table 3-1 Relative Traffic Generation of
All Vehicles by Zones in 1969

Zone No.	Relative Traffic Generation
1	0.2239
2	0.0889
3	0.1248
4	0.0733
5	0.0175
6	0.0587
7	0.0810
8	0.0958
9	0.0389
10	0.0315
11	0.0229
12	0.0350
13	0.0162
14	0.0114
15	0.0364
16	0.0103
17	0.0335
Total	1.0000

Table 3-2 Traveling Time between Zones in 1969

(hr.)

Zone No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	0.135	0.280	0.433	0.279	0.324	0.288	1.147	0.501	0.241	0.145	0.308	0.354	0.318	0.417	0.467	0.449	0.570
2		0.049	0.480	0.250	0.219	0.246	1.058	0.401	0.201	0.164	0.281	0.314	0.265	0.487	0.525	0.843	0.507
3			0.117	0.216	0.303	0.271	0.710	0.459	0.309	0.529	0.435	0.370	0.392	0.516	0.544	0.551	1.288
4				0.046	0.099	0.113	0.333	0.256	0.144	0.309	0.318	0.263	0.140	0.437	0.456	0.456	0.617
5					0.073	0.102	0.516	0.152	0.088	0.212	0.249	0.171	0.075	0.344	0.375	0.368	0.583
6						0.037	0.463	0.159	0.191	0.309	0.345	0.304	0.210	0.491	0.522	0.519	0.721
7							0.075	0.318	0.407	0.526	0.552	0.487	0.400	0.750	0.640	0.725	1.080
8								0.060	0.110	0.125	0.292	0.212	0.170	0.973	0.722	0.780	0.673
9									0.070	0.147	0.191	0.133	0.176	0.382	0.416	0.298	0.191
10										0.071	0.150	0.294	0.277	0.337	0.390	0.267	0.176
11											0.042	0.177	0.371	0.368	0.462	0.282	0.187
12												0.049	0.250	0.515	0.560	0.445	0.429
13													0.063	0.762	0.755	0.785	0.867
14														0.051	0.080	0.085	0.270
15															0.058	0.094	0.240
16																0.037	0.173
17																	0.055

(2) Estimation of OD Distribution Probability

After establishing the all-vehicle traffic generation in each zone, the exponent of the traveling time between zones and the zone pair traveling time between Bangkok and Thon Buri, the OD distribution probability is then computed by assuming the traveling time for zone pairs other than those between Bangkok and Thon Buri. The final traveling time adopted is shown in Table 3-2.

Computation of the OD distribution probability is made by the Entropy Method* developed by Dr. Tsuna Sasaki, Professor at Kyoto University.

(3) OD Distribution Probability Check

(a) Screen Lines

The accuracy of the computed OD table from the traffic volume measured on the five screen lines as shown in Fig. 3-1 was checked in the following manner.

From the computed OD distribution probability, the ratio of the traffic crossing each screen line to the total number of trips can be calculated.

As the surveyed traffic volume includes traffic having origin and/or destination outside the estimation area, the traffic volume within the area must be obtained from the former. Then, from the ratio of traffic volume to OD distribution probability crossing one screen line, the traffic volume of 100 percentile probability or the total number of trips within the area may be calculated. If the computed OD table is exact, the total number of trips within the area calculated by the above method should be the same on any screen line. If it does not agree, computation must be repeated over again from the assumption of t_{ij} , until a satisfactory result is found. The total number of trips on each screen line obtained after several trials is shown in Table 3-3.

Table 3-3 Surveyed and Computed Traffic Volume on Screen Lines

Screen Line Number	Surveyed traffic volume	Traffic Volume within the area	OD distribution probability	Total number of trips within the area
I	102,400	76,800	0.08006	959,280
II	375,600	293,000	0.21750	1,347,126
III	86,200	67,300	0.05788	1,162,750
IV	391,800	305,000	0.20416	1,493,926
V	356,200	276,000	0.28110	980,112

(b) The OD Distribution between Bangkok and Thon Buri

Comparison of the surveyed OD table and the computed OD table, is illustrated in Fig. 3-2. From this figure, we can see that the traffic distributions in both OD tables are practically equal to each other.

* Reference:

Tsuna Sasaki: Probability Method to Estimate Trip Distribution

*Annual Report of Roads 1967 Edition,
Published by Japan Road Association*

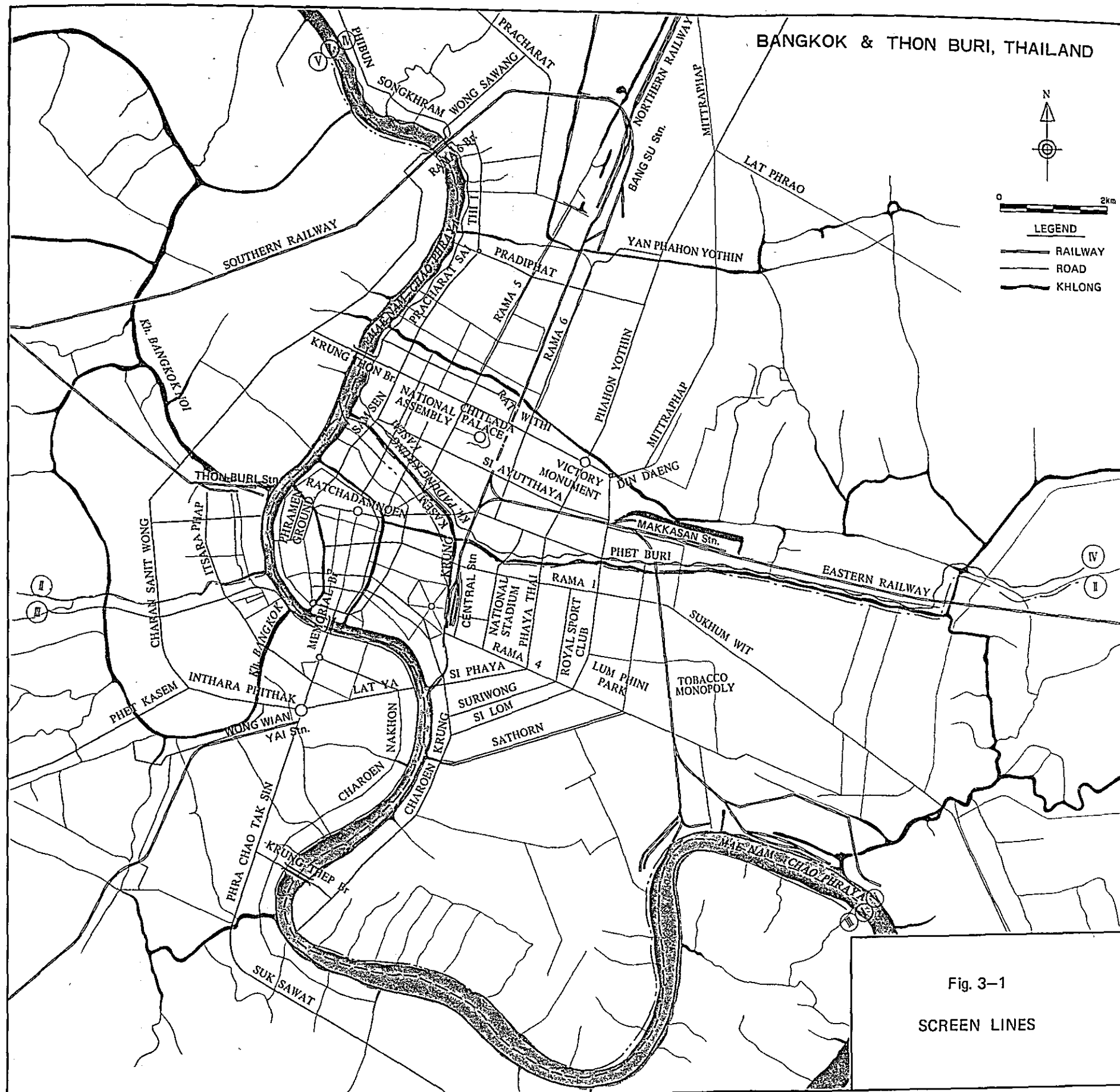
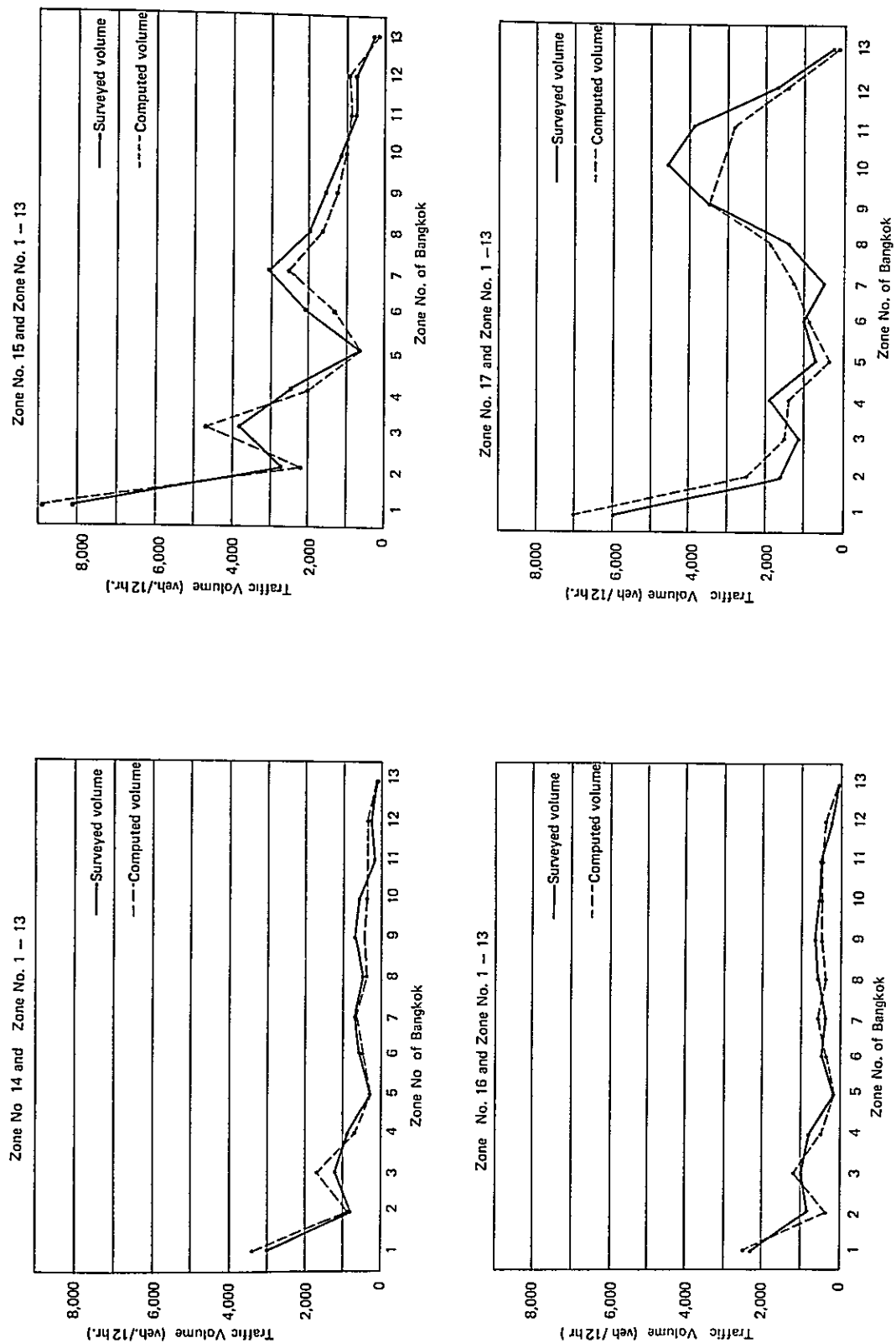


Fig. 3-2 SURVEYED AND COMPUTED TRAFFIC VOLUME BETWEEN ZONES IN BANGKOK AND THOSE IN THON BURI



In order to make an accurate estimation of the traffic volume between Bangkok and Thon Buri, the prime objective of this report, the total number of trips within the area was designated as the value, which may be obtained by use of the screen line that runs along the Mae Nam Chao Phraya, one of several screen lines shown in Fig. 3-1, and registers 959, 280 trips as shown in Table 3-3.

3-3 OD Tables by Vehicle Types

Through computations described in the foregoing sections, the OD table, traffic generation in each zone, traveling time between zones and its exponent for all vehicles have been established. In this section, the OD tables by vehicle types will be discussed.

The method to be used for estimation is the same as was used for all vehicles previously discussed. In this case, however, the traveling time between zones may be represented by the value, shown in Table 3-2, which has been established in the estimation of all vehicles, because the traveling speed of all vehicles is considered to be almost the same in such an urban area as Bangkok and Thon Buri. Table 3-4 shows the exponents of the traveling time between zones and the relative traffic generation within each zone, by vehicle types.

Table 3-4 Exponent of Traveling Time between Zones and Relative Traffic Generation of Each Vehicle Type

Zone No.	(1) (2)	Passenger car	Taxi	Truck
		1.0723	1.6112	1.5769
1		0.2257	0.2379	0.1611
2		0.0918	0.0888	0.0820
3		0.1028	0.1628	0.1223
4		0.0760	0.0756	0.0537
5		0.0220	0.0150	0.0075
6		0.0683	0.0468	0.0558
7		0.0622	0.0887	0.1642
8		0.0967	0.0824	0.1274
9		0.0493	0.0311	0.0217
10		0.0398	0.0239	0.0185
11		0.0207	0.0152	0.0449
12		0.0394	0.0292	0.0323
13		0.0200	0.0065	0.0117
14		0.0115	0.0121	0.0082
15		0.0324	0.0402	0.0415
16		0.0094	0.0094	0.0116
17		0.0320	0.0344	0.0356
Total		1.0000	1.0000	1.0000

Notice: (1) Vehicle type
(2) Exponent of distance between zones

The following clearly indicates the conformity of the foregoing computation with the actual traffic conditions.

- (1) The exponent of the traveling time between zones shows that taxis have the shortest traveling distance.
- (2) It also shows that passenger cars have the longest traveling distance.
- (3) The traffic generation of trucks in a crowded warehouse area along the Charoen Krung Rd. and around the Port of Bangkok is fairly large and is reflected in the value of the traffic generation in zone 7 (Amp. Yan Nawa) and zone 8 (Amp. Phra Khanong).

The relative traffic generation in each zone based on Table 3-4 is shown in Fig. 3-3, with the total traffic generation in zones 1 to 17 equal to 1.

Then from the previously determined traveling time, the OD distribution probability by vehicle types may be computed by the Entropy Method and is converted to OD tables, using the total number of trips.

The OD tables by vehicle types are consolidated into one OD table, which is almost equal to that obtained in 3-2.

The OD tables by vehicle types and the consolidated all-vehicle OD table are shown in Tables 3-5 through 3-8. Fig. 3-4 is the desire line chart based on Table 3-8.

Fig. 3-3 RELATIVE TRAFFIC GENERATION BY ZONES

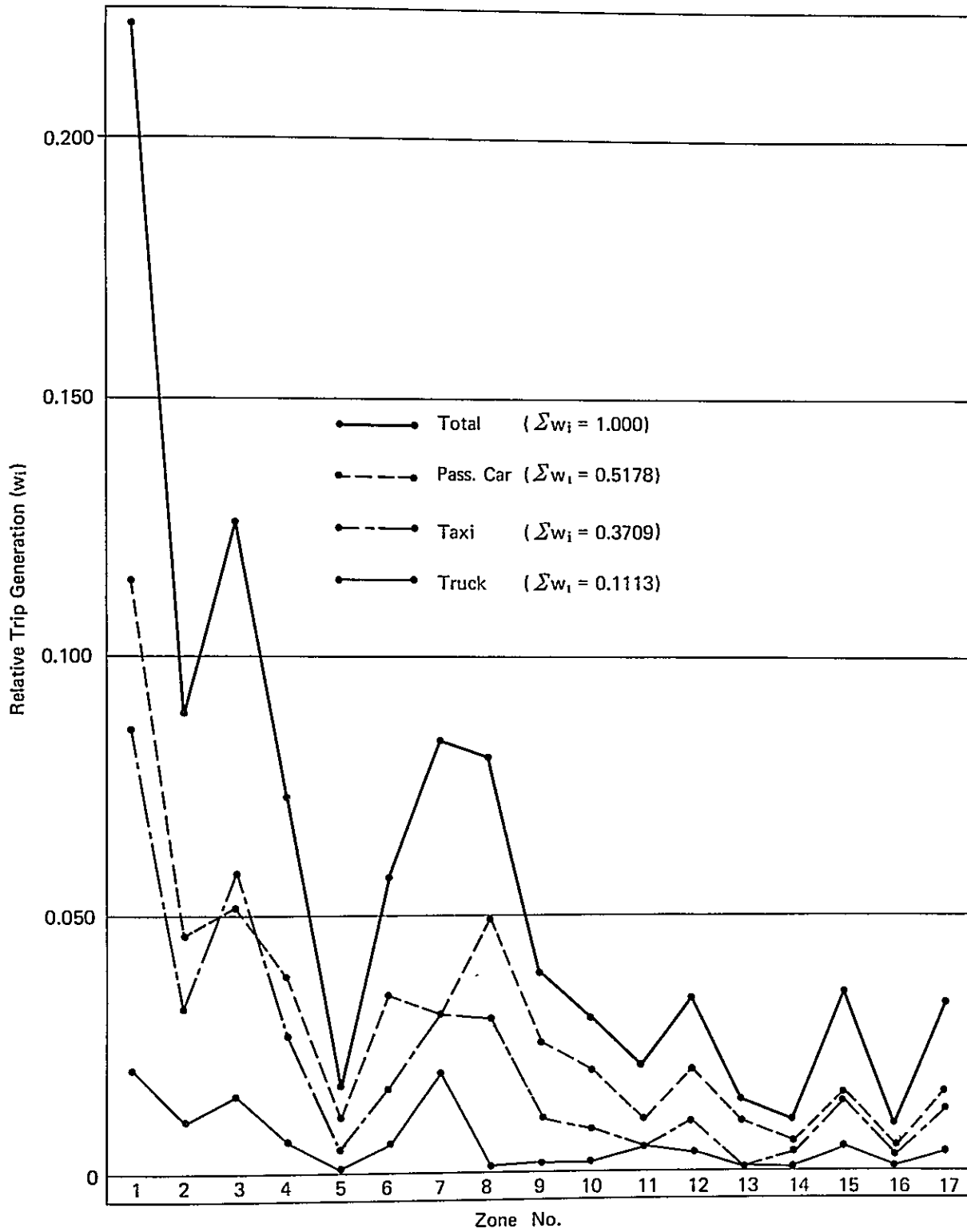


Table 3-5 Computed OD Table (Passenger Cars) for 1969

(trips/12_hr.)																		
Zone No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	TOTAL
1	42,521	13,398	13,540	9,518	2,455	8,203	3,342	7,602	7,079	10,246	3,247	5,084	2,898	1,679	4,165	1,251	3,532	182,281
2		14,942	4,181	3,690	1,283	3,342	1,251	3,326	2,961	3,088	1,235	1,995	1,219	491	1,267	222	1,378	74,211
3			15,298	6,952	1,473	4,862	3,104	4,640	3,009	1,425	1,251	2,692	1,283	744	1,964	554	824	83,094
4				8,013	2,138	5,448	3,056	3,801	2,993	1,109	760	1,710	1,710	396	1,045	301	792	61,445
5					451	1,853	586	2,011	1,536	507	301	824	1,014	158	396	111	253	17,801
6						8,053	1,916	5,654	1,980	998	633	1,299	982	301	808	238	602	55,225
7							12,091	4,814	1,568	998	681	1,409	887	348	1,156	285	697	50,280
8								13,461	5,986	4,371	1,251	3,215	2,075	253	950	253	1,077	78,201
9									2,067	1,568	839	2,249	855	285	728	301	1,774	39,845
10										1,433	919	808	443	269	649	285	1,615	32,164
11											1,275	998	222	174	396	190	1,077	16,724
12												3,563	633	222	570	206	808	31,848
13													705	79	206	63	190	16,169
14														531	1,821	491	523	9,296
15															3,603	1,235	1,647	26,209
16																483	665	7,617
17																	4,213	25,880
TOTAL																		404,145*

Notice : * shows number of trips.

Notice : * shows number of trips.

Table 3-6 Computed OD Table (Taxis) for 1969

(trips/12 hr.)																		
Zone No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	TOTAL
1	73,750	12,148	16,736	8,912	1,804	5,490	1,962	4,960	5,384	9,390	2,652	3,766	1,140	1,458	3,714	954	2,600	230,570
2		26,816	3,766	2,838	902	1,884	610	1,884	1,922	2,042	822	1,220	398	292	822	106	848	86,136
3			51,098	10,000	1,486	4,482	3,156	4,244	2,678	876	1,114	2,600	610	770	2,148	504	530	157,896
4				15,834	2,360	4,828	2,812	2,838	2,414	530	478	1,168	822	266	742	186	450	73,312
5					490	1,458	344	1,698	1,352	266	186	610	584	106	266	54	132	14,588
6						9,430	1,060	3,978	982	344	266	610	292	132	398	106	212	45,382
7							33,420	4,324	982	504	424	954	332	238	928	186	398	86,054
8								21,034	5,304	3,316	796	2,388	876	106	504	106	558	79,948
9									1,830	848	530	1,698	266	160	424	186	1,406	30,196
10										1,060	610	372	106	132	344	160	1,220	23,180
11											2,214	770	54	132	266	132	1,060	14,720
12												5,464	212	132	344	106	504	28,382
13													238	26	54	0	54	6,302
14														1,300	3,872	848	530	11,800
15															9,986	2,228	1,962	38,988
16																1,220	796	9,098
17																	10,080	33,420
TOTAL																		484,986*

Notice : * shows number of trips.

Notice : * shows number of trips.

Table 3-7 Computed OD Table (Trucks) for 1969

Zone No.	(trips/12 hr.)																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	TOTAL
1	15,096	3,195	3,823	1,911	236	1,728	786	1,807	1,021	1,964	1,597	1,100	550	288	1,074	314	733	52,319
2		8,288	1,074	759	157	733	288	864	445	550	602	445	236	79	288	26	288	26,605
3			12,019	2,278	209	1,519	1,335	1,650	550	209	733	812	314	157	655	183	157	39,696
4				3,247	314	1,493	1,100	1,047	445	130	288	340	393	52	209	52	131	17,436
5					39	288	79	393	157	26	79	105	183	0	52	26	26	2,408
6						4,111	602	2,095	288	104	262	262	209	52	157	52	105	18,171
7							21,800	2,802	340	183	471	500	288	79	498	105	209	53,265
8								12,281	1,676	1,178	812	1,152	707	26	262	52	262	41,347
9									301	157	288	419	105	26	104	52	340	7,015
10										223	367	105	52	26	104	52	340	5,993
11											3,574	628	79	79	209	131	812	14,585
12												2,029	131	26	131	52	183	10,449
13													249	0	26	0	26	3,797
14														209	943	236	131	2,618
15															3,548	917	707	13,432
16																563	340	3,716
17																	3,391	11,572
TOTAL																		162,212*

Notice : * shows number of trips.

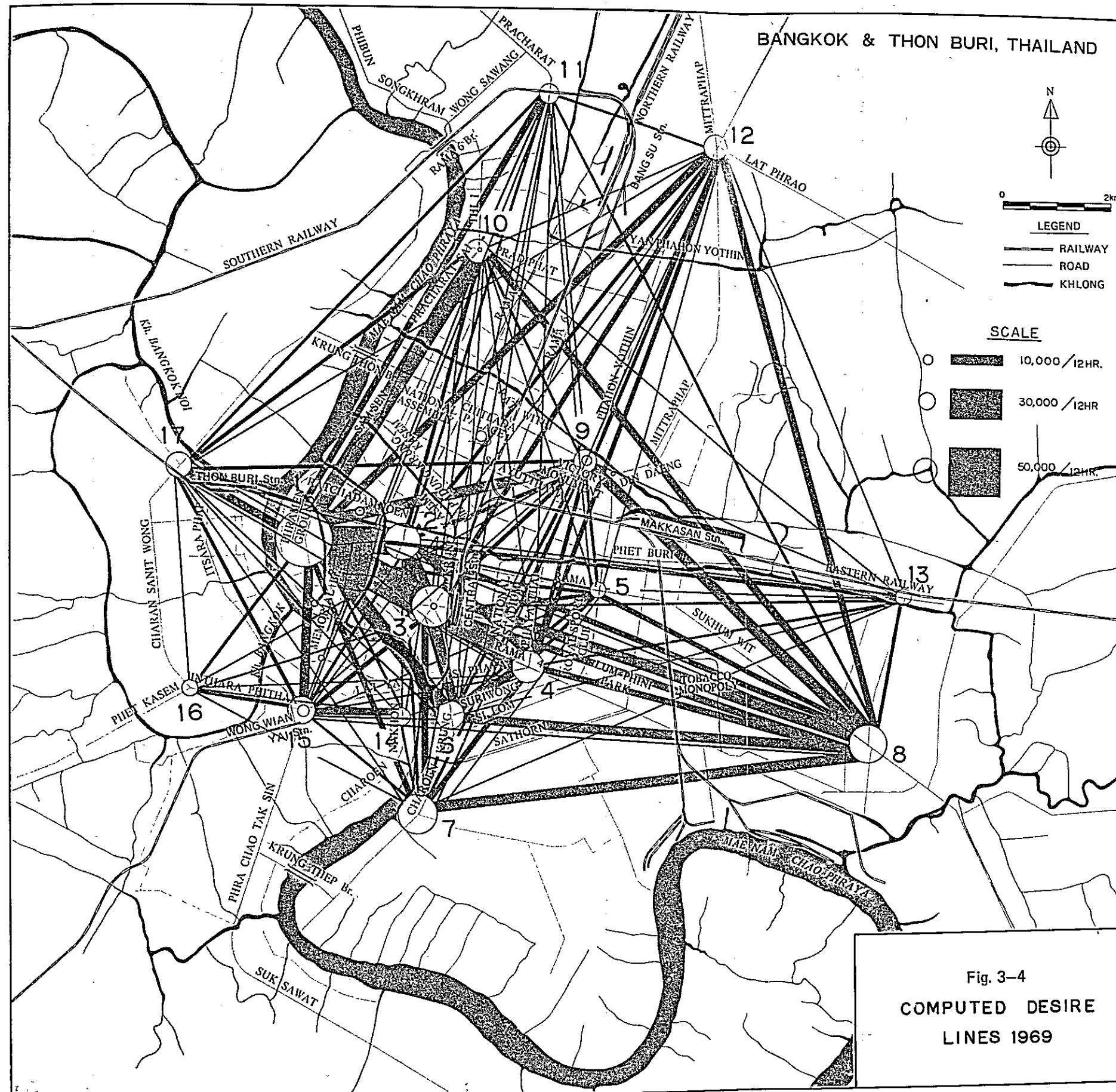
Notice : * shows number of trips.

Table 3-8 Computed OD Table (All vehicles) for 1969

(trips/12 hr.)																		
Zone No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	TOTAL
1	131,367	28,741	34,099	20,341	4,495	15,421	6,090	14,369	13,484	21,600	7,496	9,950	4,588	3,425	8,953	2,519	6,865	465,170
2		50,046	9,021	7,287	2,342	5,959	2,149	6,074	5,328	5,680	2,659	3,660	1,853	862	2,377	354	2,514	186,952
3			78,415	19,230	3,168	10,863	7,595	10,534	6,237	2,510	3,098	6,104	2,207	1,671	4,767	1,241	1,511	280,686
4				27,094	4,812	11,769	6,968	7,686	5,852	1,769	1,526	3,218	2,925	714	1,996	539	1,373	152,193
5					980	3,599	1,009	4,102	3,045	799	566	1,539	1,781	264	714	191	411	34,797
6						21,594	3,578	11,727	3,250	1,446	1,161	2,171	1,483	485	1,363	396	919	118,778
7							67,311	11,940	2,890	1,585	1,576	2,863	1,507	665	2,582	576	1,304	189,599
8								46,776	12,966	8,865	2,859	6,755	3,658	385	1,716	411	1,897	199,496
9									4,198	2,573	1,657	4,366	1,226	471	1,256	539	3,520	77,056
10										2,716	1,896	1,285	601	427	1,097	497	3,175	61,337
11											7,063	2,396	355	385	871	453	2,949	46,029
12												11,056	976	380	1,045	364	1,495	70,679
13													1,192	105	286	63	270	26,268
14														2,040	6,636	1,575	1,184	23,714
15															17,137	4,380	4,316	78,629
16																2,266	1,801	20,431
17																	17,684	70,872
TOTAL																		1,051,343*

Notice : * shows number of trips.

Notice : * shows number of trips.



3-4 Daily Trips per Vehicle

The average daily trips per vehicle can be calculated from the total trips as obtained from the OD table and vehicle registration.

Since the number of trips per vehicle of a particular kind of vehicle is one of the indicators showing the operating pattern of that particular type, the estimated values, 31.12 trip/veh./day for taxis, 4.18 trip/veh./day for trucks and 3.94 trip/veh./day for passenger cars (Table 3-9) are considered appropriate in respect to their absolute and relative values.

Table 3-9 Daily Trips of Each Vehicle Type

Vehicle type	Total trips	Registered vehicles	Trips per vehicle
Passenger car	404,145	102,530	3.94
Taxi	484,986	15,583	31.12
Truck	162,212	38,766	4.18
Total	1,051,343	156,879	6.70

CHAPTER 4 FUTURE TRAFFIC DISTRIBUTION

4-1 Method of Estimation

Future traffic in the Metropolitan Area will be forecasted for 1975 when the Sathorn Br. is expected to be completed and for 1990, 15 years thereafter.

The estimation was made in the following manner.

The future total number of trips was estimated first, by taking the product of the forecasted vehicle registration and the number of daily trips per vehicle which had been assumed not to change even in the future.

Then, the future traffic generation was estimated, using the correlation equation between land usage and traffic generation. With the future traffic generation estimated as mentioned above, and the assumed travel time, the OD distribution probability was computed by the Entropy Method. And finally, the future OD tables were computed as the products of the OD distribution probabilities and the future total trips.

4-2 Total Number of Trips in the Future

Table 4-1 shows the recent trend in the number of vehicle registrations for each vehicle type in Thailand.

Table 4-1 Annual Vehicle Registration in Thailand

Year	Passenger car	Taxi	Truck
1957	24,008	6,881	20,676
1958	27,865	7,530	22,629
1959	31,119	9,034	31,472
1960	33,105	16,762	36,253
1961	39,245	9,460	40,956
1962	41,147	10,666	45,342
1963	48,342	11,924	51,535
1964	56,835	12,497	57,769
1965	—	12,148	58,098
1966	76,912	14,011	80,389

Source: National Economic Development Board,
"Economic Progress of Thailand, General Indicators"

Population, G.N.P., consumption expenditures, capital formations, etc. are economic indicators generally thought to have an effect on the growth of the number of vehicles. As a result of a correlation analysis, the following expressions with relatively high correlation are adopted to estimate the future number of registered vehicles.

The value of the economic indicators used for correlation analysis is shown in Table 4-2.

Table 4-2 General Economic Indicators

Year	Population (1,000 persons)	Consumption Expenditure (฿1,000,000)	G N P (฿1,000,000)
1957	24,148	40,247	48,196
1958	24,873	39,281	-----
1959	25,619	43,274	53,628
1960	26,392	47,501	59,352
1961	27,210	50,388	61,875
1962	28,054	52,874	65,209
1963	28,923	55,720	71,634
1964	29,820	59,076	75,951
1965	30,744	63,108	82,662
1966	31,689	67,621	91,802
1975	37,500	82,758.4	110,306.9
1990	62,500	280,011.4	407,042

Source: (1957 - 1966) National Economic Development Board,
 "Economic Progress of Thailand, General Indicators"
 (1975 and 1990) Report of ECAFE

$$Y_p = 6.596 X_1 - 138,768$$

$$r = 0.974$$

$$Y_{ta} = 0.486 X_2 - 7,854$$

$$r = 0.875$$

$$Y_{tr} = 1.235 X_3 - 36,864$$

$$r = 0.982$$

where: Y_p : Number of registered passenger cars throughout the country
 (vehicles)

Y_{ta} : Number of registered taxis throughout the country (vehicles)

Y_{tr} : Number of registered trucks throughout the country (vehicles)

X_1 : Population (1,000 persons)

X_2 : Consumption expenditure (฿1,000,000)

X_3 : GNP (฿1,000,000)

As the values of the economic indicators are expected to change in the future as shown in Table 4-1, the number of future vehicle registrations may be obtained by substituting the changed values in the above expressions.

However, since this vehicle registration value represents the total number of vehicles in Thailand, and the vehicles to be covered in the estimation are supposed to be in the Metropolitan Area, the ratio of the number of registered vehicles in Bangkok and Thon Buri (Table 4-3) to that of the whole country (Table 4-1) shown in Table 4-4 should be used. However, as this ratio does not indicate any definite tendency, the average of the ratios for the period between 1957 and 1966 has been adopted for future estimation. Consequently, the future number of vehicle registrations in both cities may be estimated by multiplying the number of registered vehicles in the whole country by this ratio. According to Figs. 4-1 through 4-3, the total number of vehicles of all types in Bangkok and Thon Buri was 157,000 as of 1968, of which passenger cars led with a number of 103,000, followed by 39,000 trucks and 16,000 taxis. In 1975, the total number of vehicles is expected to increase to 269,000, with 159,000 passenger cars, 73,000 trucks and 37,000 taxis. In 1990, the total number is expected to grow to 615,000, with vehicle types increasing respectively to 280,000, 228,000 and 99,000. The growth rate during the 7 year period from 1968 to 1975 is estimated at an increase of 1.6 times for passenger cars, 1.9 times for trucks and 2.4 times for taxis giving an average rate of 1.7. In the 15 year period from 1975 to 1990 the growth rate will be 1.8, 3.1 and 2.7 times respectively with an average rate of 2.3

Table 4-3 Annual Vehicle Registration in Bangkok and Thon Buri

Year	Passenger car	Taxi	Samlor	Truck
1951	10,900	580	---	3,818
1952	13,869	1,172	---	5,104
1953	16,344	2,387	---	7,365
1954	14,328	2,217	---	7,298
1955	17,427	2,508	1,997	7,711
1956	18,218	4,695	1,766	6,678
1957	19,951	5,907	1,691	9,463
1958	23,236	6,191	1,632	9,338
1959	25,440	7,170	1,373	11,792
1960	27,274	14,574	1,616	14,455
1961	37,888	6,421	6,823	13,720
1962	38,045	7,083	7,873	15,458
1963	42,588	9,000	7,799	20,975
1964	49,880	8,951	7,597	19,637
1965	58,732	8,677	7,266	22,487
1966	67,699	8,644	7,262	27,638
1967	83,131	8,998	6,855	33,957
1968	102,530	8,882	6,701	38,766

Table 4-4 Ratio of Vehicle Registration in Bangkok and Thon Buri to that in Thailand

Year	Passenger car	Taxi	Truck
1957	0.8310	0.8584	0.4577
1958	0.8339	0.8222	0.4127
1959	0.8175	0.7937	0.3747
1960	0.8239	0.8695	0.3987
1961	0.9654	0.6788	0.3350
1962	0.9246	0.6641	0.3409
1963	0.8810	0.7548	0.4070
1964	0.8776	0.7163	0.3399
1965	-----	0.7143	0.3871
1966	0.8802	0.6169	0.3438
Mean	0.871	0.778	0.380

Table 4-5 Future Total Number of Trips in Bangkok and Thon Buri

Year	Vehicle type	Vehicle Registration		Number of Total Trips in Bangkok and Thon Buri
		Thailand	Bangkok and Thon Buri	
1975	Passenger car	182,412	158,881	626,000
	Taxi	47,385	36,866	1,147,000
	Truck	192,286	73,069	305,450
	Total	422,083	268,816	2,078,750
1990	Passenger car	330,982	288,286	1,135,800
	Taxi	127,005	98,810	3,075,000
	Truck	599,213	227,701	951,790
	Total	1,057,200	614,797	5,162,000

The growth of trucks will be remarkable particularly after 1975. This prediction is considered justifiable in view of the expected shift in transportation needs, which now heavily depends on water transportation, to road transportation as a result of the future industrialization of Thailand.

By multiplying the number of registered vehicles by the number of trips per vehicle as shown in Table 3-9, the total number of trips of all vehicles in the area may be obtained. The total number of trips (Table 4-5) for 1975 and for 1990 are 2,080,000 and 5,160,000 respectively. These rates represent an increase over the 1969 total (1,050,000 trips) by 2.0 and 4.9, respectively.

Fig. 4-1 REGISTERED PASSENGER CARS AND POPULATION

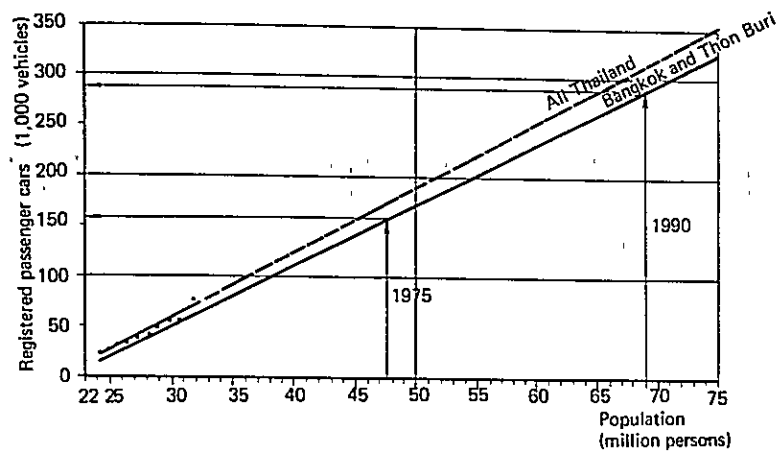


Fig. 4-2 REGISTERED TAXIS AND CONSUMERS' EXPENDITURE

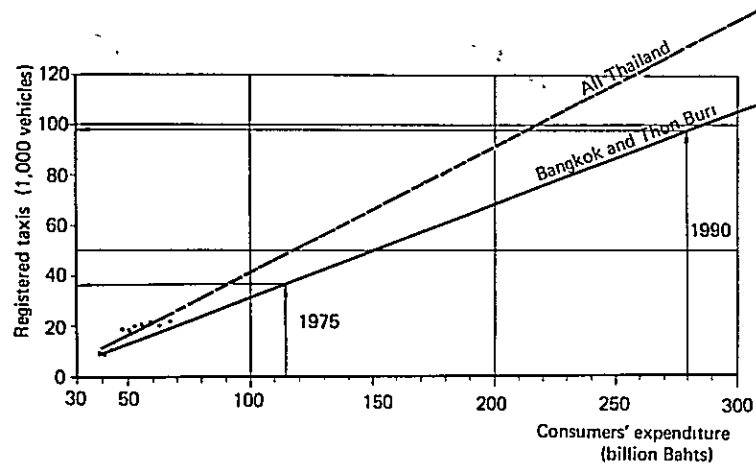
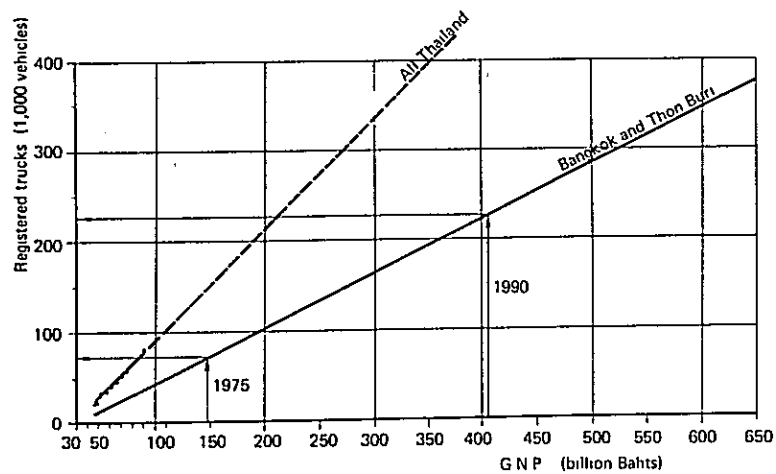


Fig. 4-3 REGISTERED TRUCKS AND GNP



4-3 Traffic Generation

To estimate future traffic generation in each zone, first an analysis must be made to find the correlation of the present traffic generation in each zone to the land usage in each zone.

The present traffic generation by vehicle types has already been obtained in Section 3-3 and the land usage may be obtained from Figs. 4-4 and 4-5. Fig. 4-5 shows the land usage status in 1969, as surveyed by the Bangkok City Municipality, but unfortunately it is incomplete. Therefore, the Thon Buri side and the incomplete portion of Bangkok must be supplemented by use of the land usage map for 1965 shown in Fig. 4-4.

The land classified according to use as obtained from the above mentioned maps, is shown in Table 4-6.

After several trials the following correlation equations were adopted for the estimation:

$$W_p = 86,798 X_1 + 9,102 X_3 - 3,675 X_4 + 17,856$$

$$R = 0.693$$

$$W_{ta} = 119,916 X_1 + 7,917 X_3 - 7,369 X_4 + 4,473 X_5 + 26,608$$

$$R = 0.685$$

$$W_{tr} = 31,668 X_1 + 5,676 X_2 + 1,455 X_3 + 3,505$$

$$R = 0.715$$

where: W_p : Traffic generation by passenger cars in each zone (trip/12hr.)

W_{ta} : Traffic generation by taxis in each zone (trip/12hr.)

W_{tr} : Traffic generation by trucks in each zone (trip/12hr.)

X_1 : Area of the commercial district (km²)

X_2 : Area of the industrial district (km²)

X_3 : Area of the governmental district (km²)

X_4 : Area of the residential district (km²)

X_5 : Area of the utilities district (km²)

R : Multiple correlation coefficient

Though the above expressions seem a bit strange in that the coefficient of the correlation is rather small and the parameters of X_4 in the expressions for passenger cars and taxis are negative, they are generally considered acceptable.

The commercial district is diversified and there seems to be a great difference in traffic generation between the areas of densely populated busy streets such as in zone 1 (Amp. Phra Nakhon) and zone 3 (Amp. Samphantawong), and in the outlying area such as in zone 8 (Amp. Phra Khanong), zone 9 (Amp. Dusit) and zone 10 (Amp. Dusit).

Fig. 4-4 LAND USE 1965

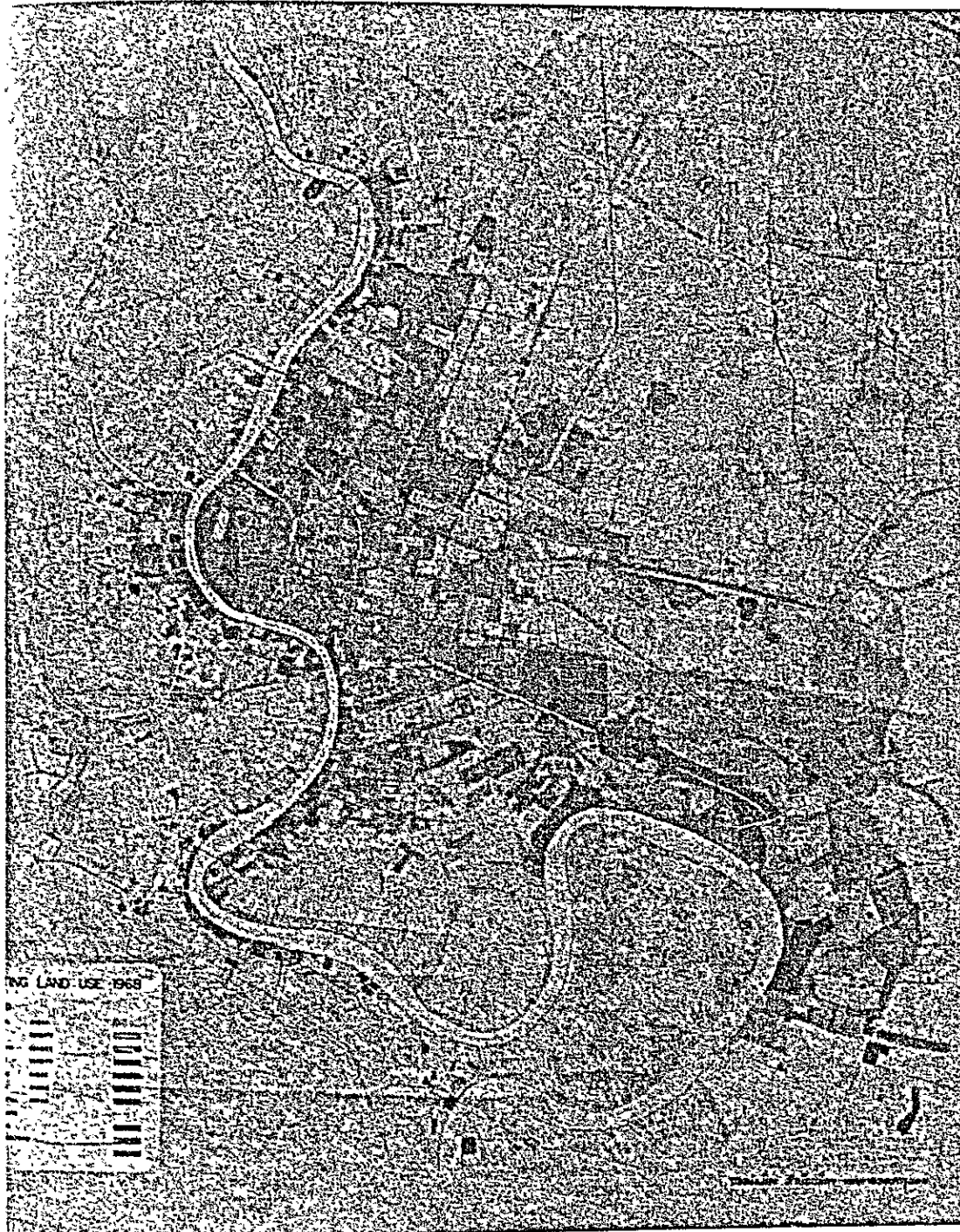


Fig. 4-5 LAND USE 1969



Table 4-6 Present and Planned Land Use

(Km²)

Zone	Zone area	1969						2000							
No.		Residential	Com-mercial	Industrial	Govern-mental	Utilities	Park	Others	Residential	Com-mercial	Industrial	Govern-mental	Utilities	Park	Others
1	4.54	1.68	0.50	—	2.18	—	0.18	—	0.34	1.84	—	2.18	—	0.18	—
2	2.34	1.01	0.75	0.05	0.51	—	0.02	—	0.20	1.56	0.05	0.51	—	0.02	—
3	1.10	0.06	0.76	—	0.28	—	—	—	0.01	0.81	—	0.28	—	—	—
4	3.48	0.90	0.70	—	1.22	0.21	0.21	0.24	0.45	1.39	—	1.22	0.21	0.21	—
5	4.19	1.64	0.21	0.08	1.09	—	0.88	0.29	0.32	1.82	0.08	1.09	—	0.88	—
6	3.69	2.07	0.66	—	0.89	—	0.07	—	0.91	1.82	—	0.89	—	0.07	—
7-E	11.80	6.96	0.35	0.83	2.24	0.07	1.35	—	3.54	2.81	1.03	3.00	0.07	1.35	—
7-W	11.80	2.98	0.12	0.40	0.46	—	0.46	7.38	6.44	3.78	0.45	0.67	—	0.46	—
8	30.20	12.25	1.16	2.08	0.93	1.16	2.31	10.31	13.09	6.65	5.74	0.93	1.48	2.31	—
9	12.40	6.94	0.25	—	2.98	0.12	0.50	1.61	6.34	2.46	—	2.98	0.12	0.50	—
10	11.00	3.85	0.22	0.33	4.70 (0.25)	—	1.65	—	3.09	0.28	0.33	5.65	—	1.65	—
11	10.00	3.58	0.15	0.31	0.23	0.47	0.98	4.28	4.70	0.20	3.42	0.23	0.47	0.98	—
12	30.60	4.11	0.08	0.09	0.28	2.19	1.83	22.02	20.95	1.95	—	3.68	2.19	1.83	—
13	33.80	4.76	0.17	0.08	0.41	0.41	0.17	27.80	29.63	2.01	0.08	1.00	0.41	0.67	—
14-N	3.60	2.28	—	0.05	0.15	—	—	1.12	2.47	0.60	0.11	0.42	—	—	—
14-S	2.40	0.55	—	0.06	—	—	—	1.79	1.56	—	—	—	—	0.84	—
15	9.00	5.48	0.23	0.12	0.29	0.05	—	2.83	4.85	1.37	1.65	0.72	0.05	0.36	—
16	6.00	0.72	—	0.05	0.48	—	—	4.75	4.60	0.43	0.05	0.92	—	—	—
17-N	14.20	4.49	—	0.02	0.01	—	—	9.68	11.21	0.99	1.99	0.01	—	—	—
17-S	8.80	2.32	0.30	0.07	0.80	0.10	—	5.21	5.17	0.53	0.07	2.93	0.10	—	—

() : Royal palace

These differences in traffic generation are corrected in the following manner.

The ratio of traffic generation, obtained by substituting the land area as presently being used in the above three expressions, to the traffic generation estimated in Section 3-3 is considered to indicate the density of the present land usage conditions by zones as mentioned above.

On the assumption that the above ratio by zones will not change in the future, the final traffic generation in each zone may be obtained by multiplying the value obtained by substituting the land area as will be used, in the future by the above ratio.

For the land-use plan required for the estimation, Fig. 4-6, which has been worked out by the Bangkok Municipality for the year 2000, may be utilized. The land area classified according to its use which was obtained from this study is shown in Table 4-6. However, as the estimation is set for the years from 1975 and 1990, the land area and its usage during these years are estimated on the assumption that the annual change in land usage will remain constant. The results are shown in Table 4-7.

Fig. 4-5

GREATER BANGKOK PLAN 2000

A MASTER PLAN FOR 6,500,000 PERSONS

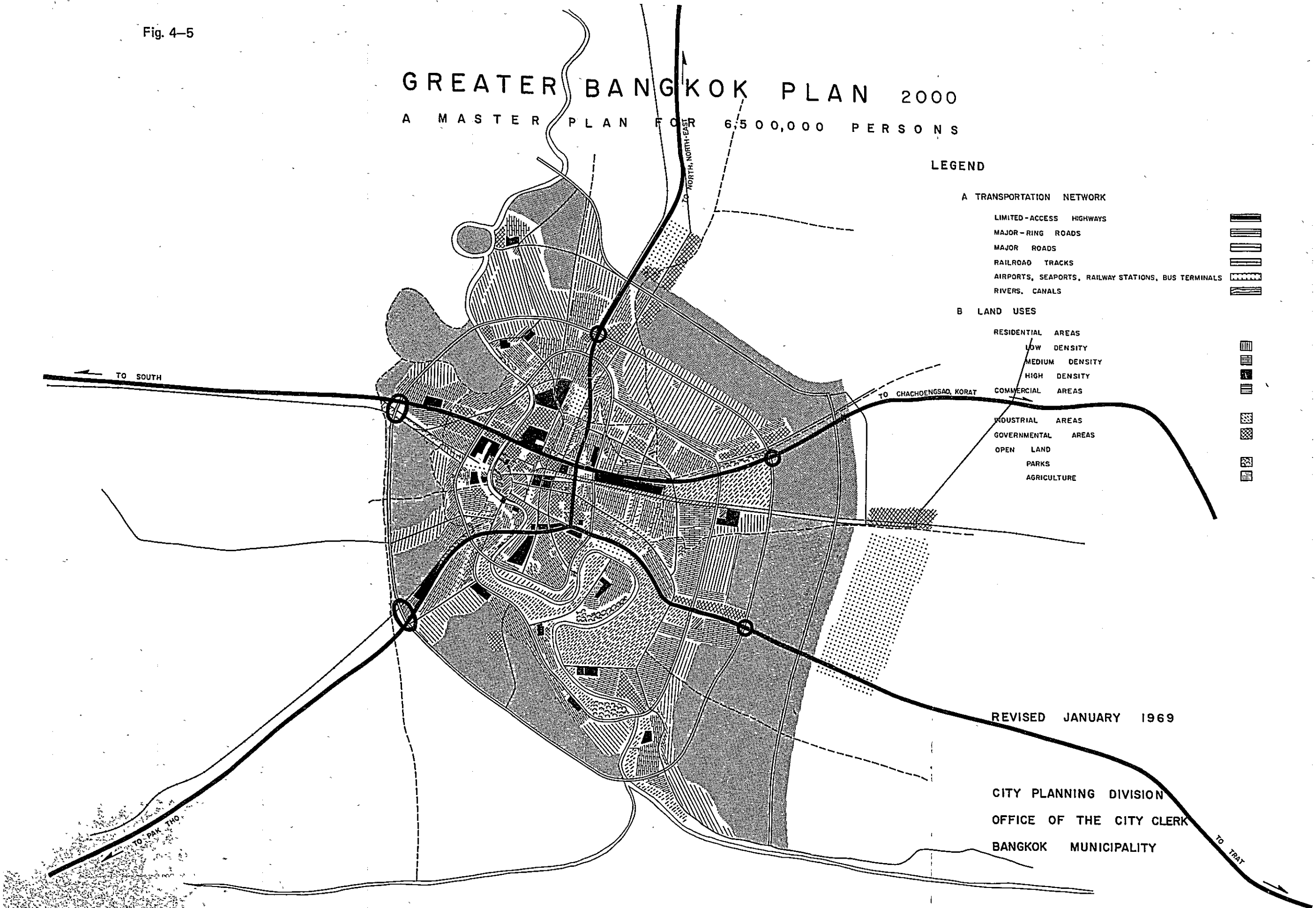
LEGEND

A TRANSPORTATION NETWORK

- LIMITED-ACCESS HIGHWAYS
- MAJOR-RING ROADS
- MAJOR ROADS
- RAILROAD TRACKS
- AIRPORTS, SEAPORTS, RAILWAY STATIONS, BUS TERMINALS
- RIVERS, CANALS

B LAND USES

- RESIDENTIAL AREAS
 - LOW DENSITY
 - MEDIUM DENSITY
 - HIGH DENSITY
- COMMERCIAL AREAS
- INDUSTRIAL AREAS
- GOVERNMENTAL AREAS
- OPEN LAND
- PARKS
- AGRICULTURE



REVISED JANUARY 1969

CITY PLANNING DIVISION
OFFICE OF THE CITY CLERK
BANGKOK MUNICIPALITY

Table 4-7 Future Land Use

(Km²)

Zone No.	Zone area	1975							1990						
		Residential	Com- mercial	Industrial	Govern- mental	Utilities	Park	Others	Residential	Com- mercial	Industrial	Govern- mental	Utilities	Park	Others
1	4.54	1.39	0.79	—	2.18	—	0.18	—	0.76	1.42	—	2.18	—	0.18	—
2	2.34	0.83	0.93	0.05	0.51	—	0.02	—	0.44	1.32	0.05	0.51	—	0.02	—
3	1.10	0.05	0.77	—	0.28	—	—	—	0.03	0.79	—	0.28	—	—	—
4	3.48	0.80	0.85	—	1.22	0.21	0.21	0.19	0.62	1.22	—	1.22	0.21	0.21	—
5	4.19	1.35	0.56	0.08	1.09	—	0.88	0.23	0.76	1.38	0.08	1.09	—	0.88	—
6	3.69	1.82	0.91	—	0.89	—	0.07	—	1.27	1.46	—	0.89	—	0.07	—
7-E	11.80	6.21	0.89	0.87	2.41	0.07	1.35	—	4.61	2.04	0.97	2.76	0.07	1.35	—
7-W	11.80	3.74	0.92	0.41	0.51	—	0.46	5.76	6.73	3.32	0.54	0.75	—	0.46	—
8	30.20	12.43	2.36	2.88	0.93	1.23	2.31	8.06	14.56	5.61	5.22	0.93	1.57	2.31	—
9	12.40	6.81	0.73	—	2.98	0.12	0.50	1.26	6.92	1.88	—	2.98	0.12	0.50	—
10	11.00	3.66	0.23	0.33	4.88 (0.25)	—	1.65	—	3.36	0.27	0.33	5.39	—	1.65	—
11	10.00	3.83	0.16	0.99	0.23	0.47	0.98	3.34	5.19	0.21	2.92	0.23	0.47	0.98	—
12	30.60	7.80	0.49	0.07	1.02	2.19	1.83	17.20	21.17	1.84	0.04	3.53	2.19	1.83	—
13	33.80	10.21	0.57	0.08	0.54	0.41	0.28	21.71	29.58	1.94	0.08	1.10	0.41	0.69	—
14-N	3.60	2.34	0.13	0.06	0.21	—	—	0.86	2.62	0.49	0.09	0.40	—	—	—
14-S	2.40	0.77	—	0.05	—	—	0.18	1.40	1.38	0.22	0.02	—	—	0.78	—
15	9.00	5.34	0.48	0.46	0.38	0.05	0.08	2.21	5.67	1.14	1.20	0.66	0.05	0.28	—
16	6.00	1.57	0.09	0.05	0.58	—	—	3.71	4.41	0.52	0.05	1.02	—	—	—
17-N	14.20	5.96	0.22	0.45	0.01	—	—	7.56	11.89	0.88	1.42	0.01	—	—	—
17-S	8.80	2.94	0.35	0.07	1.27	0.10	—	4.07	5.27	0.57	0.07	2.79	0.10	—	—

() : Royal palace

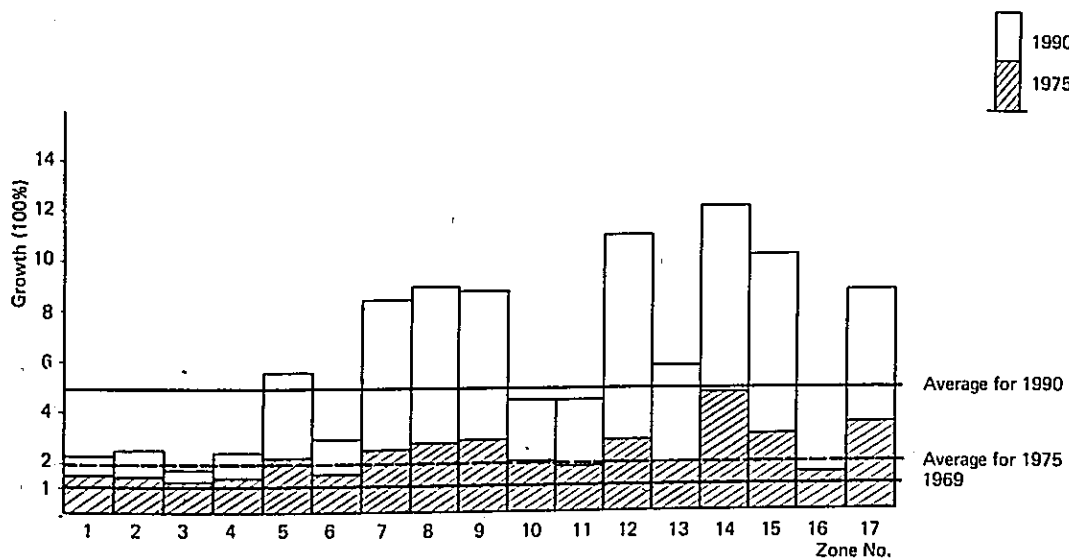
The relative traffic generation in each zone included in the estimation as worked out in the equations above are presented in Table 4-8. Fig. 4-7 shows the future growth of traffic generation in each zone.

Table 4-8 Future Traffic Generation by Zones

Year (1) Zone No.	1975			1990		
	Passenger car	Taxi	Truck	Passenger car	Taxi	Truck
1	0.16379	0.17308	0.13376	0.11412	0.10074	0.10525
2	0.06779	0.06467	0.05767	0.04824	0.04626	0.03797
3	0.06417	0.09967	0.07216	0.03447	0.05333	0.03563
4	0.05426	0.05326	0.03672	0.03793	0.03749	0.02418
5	0.02430	0.01744	0.00844	0.02592	0.01929	0.00863
6	0.05485	0.03758	0.04268	0.04348	0.03035	0.03129
7-E	0.04867	0.04382	0.13104	0.04815	0.05114	0.12239
7-W	0.04577	0.04646	0.11659	0.06825	0.07513	0.17785
8	0.13531	0.13109	0.13337	0.17650	0.18045	0.14240
9	0.06161	0.05618	0.02474	0.07111	0.07526	0.02600
10	0.04919	0.02896	0.02153	0.05177	0.03035	0.02079
11	0.02558	0.01839	0.03675	0.02692	0.01927	0.03307
12	0.05316	0.04525	0.05639	0.07543	0.06685	0.08746
13	0.02278	0.00599	0.01564	0.03023	0.00629	0.02219
14-N	0.01809	0.01619	0.01012	0.02307	0.02046	0.01190
14-S	0.01211	0.01274	0.00464	0.01352	0.01265	0.00626
15	0.04273	0.07023	0.04434	0.05290	0.09727	0.04639
16	0.00749	0.00688	0.01112	0.00878	0.00765	0.01561
17-N	0.01141	0.00991	0.01845	0.02009	0.02533	0.02696
17-S	0.03694	0.06222	0.02382	0.02911	0.04444	0.01778
Total	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

Notice: (1) Vehicle type

Fig. 4-7 GROWTH IN TRAFFIC GENERATION BY ZONES



The following tendencies are expected.

The growth of C.B.D. in Bangkok will be relatively smaller in the future.

In regards to the traffic generation, zone 1, 2, 3 and 4 (Amp. Phra Nakhon, Pom Prap, Samphanthawong and the west half of Pathum Won have small growth rates which in 1990 will be from 1.8 times to 2.6 times that of 1969. Since the over-all average rate is 4.9 times that of 1969, the above rates are a mere half of the average. It is probably due to the fact that these zones are already highly concentrated and there is not much room for further development.

On the other hand, those zones having especially high growth rates, more than nine times (about twice the average rate), are zone 7 (Amp. Yan Nawa), zone 8 (Amp. Phra Khanong), zone 9 (eastern part of Amp. Dusit), zone 12 (Amp. Bang Khen), zone 14 (Amp. Khlong Sarn), zone 15 (Amp. Thon Buri) and zone 17 (Amp. Bangkok Noi).

All of these zones are located in the outlying regions where the growth of the traffic generation reflects the future development scheme, as evident from the future land usage map.

4.4 Traffic Distributions

In order to compute the OD distribution by the Entropy Method, future traveling time and its exponent in the future are needed in addition to the future traffic generation of each zone as obtained in Section 4-3. As it is difficult to predict the future change for the latter, this report adopts the present value of the exponent obtained in Section 3-3.

Traveling time in the future is not constant, and it could change greatly depending on the future road network. Accordingly, with the change in the future road network, the figures shown in Table 4-9 are estimated as the future traveling time between zones.

On the basis of the traffic generation in each zone, the traveling time, and its exponent, the future OD distribution probability may be computed by the Entropy Method and then multiplied by the total number of trips to obtain the future OD table. Tables 4-10 through 4-17 show the estimated OD tables for each type of vehicles and their totals for 1975 and 1990. The desire line charts for all vehicles are shown in Figs. 4-8 and 4-9.

Incoming, outgoing and through traffic is not estimated by the Entropy Method but by the following method. Geometric means of the growth rates of traffic generation in each zone of the area and the growth rates of the number of registered vehicles in Thailand are used as the growth rates of the incoming and outgoing traffic. The product of this growth rate and the present traffic volume obtained from OD survey should be used as the future OD traffic volume. For the through traffic, the growth rate of the number of registered vehicles in Thailand is applied. However the OD tables do not include all the incoming, outgoing and through traffic in the Metropolitan Area but it includes only the traffic crossing over the Mae Nam Chao Phraya.

In regards to the estimated OD traffic, the following comments may be added.

First, the traffic volume between Bangkok and Thon Buri will grow to 217,000 trips in 1975 and 598,000 trips in 1990, 2.8 times and 7.8 times that of the present, respectively. These are a greater than those of the total number of trips (2.0 times and 4.9 times respectively). This is because of the anticipated development on the Thon Buri side and the traffic increase due to the completion of the Tha Chang and Sathorn Bridges.

Secondly, it is particularly noteworthy that the traffic volume between zones in the outlying area shows a remarkable increase. Especially the traffic in zone pairs 7w-8 and 8-9 is expected to exceed 100,000 trips in 1990. Zone pairs which are expected to have a traffic volume of more than 40,000 trips in 1990 are 1-9, 8-12 and 9-12. Those expected to have more than 30,000 trips are 1-10, 8-10, 7E-15 and 14N-15. Of the above 9 pairs, only traffic in pairs 1-9 and 1-10 connect from the C.B.D. to the outlying areas, in other words in the radial flow, and the rest are those to be handled by ring roads.

Table 4-9 Future Traveling Time between Zones

Zone No.	1	2	3	4	5	6	7-E	7-W	8	9	10	11	12	13	14-N	14-S	15	16	17-N	17-S
1	0.135	0.280	0.433	0.279	0.324	0.288	0.500	1.147	0.501	0.241	0.145	0.318	0.354	0.318	0.417	0.487	0.467	0.449	0.170	0.220
2		0.046	0.480	0.250	0.219	0.246	0.410	1.058	0.401	0.201	0.164	0.281	0.314	0.265	0.487	0.557	0.525	0.843	0.250	0.300
3			0.117	0.216	0.303	0.271	0.605	0.710	0.459	0.309	0.529	0.435	0.370	0.392	0.516	0.586	0.544	0.551	0.269	0.319
4				0.046	0.099	0.113	0.389	0.333	0.256	0.144	0.309	0.318	0.263	0.140	0.437	0.306	0.456	0.456	0.230	0.230
5					0.073	0.102	0.171	0.516	0.152	0.088	0.212	0.249	0.171	0.075	0.310	0.310	0.375	0.368	0.480	0.500
6						0.037	0.282	0.463	0.159	0.191	0.309	0.345	0.304	0.210	0.300	0.300	0.522	0.519	0.500	0.430
7-E							0.038	0.180	0.318	0.400	0.526	0.562	0.487	0.400	0.550	0.550	0.170	0.214	0.415	0.329
7-W							0.038	0.038	0.105	0.300	0.347	0.491	0.433	0.275	0.382	0.382	0.339	0.420	0.597	0.511
8								0.060	0.110	0.110	0.125	0.292	0.212	0.170	0.973	0.722	0.722	0.780	0.600	0.700
9								0.070	0.070	0.147	0.191	0.191	0.133	0.176	0.382	0.482	0.416	0.298	0.130	0.251
10									0.071	0.180	0.180	0.180	0.294	0.277	0.337	0.437	0.390	0.267	0.110	0.236
11										0.043	0.177	0.371	0.049	0.250	0.368	0.468	0.462	0.282	0.127	0.247
12											0.049	0.063	0.063	0.063	0.762	0.762	0.755	0.785	0.807	0.927
13															0.025	0.072	0.080	0.145	0.330	0.210
14-N																0.025	0.080	0.140	0.330	0.210
14-S																	0.058	0.094	0.300	0.180
15																		0.038	0.233	0.113
16																			0.028	0.130
17-N																				0.028
17-S																				0.028

Table 4-10 Estimated OD Table (Passenger Cars) for 1975

Zone No		BANGKOK ZONE												THON BURI ZONE										EXTERNAL ZONE										INT. TOTAL	EXT. TOTAL	TOTAL																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
		1	2	3	4	5	6	7-E	7-W	8	9	10	11	12	13	14-N	14-S	15	16	17-N	17-S	TOTAL	18	19	20	21	22	23	24																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
1		53,535	9,761	9,059	7,042	2,461	6,220	2,976	717	6,401	9,526	16,312	3,360	5,722	3,430	1,477	871	3,659	794	3,677	6,854	207,389	0	1,686	472	10	118	979	41	3,306	210,695																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
2			24,254	2,217	2,411	1,314	2,297	1,172	235	2,619	3,652	3,875	1,181	1,991	1,317	333	203	876	85	576	1,210	85,833	0	669	66	0	26	319	6	1,086	86,919																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
3				18,945	5,601	1,453	3,637	1,170	812	3,905	3,421	1,130	1,098	2,836	1,310	561	346	1,527	305	949	2,027	81,254	0	794	46	4	88	342	21	1,295	82,549																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
4					12,474	3,296	5,615	913	1,041	3,811	4,432	1,026	699	1,888	2,582	283	374	784	160	472	1,320	68,698	0	612	62	0	59	240	0	973	69,671																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
5						1,179	2,920	1,476	231	3,836	4,263	822	455	1,647	3,057	215	162	473	99	66	172	30,776	0	307	26	0	0	114	5	452	31,228																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
6							15,161	1,407	575	7,500	2,637	953	572	1,396	1,265	476	359	588	121	129	457	69,446	0	652	30	0	10	168	0	860	70,306																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
7-E								18,938	2,911	15,103	2,871	938	471	304	758	523	209	157	3,939	559	197	795	61,622	0	401	27	0	4	116	5	553	62,175																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
7-W										15,103	14,709	1,319	810	335	815	843	332	249	1,185	172	99	355	57,951	0	370	24	0	4	108	5	511	58,462																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
8										42,974	15,510	9,766	1,825	6,071	4,352	184	221	869	157	238	522	171,315	0	886	75	0	28	294	16	1,299	172,614																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
9											7,423	3,546	1,671	5,944	1,933	377	197	974	336	1,245	1,235	78,002	0	633	164	0	56	431	26	1,310	79,312																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
10												4,182	1,331	1,209	730	355	178	833	308	1,243	1,049	54,411	0	378	170	12	16	243	23	842	55,253																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
11													4,231	2,075	328	221	114	456	202	702	697	26,088	0	223	53	0	12	108	7	403	26,491																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
12														15,809	1,225	259	148	671	197	264	475	67,309	0	314	38	0	28	199	11	590	67,899																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
13															2,723	71	53	213	40	39	88	28,845	0	103	9	0	0	45	0	157	29,002																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
14-N															5,099	1,449	4,823	385	105	602	22,915	11	0	44	19	68	0	11	153	23,068																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
14-S																2,892	3,633	307	80	454	15,339	8	0	29	13	46	0	8	104	15,443																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
15																	11,856	2,258	363	2,273	54,109	38	8	345	40	340	0	151	922	55,031																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
16																		960	110	966	9,481	10	0	79	6	65	0	42	202	9,683																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
17-N																				776	14,450	6	17	389	20	84	16	48	580	15,030																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
17-S																				12,223	46,773	17	53	1,232	62	267	52	151	1,834	48,607																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
18																					0	39	5	0	0	0	30	0	164	164																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
19																						0	109	27	89	0	43	8,413	8,413																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
20																							0	4	5	107	4	3,614	3,614																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
21																							0	5	59	4	285	285																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
22																							0	132	0	1,550	1,550																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
23																							0	93	4,195	4,195																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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Notice: * shows number of trips

626,003*

Table 4-11 Estimated OD Table (Taxis) for 1975

Zone No.	BANGKOK ZONE										THON BURI ZONE										EXTERNAL ZONE										INT. EXT. TOTAL	
																																INT. TOTAL
	1	2	3	4	5	6	7-E	7-W	8	9	10	11	12	13	14-N	14-S	15	16	17-N	17-S	18	19	20	21	22	23	24					
1	110,649	18,047	23,069	13,333	3,728	8,958	5,067	1,298	11,965	17,286	19,664	5,224	9,693	2,029	2,373	1,562	9,543	1,259	6,216	17,812	399,424	0	1,551	122	0	55	427	32	2,187	401,611		
2		43,760		4,203	1,851	3,050	1,842	391	4,524	6,117	4,263	1,686	3,106	719	488	332	2,087	121	882	2,855	149,246	0	406	11	0	30	94	18	559	149,805		
3			64,730	13,724	2,831	6,733	2,540	1,916	9,390	7,894	1,669	2,156	6,152	987	1,147	790	5,085	617	2,023	6,671	230,016	0	699	11	0	42	61	25	838	230,854		
4				23,608	4,887	7,846	1,473	1,848	6,848	7,690	1,130	1,016	3,036	1,477	427	640	1,924	238	741	3,217	122,914	0	461	111	0	27	84	11	694	123,608		
5					1,420	3,293	1,970	325	5,644	6,050	737	536	2,162	1,437	264	223	938	120	81	328	40,245	0	165	0	0	0	35	0	200	10,445		
6						16,765	1,749	768	10,432	3,450	799	630	1,699	543	553	468	1,094	136	150	830	86,711	0	195	0	0	24	0	0	219	86,930		
7-E							30,377	4,842	4,697	1,442	468	396	1,094	264	287	242	9,172	784	279	1,757	101,119	0	378	0	0	17	90	12	497	101,616		
7-W								28,980	27,348	2,239	892	480	1,291	472	504	426	2,946	259	152	845	107,202	0	393	0	0	17	94	13	517	107,719		
8									81,733	27,354	11,182	2,684	9,902	2,489	270	370	2,115	232	365	1,234	302,511	0	380	34	0	0	156	0	570	303,081		
9										12,588	3,826	2,362	9,325	1,046	543	316	2,284	484	1,903	2,862	129,649	0	437	72	0	0	220	18	747	130,396		
10											3,025	1,262	1,304	253	334	186	1,276	291	1,249	1,590	58,425	0	293	321	0	11	72	11	708	59,133		
11											5,908	2,783	149	273	157	916	251	932	1,392	37,101	0	210	0	0	0	53	22	285	37,386			
12												24,275	619	350	222	1,475	265	369	1,018	104,415	0	184	3	0	17	57	13	274	104,689			
13													502		7,285	2,241	10,798	513	140	1,266	37,374	18	0	167	0	42	12	18	257	37,631		
14-N																																
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1,146,997*

10,913*

1,157,910*

Notice : * shows number of trips.

Notice : * shows number of trips.

1,146,997*

10,913*1,157,910*

Table 4-12 Estimated OD Table (Trucks) for 1975

Zone No	BANGKOK ZONE										THION BURI ZONE										INT. INT. TOTAL	EXTERNAL ZONE								INT. EXT. TOTAL	TOTAL																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
	1	2	3	4	5	6	7-E	7-W	8	9	10	11	12	13	14-N	14-S	15	16	17-N	17-S		18	19	20	21	22	23	24																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
1	15,530	5,139	5,610	2,922	534	3,114	4,579	1,679	4,868	2,066	2,911	2,923	3,783	1,326	702	298	2,524	709	2,560	2,635	81,942	45	778	340	45	139	1,034	92	84,415																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
2	6,447	1,817	1,188	294	1,333	2,049	662	2,236	909	923	1,207	1,556	583	215	93	805	131	613	683	35,330	0	637	59	0	39	208	49	992	36,322																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
3	7,190	2,423	362	2,094	362	2,094	2,352	1,769	3,370	997	459	1,316	2,274	667	352	154	1,351	359	987	1,115	44,208	0	755	59	14	38	381	5	1,252	45,460																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
4	2,068	390	1,739	1,228	1,295	2,049	735	266	599	1,066	655	136	100	531	143	380	515	22,496	0	470	73	0	33	253	30	859	23,355																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
5	58	3,174	1,911	1,003	3,765	599	292	605	1,006	467	226	114	506	138	181	290	26,147	0	385	11	0	32	350	0	778	26,925																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
6	21,781	7,340	4,758	720	439	952	1,612	622	313	157	4,476	943	591	1,027	80,267	14	523	8	6	38	461	38	1,088	81,355																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
7-E	17,275	13,941	876	613	983	1,634	830	413	207	1,908	409	357	572	71,415	12	465	7	5	33	411	33	966	72,381																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
7-W	15,155	3,064	2,184	2,048	4,192	1,660	181	125	414	247	11,534	0	332	53	0	59	1,108	47	2,229	83,922																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
8	482	310	545	468	155	89	33	311	125	414	247	11,534	0	332	53	0	59	1,108	47	2,229	83,922																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
9	5,397	588	192	80	711	246	382	383	34,543	0	202	11	0	33	404	0	650	35,153																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
10	402	5397	588	192	80	711	246	382	383	34,543	0	202	11	0	33	404	0	650	35,153																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
11	5397	588	192	80	711	246	382	383	34,543	0	202	11	0	33	404	0	650	35,153																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
12	402	5397	588	192	80	711	246	382	383	34,543	0	202	11	0	33	404	0	650	35,153																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
13	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	543	5

Notice: * shows number of trips.

Table 4-13 Estimated OD Table (All vehicles) for 1975

Zone No.	BANGKOK ZONE													THION BURI ZONE							INT. INT. TOTAL	EXTERNAL ZONE					INT. EXT. TOTAL	TOTAL	(imp/12 hr)			
	1	2	3	4	5	6	7 E	7 W	8	9	10	11	12	13	14 N	14 S	15	16	17 N	17 S		18	19	20	21	22				23	24	
1	179,714	32,947	37,138	23,297	6,723	18,292	12,622	3,694	23,234	28,878	38,887	11,507	19,198	6,785	4,552	2,731	15,726	2,762	12,453	27,301	688,755	45	4,015	934	55	312	2,440	165	7,966	696,721		
2		74,461	9,196	7,802	3,459	6,680	5,063	1,388	9,379	10,678	9,061	4,074	6,653	2,619	1,036	628	3,768	337	2,071	4,748	270,409	0	1,712	136	0	95	621	73	2,637	273,046		
3			90,865	21,748	4,646	12,464	6,062	4,497	16,665	12,312	3,258	4,570	11,262	2,964	2,060	1,290	7,963	1,281	3,959	9,813	355,478	0	2,248	116	18	168	784	51	3,385	358,863		
4					8,573	15,200	3,614	4,184	12,708	12,857	2,422	2,314	5,990	4,714	846	1,114	3,239	541	1,593	5,052	214,108	0	1,543	246	0	119	577	41	2,526	216,634		
5					2,657	6,629	4,082	730	10,249	10,580	1,644	1,158	4,171	4,768	521	407	1,551	257	184	548	76,194	0	573	26	0	13	260	5	877	77,071		
6					35,100	5,067	2,246	21,697	6,686	2,044	1,807	4,101	2,275	1,255	941	2,188	395	460	1,577	182,304	0	1,232	41	0	66	518	0	1,857	184,161			
7 E					71,096	15,093	12,326	3,100	1,378	1,652	3,464	1,409	809	556	17,587	2,286	1,067	3,579	243,008	14	1,302	35	6	59	667	55	2,138	245,146				
7 W					61,458	55,998	4,434	2,315	1,793	3,740	2,145	1,249	882	6,039	840	608	1,772	236,568	12	1,228	31	5	54	613	51	1,994	238,562					
8					139,862	45,928	20,493	7,227	4,658	16,607	3,289	1,016	551	3,612	956	3,571	4,380	222,806	13	1,247	262	0	82	1,093	44	2,741	225,547					
9					7,517	3,138	3,081	1,138	778	397	2,420	724	2,906	2,886	124,370	0	838	568	24	39	735	46	2,250	126,620	87,412							
10					13,084	6,734	742	45,481	2,432	801	450	2,857	708	1,015	1,876	206,267	0	700	52	0	78	660	24	1,514	207,781							
11					12,927	3,866	16,889	1,078	340	2,078	66,490	57	0	223	70	170	20	128	668	67,158												
12					8,235	13,397	860	247	1,630	47,579	36	0	166	37	106	13	69	427	48,006													
13					59,253	8,402	1,584	11,114	243,346	95	8	1,285	136	752	41	403	270	246,066														
14 N																																
14 S																																
15																																
16																																
17 N																																
17 S																																
18																																
19																																
20																																
21																																
22																																
23																																
24																																
TOTAL																												2,078,458*	\$1,800**12,130,258*	3,626	3,626	

Notice : * shows number of trips.

Notice : * shows number of trips.

Table 4-14 Estimated OD Table (Passenger Cars) for 1990

Zone No	BANGKOK ZONE														THON BURI ZONE										EXTERNAL ZONE										INT- INT TOTAL	INT- EXT TOTAL	TOTAL
	1	2	3	4	5	6	7 E	7 W	8	9	10	11	12	13	14-N	14-S	15	16	17-N	17-S	EXTERNAL ZONE																
																					18	19	20	21	22	23	24										
1	60,284	11,365	8,451	7,869	3,723	7,696	4,210	1,299	10,798	15,236	22,646	4,892	10,414	6,293	2,477	1,323	6,066	1,276	8,713	8,549	263,864	0	2,562	718	15	179	1,487	63	5,024	268,888							
2		29,194	2,138	2,784	2,055	2,936	1,712	439	4,566	6,039	5,583	1,783	3,745	2,497	577	319	1,500	140	1,413	1,561	111,540	0	1,027	101	0	40	489	9	1,666	113,206							
3			14,628	5,179	1,819	3,723	1,368	1,216	5,451	4,530	1,311	1,335	4,272	1,989	778	434	2,094	407	1,862	2,092	79,705	0	1,060	62	5	118	456	28	1,729	81,434							
4				13,815	4,942	6,885	1,278	1,867	6,373	7,029	1,427	1,019	3,407	4,696	470	563	1,287	255	1,110	1,632	87,702	0	931	94	0	90	365	0	1,480	89,182							
5					2,393	4,848	2,799	561	8,685	9,154	1,545	897	4,023	7,527	484	330	1,050	214	208	287	59,937	0	577	49	0	0	214	10	850	60,787							
6						20,581	2,182	1,142	13,885	4,630	1,469	924	2,787	2,548	875	597	1,069	214	335	626	100,533	0	1,057	48	0	17	271	0	1,393	101,926							
7-E							33,519	6,601	6,071	1,883	835	564	1,729	1,202	439	299	8,173	1,126	587	1,244	111,340	0	639	43	0	7	186	9	884	112,224							
7-W								43,873	39,846	3,389	1,835	795	2,380	2,484	891	607	3,149	445	379	711	157,782	0	920	61	0	10	267	12	1,270	159,059							
8									108,485	37,137	20,472	4,015	16,536	11,947	460	502	2,156	377	845	975	408,067	0	1,843	156	0	57	611	33	2,700	410,767							
9										16,857	7,037	3,478	15,354	5,036	895	423	2,290	767	4,193	2,187	164,401	0	1,237	321	0	110	843	51	2,562	166,963							
10											6,683	2,234	2,963	1,664	743	336	1,728	617	3,622	1,627	93,060	0	666	299	21	28	428	40	1,482	94,542							
11												7,666	4,928	785	485	226	991	424	2,149	1,131	48,387	0	410	98	0	21	199	12	740	49,127							
12													46,452	3,628	700	360	1,796	510	1,014	958	174,408	0	678	84	0	63	441	25	1,291	175,699							
13														8,131	192	132	571	107	151	178	69,889	0	217	19	0	0	93	0	329	70,218							
14-N															12,679	3,261	11,861	920	373	1,116	53,355	34	0	92	41	144	0	24	335	53,690							
14-S																5,895	8,088	663	254	761	31,268	20	0	54	24	84	0	14	196	31,464							
15																	28,836	5,334	1,268	4,167	122,310	78	16	699	82	485	0	307	1,667	123,977							
16																		2,203	373	1,719	20,294	21	0	155	12	129	0	82	399	20,693							
17-N																			7,781	2,039	46,450	17	52	1,220	62	264	51	150	1,816	48,266							
17-S																				16,873	67,306	24	76	1,756	89	380	73	215	2,613	69,919							
18																						0	0	71	10	0	0	55	0	330	330						
19																							0	0	197	48	161	0	77	14,522	14,522						
20																								0	6	10	194	6	6,552	6,552							
21																								0	0	10	107	6	528	528							
22																								0	0	239	0	2,646	2,646								
23																									0	0	168	7,237	7,237								
24																											0	0	1,341	1,341							
TOTAL																															31,791*	1,167,590*					

1,135,799*

Notice . . * shows number of trips

Notice : * shows number of trips

1,135,799*

Table 4-15 Estimated OD Table (Taxis) for 1990

Zone No.		BANGKOK ZONE												THON BURI ZONE										EXTERNAL ZONE										INT. EXT. TOTAL								
		1	2	3	4	5	6	7 E	7 W	8	9	10	11	12	13	14-N	14-S	15	16	17-N	17-S	INT. TOTAL	18	19	20	21	22	23	24													
1	43,875	27,732	28,779	19,791	7,636	14,685	10,306	3,201	26,968	40,902	35,863	9,408	23,631	4,015	5,105	2,780	22,116	2,479	25,899	27,385	626,431	0	3,181	249	0	113	875	66	4,484	630,915												
2	79,465	7,608	77,430	7,371	4,480	5,909	4,427	1,138	12,050	17,105	9,212	3,600	8,948	1,681	1,240	699	5,714	280	4,344	5,185	287,653	0	923	26	0	68	214	42	1,273	288,926												
3																					9,833	331,651	0	1,373	21	0	83	120	50	1,647	333,298											
4																					5,642	233,108	0	1,039	250	0	61	188	25	1,563	234,671											
5																					793	119,946	0	467	0	0	0	98	0	565	120,511											
6																					1,608	188,715	0	472	0	0	58	0	0	530	189,245											
7E																					4,221	317,991	0	1,005	0	0	44	240	33	1,322	319,313											
7W																					2,458	467,135	0	1,446	0	0	63	346	47	1,902	469,037											
8																					3,286	1,122,061	0	1,198	107	0	0	492	0	1,797	1,123,858											
9																					8,003	468,004	0	1,360	225	0	0	686	56	2,327	470,331											
10																					3,451	146,956	0	762	834	0	29	187	29	1,841	148,797											
11																					2,988	93,347	0	546	0	0	0	137	58	741	94,088											
12																					2,933	415,659	0	601	11	0	55	186	44	897	416,556											
13																					149	39,125	0	0	36	0	28	36	0	100	39,225											
14-N																					3,217	127,205	59	0	531	0	133	37	59	819	128,024											
14-S																					2,249	78,688	36	0	328	0	82	23	36	505	79,193											
15																					21,445	604,888	180	0	2,159	45	472	90	214	3,160	608,048											
16																					47,562	33	0	666	0	0	0	59	758	48,320												
17-N																					8,343	157,504	49	0	960	37	224	0	183	1,453	158,957											
17-S																					79,199	276,367	85	0	1,684	66	393	0	321	2,549	278,916											
18																					0	0	33	0	0	0	0	0	0	475	475											
19																					0	367	0	0	367	0	65	0	41	14,879	14,879											
20																					0	0	0	0	0	0	0	41	0	8,495	8,495											
21																					0	0	0	0	0	0	0	33	0	181	181											
22																					0	0	0	0	0	0	0	33	0	2,004	2,004											
23																					0	0	0	0	0	0	0	33	0	4,095	4,095											
24																					0	0	0	0	0	0	0	33	0	1,396	1,396											
TOTAL																										30,879*	0													30,879*	1,396	3,105,877*

0074998

Notice : * shows number of trips.

Notice : * shows number of trips

Table 4-16 Estimated OD Table (Trucks) for 1990

Zone No		BANGKOK ZONE																	TION BURI ZONE										INT- INT TOTAL		EXTERNAL ZONE								INT- EXT TOTAL		TOTAL
		1	2	3	4	5	6	7-E	7-W	8	9	10	11	12	13	14-N	14-S	15	16	17-N	17-S	18	19	20	21	22	23	24	18	19	20	21	22	23	24						
1	35,237	10,210	8,589	5,606	1,495	6,671	11,549	5,918	13,263	5,803	6,896	7,130	14,328	5,008	2,148	1,040	6,933	2,572	9,982	5,674	201,289	123	2,151	940	123	386	2,861	254	6,838	208,127											
2		11,217	2,436	1,997	720	2,502	4,525	2,044	5,334	2,233	1,916	2,579	5,162	1,929	576	285	1,938	415	2,091	1,289	72,615	0	1,611	149	0	97	526	123	2,506	75,121											
3			7,430	3,136	683	3,028	4,003	4,209	6,195	1,891	734	2,167	5,811	1,701	727	363	2,503	878	2,596	1,620	68,130	0	1,653	129	31	82	834	10	2,739	70,869											
4				3,355	923	3,151	2,619	3,861	4,720	1,746	532	1,235	3,413	2,091	354	296	1,232	438	1,250	937	46,247	0	1,191	186	0	83	640	123	2,223	48,470											
5					200	1,101	1,978	755	2,584	927	249	502	1,695	1,278	160	92	476	172	178	128	16,496	0	319	0	0	41	350	0	710	17,206											
6						6,423	4,552	3,339	9,684	1,588	655	1,393	3,598	1,666	652	373	1,313	470	670	590	59,842	0	1,027	29	0	86	935	0	2,077	61,919											
7-E							61,059	28,760	14,406	2,248	1,160	2,583	6,789	2,612	1,064	609	13,668	3,798	2,558	2,458	234,057	37	1,392	21	16	100	1,228	100	2,894	236,951											
7-W							95,152			3,821	2,263	3,727	9,614	4,874	1,964	1,123	8,140	2,301	2,162	1,914	340,098	53	2,003	31	23	145	1,767	145	4,167	344,265											
8							49,567			10,331	6,222	6,000	19,064	7,526	664	524	3,336	1,092	1,982	1,259	272,325	0	3,067	202	0	192	3,572	151	7,184	279,509											
9										1,674	1,043	1,888	6,274	1,448	362	161	1,203	612	2,040	755	49,722	42	565	84	0	84	1,413	0	2,188	51,910											
10											720	1,389	1,853	615	286	124	892	476	1,682	557	30,984	0	483	223	36	36	1,216	36	2,030	33,014											
11												7,726	7,639	1,076	623	275	1,778	1,074	3,460	1,271	63,241	0	983	156	0	180	1,687	8	3,014	66,255											
12													34,127	3,704				1,484	2,486	1,377	167,248	0	1,148	63	0	189	2,296	0	3,696	170,944											
13														2,530				738	252	335	216	42,443	0	394	105	0	39	644	53	1,235	43,678										
14-N															2,241	824	4,694	883	501	608	22,751	94	0	38	170	199	28	331	860	23,611											
14-S																	733	2,684	524	286	348	11,974	49	0	19	88	102	15	170	443	12,417										
15																		12,081	5,121	2,022	2,619	88,713	0	0	818	263	839	40	586	2,546	91,259										
16																			2,405	943	1,534	29,849	22	0	111	334	457	0	401	1,325	31,174										
17-N																				1,809	51,555	0	0	859	436	334	77	494	2,200	53,755											
17-S																				3,516	33,995	0	0	573	291	222	51	329	1,466	35,461											
18																					0	0	0	0	0	0	124	0	544	544											
19																				0	788	1,036	1,808	0	1,252	22,871	0	22,871	22,871												
20																					62	62	93	1,577	0	7,380	0	7,380	7,380												
21																					0	0	0	0	0	402	0	3,311	3,311												
22																					0	1,329	294	7,417	0	7,417	7,417														
23																					0	866	24,478	0	24,478	24,478															
24																					0	5,726	0	5,726	5,726																
TOTAL																					951,787*								62,034*	1,013,821*											

Notice • • shows number of trips

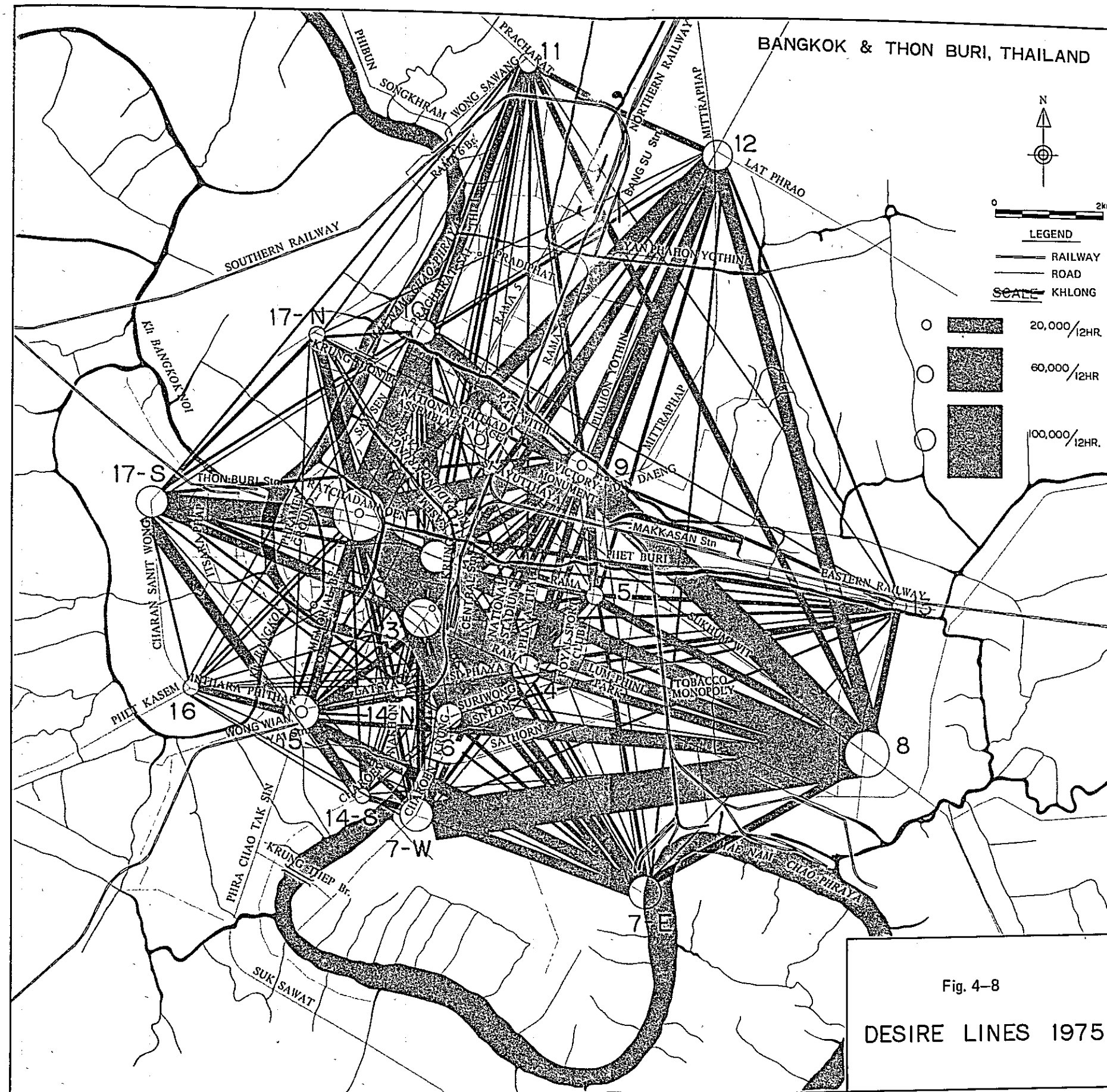
Notice : * shows number of trips

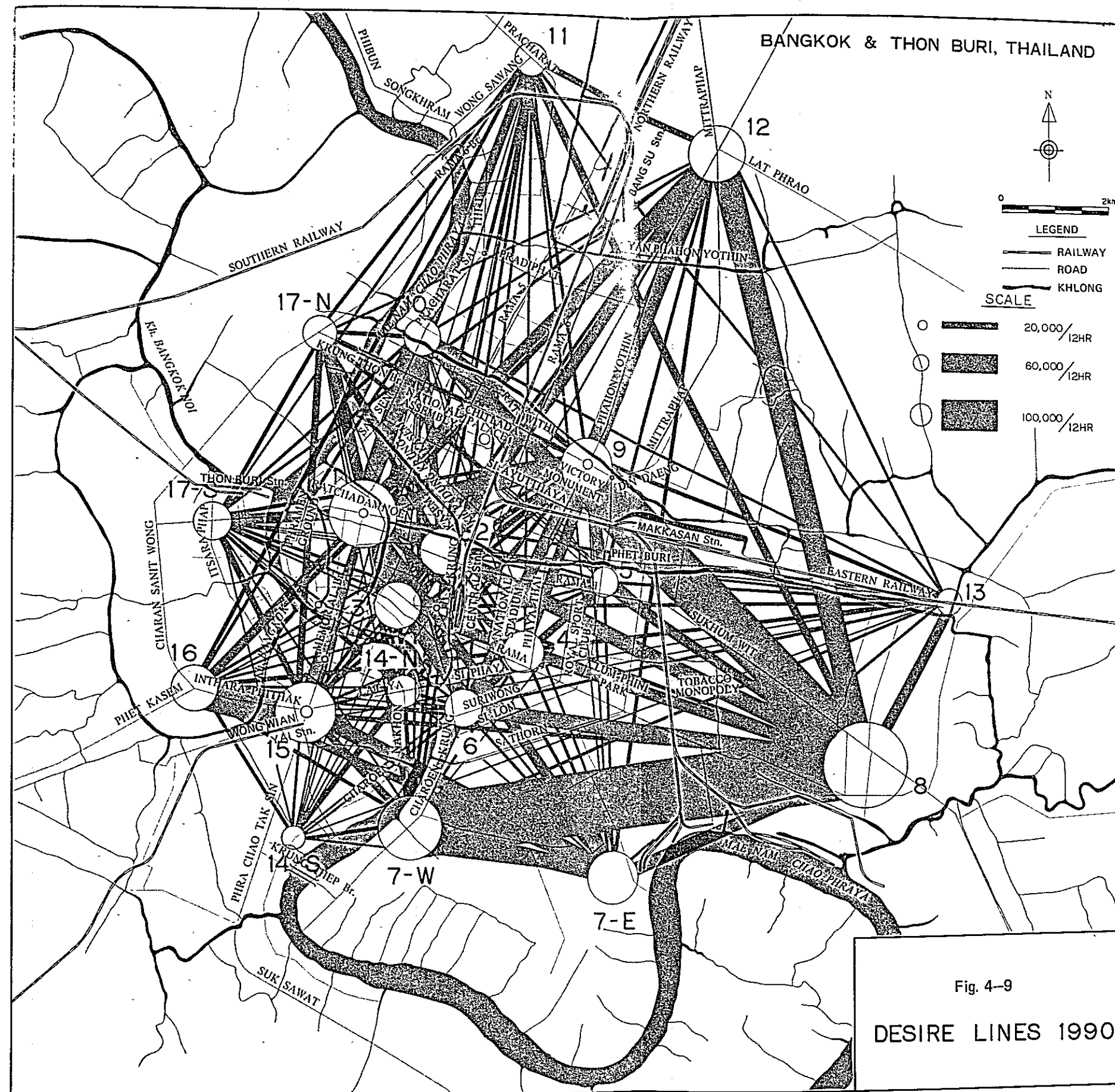
Table 4-17 Estimated OD Table (All Vehicles) for 1990

Zone No.	BANGKOK ZONE														THON BURI ZONE										EXTERNAL ZONE							INT-EXT TOTAL		TOTAL
	1	2	3	4	5	6	7-E	7-W	8	9	10	11	12	13	14-N	14-S	15	16	17-N	17-S	INT-INT TOTAL	18	19	20	21	22	23	24	INT-EXT TOTAL					
1	239,396	49,307	45,819	33,266	12,854	29,052	26,065	10,418	51,029	61,941	65,405	21,430	48,373	15,316	9,730	5,143	35,115	6,327	44,594	41,608	1,091,584	123	7,894	1,907	138	678	5,223	383	16,346	1,107,930				
2		119,876	12,182	12,152	7,255	11,347	10,664	3,621	21,950	25,377	16,711	7,962	17,855	6,107	2,393	1,303	9,152	835	7,848	8,035	471,808	0	3,561	276	0	205	1,229	174	5,445	477,253				
3			99,488	27,848	8,061	17,334	10,320	9,954	31,941	24,336	4,984	2,256	24,467	5,563	3,870	2,144	15,891	2,449	12,546	13,545	479,486	0	4,086	212	36	283	1,410	88	6,115	485,601				
4				57,146	17,283	24,710	7,312	10,923	28,704	29,538	4,327	4,360	15,264	10,120	1,871	2,159	7,603	1,228	5,886	8,211	367,057	0	3,161	530	0	234	1,193	148	5,266	372,323				
5					7,173	14,447	11,082	2,575	31,297	32,621	3,924	2,930	14,014	13,279	1,538	1,047	4,946	757	915	1,208	196,379	0	1,363	49	0	41	662	10	2,125	198,504				
6						61,627	11,212	6,866	53,194	16,505	3,974	3,760	11,607	5,569	3,026	2,018	5,575	1,023	1,793	2,824	349,090	0	2,556	77	0	161	1,206	0	4,000	353,090				
7-E							191,013	53,997	37,019	9,466	3,344	4,279	12,688	4,632	2,465	1,581	55,016	7,335	4,962	7,923	663,388	37	3,036	64	16	151	1,654	142	5,100	668,488				
7-W								274,255	215,612	17,248	7,212	6,183	17,959	9,129	4,905	3,163	24,210	3,709	3,738	5,083	965,015	53	4,369	92	23	218	2,380	204	7,339	972,354				
8									477,218	159,619	62,248	18,455	77,427	28,006	2,133	2,167	13,979	2,258	5,459	5,520	1,802,453	0	6,108	465	0	249	4,675	184	11,681	1,814,134				
9										72,720					3,382	1,605	13,120	3,113	20,663	10,945	682,127	42	3,162	630	0	194	2,942	107	7,077	689,204				
10											14,642				2,050	930	6,818	1,903	12,589	5,635	271,000	0	1,911	1,356	57	93	1,831	105	5,353	276,353				
11												28,615	22,019	2,272	1,935	894	5,752	2,190	10,978	5,390	204,975	0	1,939	254	0	201	2,023	78	4,495	209,470				
12													191,499	9,628	3,087	1,563	11,457	2,970	6,385	5,268	757,315	0	2,427	158	0	307	2,923	69	5,884	763,199				
13														12,173	40,810	499	321	1,875	415	603	151,457	0	611	160	0	67	773	53	1,664	153,121				
14-N																					203,311	187	0	661	211	476	65	414	2,014	205,325				
14-S																					121,930	105	0	401	112	268	38	220	1,144	123,074				
15																					815,911	258	16	3,676	390	1,796	130	1,107	7,373	823,284				
16																					97,705	76	0	932	346	586	0	542	2,482	100,187				
17-N																					255,509	66	52	3,039	535	822	128	827	5,469	260,978				
17-S																					377,668	109	76	4,013	446	995	124	865	6,628	384,296				
18																					0	0	104	10	0	0	179	0	1,349	1,349				
19																					0	0	0	0	0	0	0	0	0	0	0			
20																					1,352	1,084	62	68	103	1,812	6	22,427	52,272	52,272				
21																					0	0	0	0	0	0	0	0	0	0	0	0		
22																					0	0	0	0	0	0	0	0	0	0	0	0		
23																					0	0	0	0	0	0	0	0	0	0	0	0		
24																					0	0	0	0	0	0	0	0	0	0	0	0		
TOTAL																					5,162,584*												5,162,584*	

Notice : * shows number of trips.

Notice : * shows number of trips.





CHAPTER 5 FUTURE TRAFFIC ASSIGNMENT

5-1 Method of Estimation

Future traffic assignment is made on the basis of the future OD table and the future road network. The future road network will include the roads now planned by the Bangkok and Thon Buri Municipalities as well as the existing road network. In this report, the Minimum Path Method is adopted for traffic assignment.

The traveling time over a certain road varies depending on the traffic volume and therefore in the assignment of traffic, the relationship between traffic volume and speed must be taken into consideration. For this reason, the OD traffic volume was divided in ten equal parts, and the assignment to the road network was done ten times. The detailed procedure is described in Section 5-4.

Assignments were made for 1975 and 1990. For 1975, however, in order to clarify the impact of the Sathorn Br. on the traffic flow, two separate computations were made, one with the Sathorn Br. in the road network to be assigned and the other without the Sathorn Br.

5-2 Future Road Network

The future road network to be covered for traffic assignment is shown in Fig. 5-1. In the assignment for 1975, out of all the projected roads only the Tha Chang Br. and the Sathorn Br. and their connecting roads were included in the assignment.

As shown in Fig. 5-1, the future road network includes most of the busy roads in the area. However, it also includes such roads as Phahon Yothin Rd. and Mittraphap Rd., which are combined into one road because they are considered to have no influence on the traffic flow in the city area.

Then, the relationship between the traffic volume and the vehicle speed must be determined for each of these road network links. Such a relationship is generally expressed by the following linear equations:

$$V = aQ + b$$

where: V : vehicle speed (km/hr.)

Q : traffic volume (veh./hr.)

and

a, b : constants to be determined by characteristics of roads

The constants of this equation, a and b , are determined from the travel time study conducted by the Team referring to past observations in Japan as well as to the Highway Capacity Manual of AASHO.

Two lane road

$$V = -0.0090Q + 50$$

$$V = -0.0045Q + 30$$

Four lane road

$$V = -0.0047 Q + 60$$

$$V = -0.0036 Q + 50$$

$$V = -0.0019 Q + 30$$

Six lane road

$$V = -0.0031 Q + 60$$

$$V = -0.0024 Q + 50$$

$$V = -0.0014 Q + 30$$

Eight lane road

$$V = -0.0010 Q + 30$$

In the above equations, those having b of 30 are used for roads in the downtown area and the rest for roads in the outlying area.

5-3 Regular Bus Service

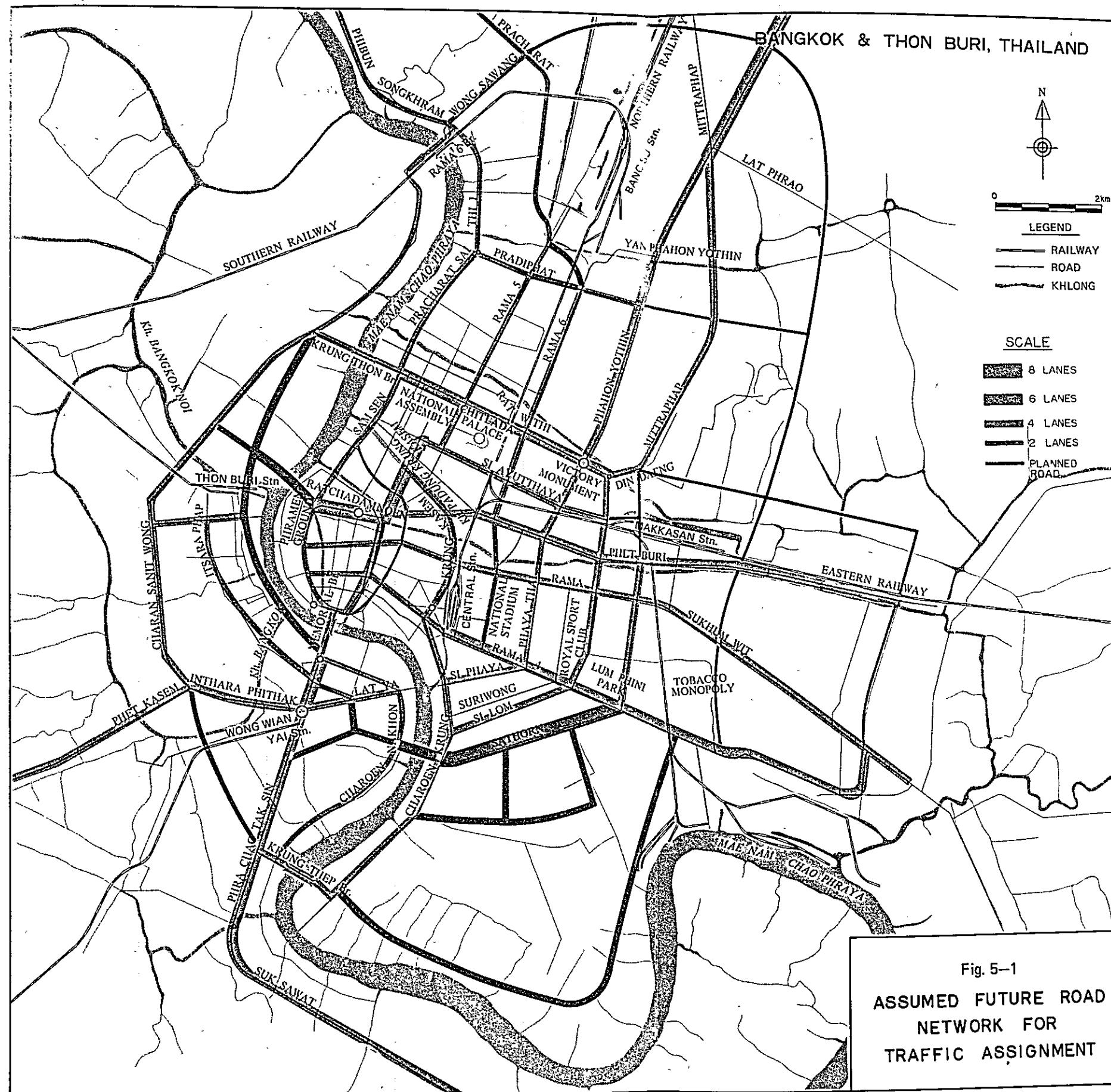
(1) Bus Traffic

So far, no consideration has been given to regular bus service in the estimation of traffic volume because regular buses are under government control and therefore traffic volume can be easily found on route maps and operation tables. Fig. 5-2 shows the present traffic volume of buses.

The traffic volume of buses on the existing roads is expected to increase in proportion to the growth rate of other traffic generation of the zone where the road is located. Traffic volume of buses on projected roads are assumed equal to that on existing roads which have similar function and standard. The traffic volume of buses, thus obtained, is assigned to each route prior to the assignment of other traffic.

(2) Regular Bus Traffic on the Sathorn Bridge

Most of the passengers presently utilizing ferries to cross the Mae Nam Chao Phraya are expected to become bus passengers when the bridges are completed and new bus routes are added. Of the many ferry stations on the Mae Nam Chao Phraya, those likely to be affected by the completion of the Tha Chang Br. and the Sathorn Br. were chosen, from the number of passengers using these ferry stations, the volume of bus traffic was estimated. The average number of ferry passengers using per day was based on the survey conducted by the Harbor Dept. in March, 1969, for a period of one week. The percentage of passengers that will shift to buses was taken as the ratio of the ferry passengers using buses to complete their trips. This figure was based on a survey made by the Team at five stations in the vicinity of the proposed Sathorn Br. as shown in Table 5-1. One bus was allocated to every 25 passengers. According to the table, 2,624 buses would have crossed the Tha Chang Br. and 1,247 buses the Sathorn Br. if both bridges existed in 1969.



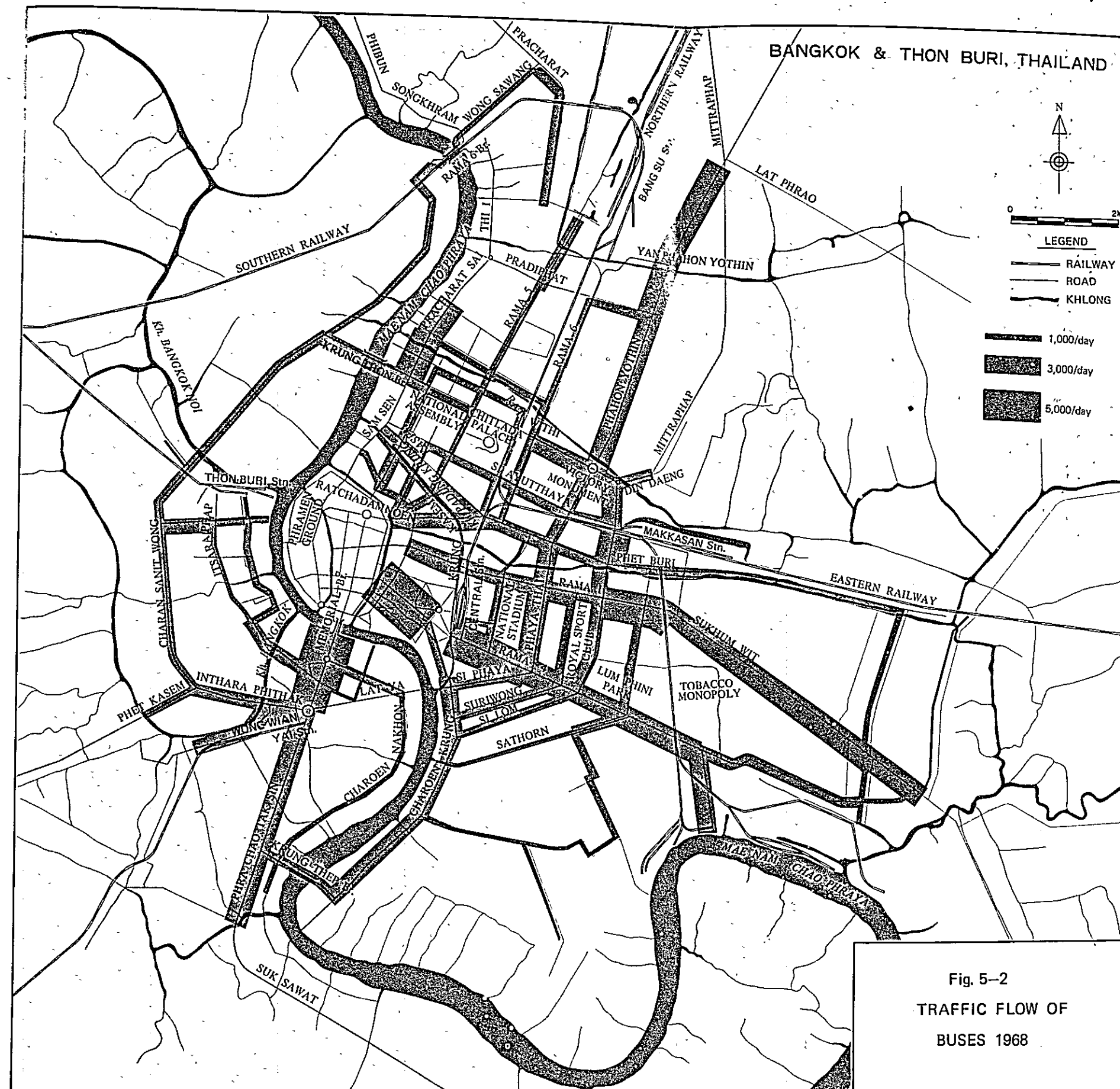


Table 5-1 Estimated Number of Bus Passengers crossing over the Tha Chang and Sathorn Bridges

Bridge	Ferry station	Average Number of Ferry Passengers per Day	Ratio of Bus Passengers	Number of Bus Passengers	Number of Buses
Tha Chang	Tevesa	5,963	0.746	4,448	2,624
	Bangyeekun	3,914		2,919	
	Kasen	1,389		1,036	
	Pra Artid	9,003		6,716	
	Prachan Nue	2,579		1,923	
	Prachan Noc (ST.)	9,570		7,139	
	Prachan Noe (Pranok)	21,430		15,986	
	Prachan Khlong (Middle)	10,307		7,689	
	Khun Koey	2,448		1,826	
	Tha Chang	21,359		15,927	
	Total	87,962		65,609	
Sathorn	Rajavong	16,164	0.812	13,125	1,247
	Swasdai	4,600	0.933	4,291	
	Si Praya	14,085	0.514	7,239	
	Bang Rak	2,734	0.753	2,058	
	Sathorn Tai	3,326	0.750	2,494	
	Ta Sita	2,805	0.704	1,974	
	Total	43,714	0.746	31,181	

5-4 Traffic Assignment

As all of the required conditions have been provided in the previous discussions, computation of traffic assignment will be made in the following sequence.

- (1) First, the road traffic was assumed to be only that of the regular buses already estimated in Section 5-3, and the vehicle speed and the required traveling time have been determined in advance.
- (2) A generation node was picked up at random. From this node, to all absorption nodes the shortest routes or the minimum pathes were selected.
- (3) The traffic volume to be assigned at one time is 1/10 of the OD table traffic, which was assigned to those minimum routes.
- (4) The assigned traffic volume was substituted in the Q-V equation for each road section to calculate speed and traveling time for that particular road section.
- (5) Another node was picked up at random from the remaining generation nodes and the minimum routes were determined in the same manner as before. In other words, procedures (2) through (4) have been repeated.

(6) Procedures (2) through (4) were repeated until all of the generation nodes were selected. Then the second 1/10 of the OD table traffic was assigned in the same manner, and to every 1/10 of the OD table traffic the same procedure was repeated until all of the OD traffic volume was assigned.

The results of this computation are shown in Figs. 5-3 through 5-5. The traffic volume on each bridge is shown in Table 5-2, according to which the traffic crossing over the Mae Nam Chao Phraya in 1975 when the Sathorn Br. will have been completed is larger than that without the bridge by about 17,000.

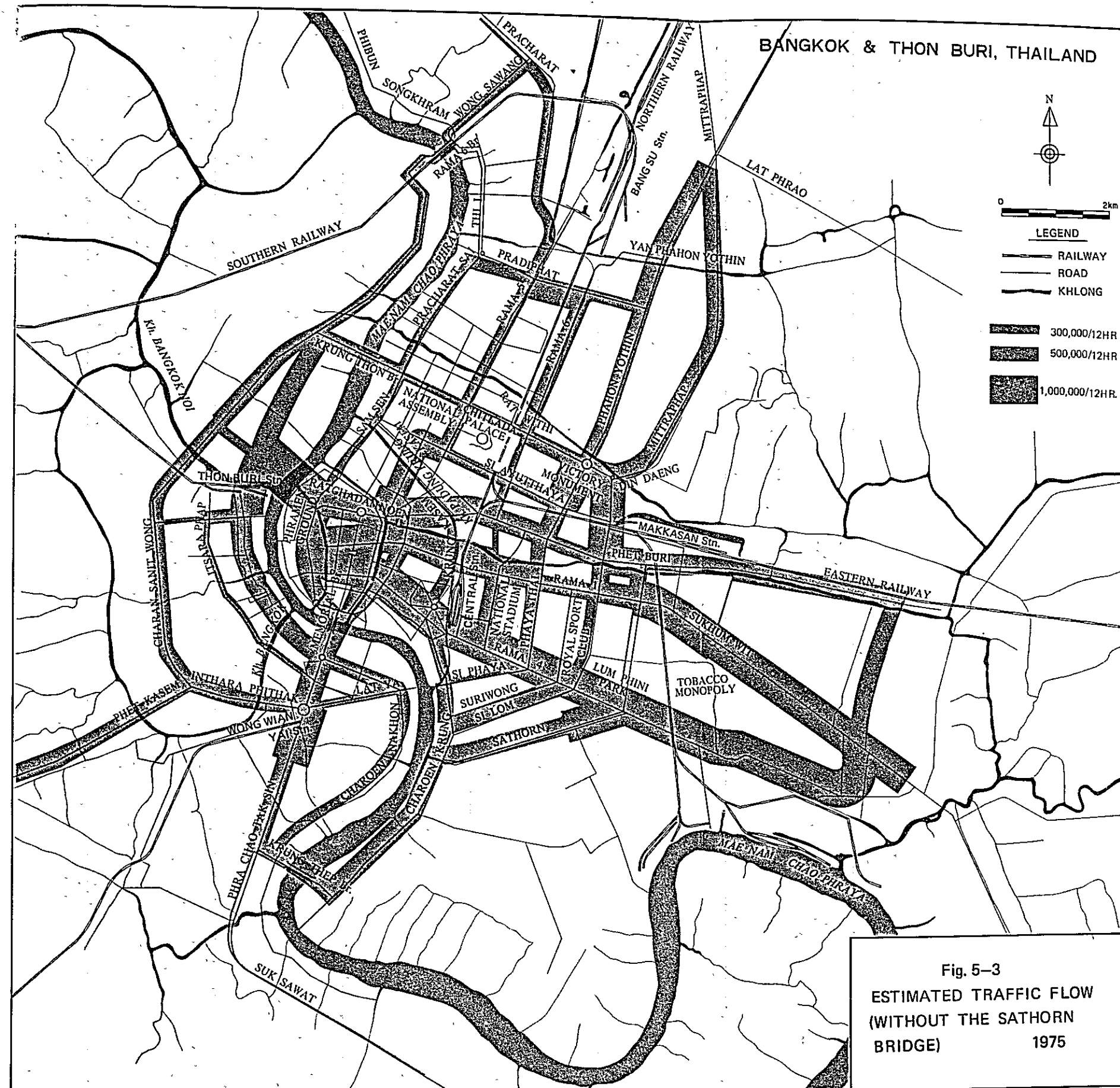
Table 5-2 Future Traffic Volume of Bridges

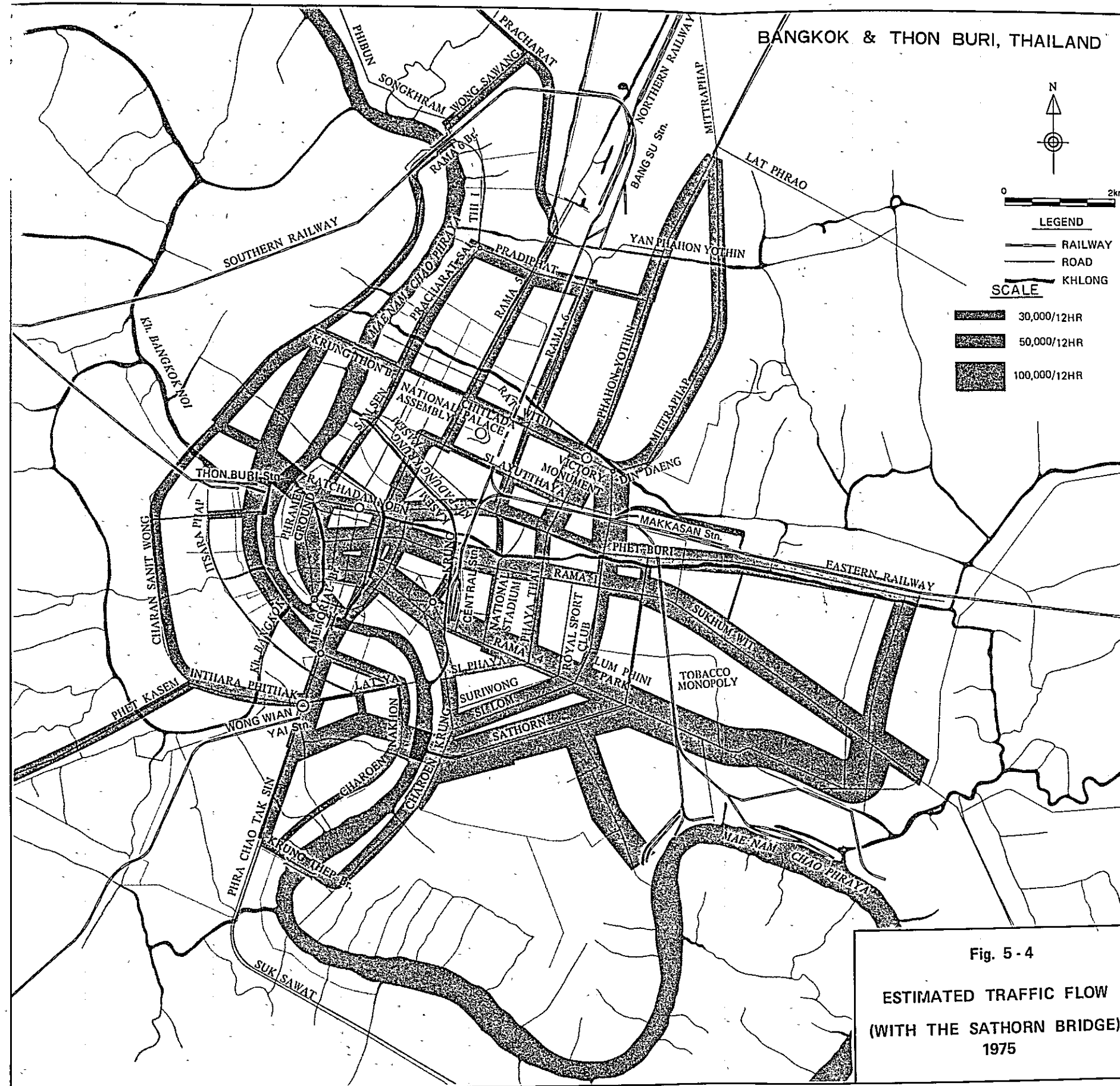
Bridge	1975		1990
	without Sathorn Br.	with Sathorn Br.	
Rama 6	33,467	32,939	49,219
Krung Thon	43,820	36,345	125,086
Tha Chang	146,678	95,230	275,170
Memorial	68,669	66,609	73,422
Sathorn	—	100,670	203,778
Krung Thep	70,652	48,841	126,836
Total	363,286	380,634	853,511

The traffic crossing over the Mae Nam Chao Phraya will come to 381,000 vehicles in 1975 and 854,000 vehicles in 1990, an increase of 3.7 times and 8.3 times respectively as many as 102,000 vehicles in 1969. These growth rates exceed those of the OD traffic volume rates between Bangkok and Thon Buri, which are 2.8 times for 1975 and 7.8 times for 1990. Reasons for this growth can be found in Fig. 5-6, which shows the origins and destinations of the traffic crossing over the Mae Nam Chao Phraya. Although the cross-river traffic having both origins and destinations within Bangkok is not much at present, it will increase to about 1/3 of the total traffic in 1975 and will diminish again to less than 20% in 1990. This is due to the fact that with the addition of the Tha Chang Br. and the Sathorn Br. to the existing four bridges, part of the traffic within Bangkok tends to make a detour via Thon Buri across the river. The decrease in 1990 is probably because the traffic between Bangkok and Thon Buri, which has to use the bridges, will increase so much that there will be little room left for the traffic within Bangkok to make a detour.

The future traffic volumes of the six bridges are shown in Fig. 5-7. As the traffic on the Memorial Br. has already reached its capacity, there will be very little increase in the traffic during a period from 1975 to 1990, which, however, does not necessarily mean that the traffic demand in C.B.D. will not increase so much.

Meanwhile, traffic on the Tha Chang Br. and the Sathorn Br. will grow rapidly and exceed 200,000 vehicles in 1990. However, the traffic is not likely to reach such a volume in view of their traffic capacities. The possible traffic volume of the bridges may be estimated from the present traffic on the Memorial Br., which is considered to have reached its capacity.





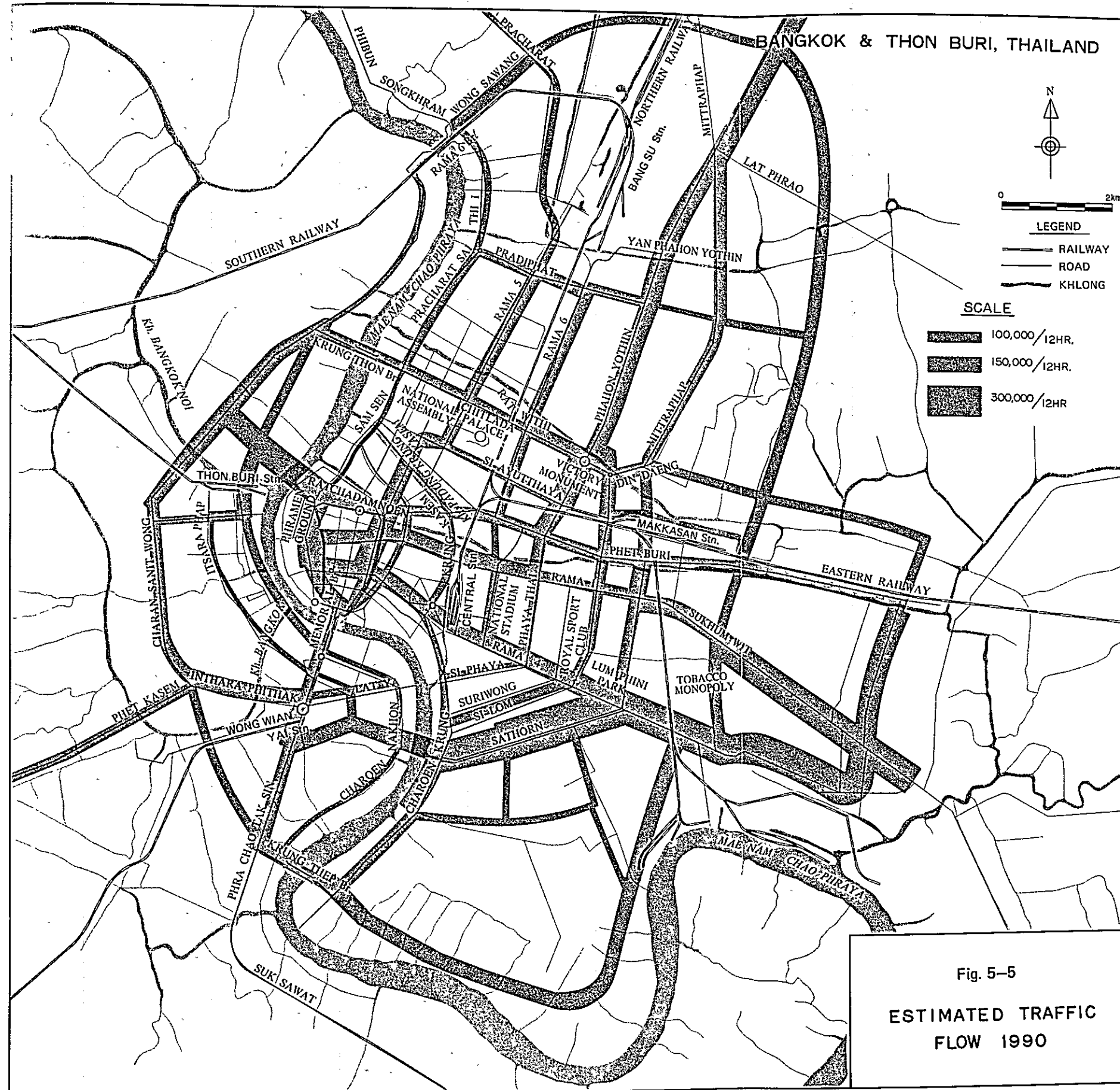
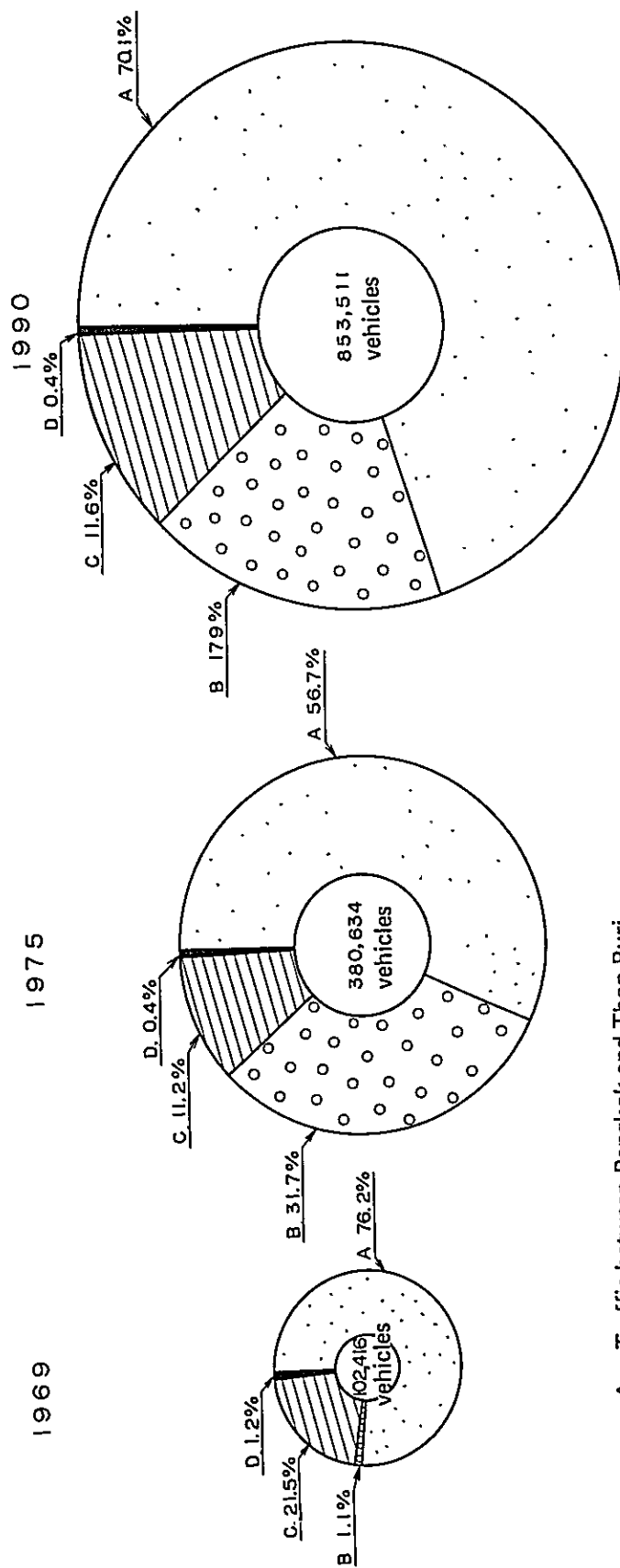


Fig. 5-6 ESTIMATED CHANGE IN ORIGIN AND DESTINATION
OF THE TRAFFIC ACROSS THE MAE NAM CHAO PHRAYA



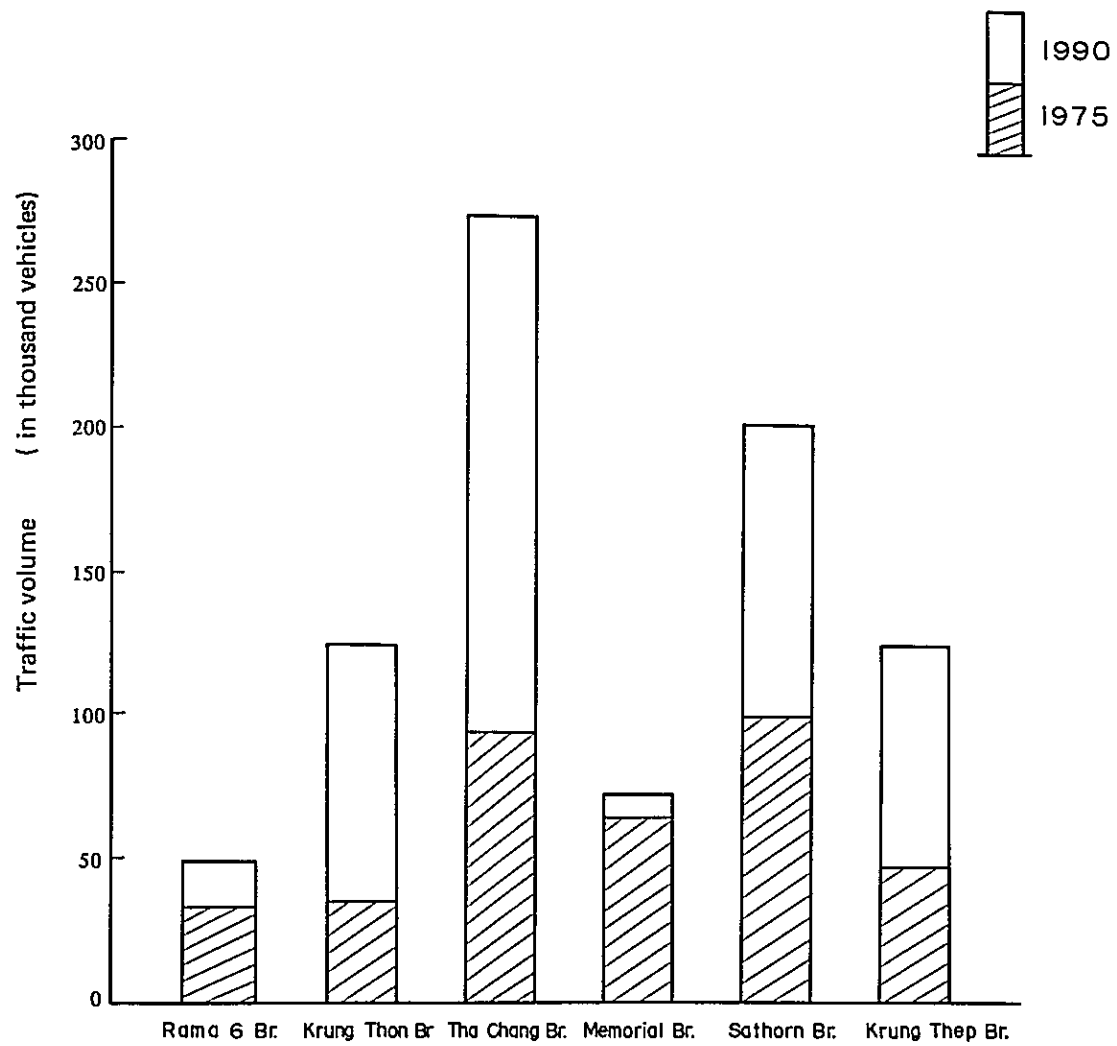
A — Traffic between Bangkok and Thon Buri

B — Traffic in Bangkok or Thon Buri

C — Traffic flowing in or out of Bangkok or Thon Buri

D — Traffic passing through Bangkok and Thon Buri

Fig. 5-7 ESTIMATED FUTURE TRAFFIC VOLUME BY BRIDGES



The Memorial Br. has a roadway width of 10 meters and is carrying a traffic load of 57,000 vehicles (excluding motorcycles) during a 12 hour duration. Assuming that it has three lanes, the traffic per lane would be about 20,000 vehicles.

As the Tha Chang Br. and the Sathorn Br. are to have six lanes each, the Krung Thep Br. has four lanes and the Rama 6 Br. two lanes, the three lanes of the Memorial Br. makes it a total of 25 lanes over the six bridges spanning the Mae Nam Chao Phraya with an estimated traffic capacity of 500,000 vehicles. On the other hand, the traffic crossing the river will increase from 381,000 vehicles in 1975 to 854,000 vehicles in 1990. Assuming that the annual change in the traffic volume during this period will be of constant, the annual increase will be 32,000 vehicles making the total cross-river traffic a number of 500,000 vehicles in 1980. At that time, all of the six bridges will have traffic jams as serious as those now experienced on the Memorial Br. To meet the demand in 1990, it would be necessary to provide at least 18 more additional lanes. However, it will require careful planning based on a more comprehensive study to determine when, where and how many additional bridges should be constructed.

5-5 Reduction in the Total Traveling Distance upon Completion of the Sathorn Bridge

Finally, the reduction in the total traveling distance was obtained from the results of traffic assignment for 1975 calculated once with the Sathorn Br. and its connecting roads included and once without them.

The existence of the Sathorn Br. will bring about a change in traveling routes of every OD pair, and consequently the traveling distance and time will change. In this report, however, the change in the total traveling distance is obtained only for the traffic using the Sathorn Br. According to the results of the assignment, in 1975 the traffic through the Sathorn Br. will number 101,000 vehicle/12 hr. which is shown in Table 5-3 in a form of an OD table. Tables 5-4 through 5-6 are the OD tables by vehicle types corresponding to Table 5-3.

The routes taken by the zone pair traffic in the above tables in the case without the bridge may be found in the results of the traffic assignment under that condition. By comparing the routes in both cases, the reduction in the traveling distance for each zone pair can be obtained.

The zone pair traveling distances in the above two cases are shown in Tables 5-7 and 5-8, and their differences in Table 5-9. Tables 5-10 through 5-12 present the differences in the total traveling distances of passenger cars, taxis and trucks in terms of vehicle-km in each zone pair.

From the above computation, the total reduction in traveling distance, due to the completion of the Sathorn Br., will be 129,469 veh-km for passenger cars, 238,528 veh-km for taxis and 160,876 veh-km for trucks bring the total 528,863 veh-km. On the basis of the foregoing the benefits of the Sathorn Br. Project will be assessed and its economic feasibility will be discussed.

Table 5-3 Estimated OD Table of Traffic on the Sathorn Br. (All vehicles) for 1975

Zone No	BANGKOK ZONE													THON BURI ZONE							INT- EXT TOTAL	TOTAL														
	1	2	3	4	5	6	7-E	7-W	8	9	10	11	12	13	14-N	14-S	15	16	17-N	17-S			EXTERNAL ZONE													
																							18	19	20	21	22	23	24							
1	-	-	-	-	-	-	8,835	1,872	-	-	-	-	-	-	-	-	-	-	-	-	-	10,707	-	-	-	-	-	-	-	-	-	-	10,707	-		
2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
3	-	-	-	-	-	-	-	2,127	-	-	-	-	-	-	-	-	-	-	-	-	-	2,127	-	-	-	-	-	-	-	-	-	-	-	2,127	-	
4	-	-	-	-	-	-	-	-	737	-	-	-	-	-	-	-	-	-	-	-	-	2,844	-	-	-	-	-	-	-	-	-	-	-	2,844	-	
5	-	-	-	-	-	-	-	-	146	-	-	-	-	-	-	-	-	-	-	-	-	1,503	-	-	-	-	-	-	-	-	-	-	-	1,503	-	
6	-	-	-	-	-	-	-	469	-	-	-	-	-	-	-	-	-	-	-	-	-	3,160	-	-	-	-	-	-	-	-	-	-	-	3,160	-	
7-E	-	-	-	-	-	-	-	-	7,403	-	-	-	-	-	-	-	-	-	-	-	-	40,961	-	-	-	-	-	-	-	-	-	-	-	40,961	-	
7-W	-	-	-	-	-	-	-	-	-	23,051	887	463	899	748	858	573	353	1,916	336	304	786	43,928	1	382	10	1	-	193	15	602	44,530	3,190	32,903	-	-	
8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	604	680	3,836	608	935	-	29,714	-	1,837	-	-	77	1,275	-	-	42	-	42	2,469	-
9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	276	1,264	-	-	-	2,427	-	-	-	-	-	-	-	-	-	-	-	463	-	
10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	463	-	-	-	-	-	-	-	-	-	-	-	-	-	899	-
11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	899	-	-	-	-	-	-	-	-	-	-	-	-	-	899	-
12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	225	1,143	-	-	-	2,116	-	-	-	-	-	50	-	-	-	-	50	-	2,166	-
13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	137	97	507	95	-	-	1,694	-	1,837	-	-	-	11	152	-	-	281	1,975	-	-	
14-N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3,267	-	-	-	-	-	-	-	-	-	-	-	-	-	3,267	-
14-S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3,513	9	-	-	-	11	-	-	-	-	-	-	20	3,533	-	
15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	28,524	14	-	-	-	20	-	-	-	-	-	-	34	28,558	-	
16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3,980	-	-	-	-	-	-	-	-	-	-	-	-	3,980	-	
17-N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,353	-	-	-	-	-	-	-	-	-	-	-	-	2,353	-	
17-S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3,916	-	-	-	-	-	-	-	-	-	-	-	-	3,916	-	
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24	24	
19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3,882	3,882	
20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	10	
21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32	32	
22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	300	299		
23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,360	2,360		
24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15	15		
TOTAL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6,622*	100,670*	

94,048*

Notice . * shows number of trips

Notice . * shows number of trips

Table 5-4 Estimated OD Table of Traffic on the Sathorn Br. (Passenger Cars) for 1975

Zone No.	BANGKOK ZONE													THON BURI ZONE							INT- INT	EXTERNAL ZONE								INT- EXT TOTAL	TOTAL
	1	2	3	4	5	6	7-E	7-W	8	9	10	11	12	13	14-N	14-S	15	16	17-N	17-S		18	19	20	21	22	23	24			
1	-	-	-	-	-	-	2,085	365	-	-	-	-	-	-	-	-	-	-	-	-	2,450	-	-	-	-	-	-	-	2,450		
2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
3	-	-	-	-	-	-	-	407	-	-	-	-	-	-	-	-	-	-	-	-	407	-	-	-	-	-	-	-	-		
4	-	-	-	-	-	-	-	108	-	-	-	-	-	-	-	-	-	-	-	-	694	-	-	-	-	-	-	-	-		
5	-	-	-	-	-	-	-	46	-	-	-	-	-	-	-	-	-	-	-	-	517	-	-	-	-	-	-	-	720		
6	-	-	-	-	-	-	-	115	-	-	-	-	-	-	-	-	-	-	-	-	978	-	-	-	-	-	-	-	684		
7-E	-	-	-	-	-	-	-	1,365	-	-	-	-	-	-	-	-	-	-	-	-	9,208	-	-	-	-	-	-	-	9,579		
7-W	-	-	-	-	-	-	-	-	6,091	263	162	167	163	337	166	100	474	69	50	177	0,625	-	-	-	-	-	-	-	1,558		
8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	175	210	824	149	226	-	7,675	-	-	-	-	-	-	-	8,730		
9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	99	341	-	-	-	703	-	-	-	-	-	-	-	717		
10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	162	-	-	-	-	-	-	-	-	162		
11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	167	-	-	-	-	-	-	-	-	167		
12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	74	269	-	-	-	506	-	-	-	-	-	-	-	524		
13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	68	51	202	38	-	696	-	-	-	-	-	-	-	784		
14-N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,049	-	-	-	-	-	-	-	-	1,049		
14-S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,175	2	-	-	-	-	-	-	-	1,181		
15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6,853	6	-	-	-	-	-	-	-	6,865		
16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	904	-	-	-	-	-	-	-	-	904		
17-N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	487	-	-	-	-	-	-	-	-	487		
17-S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	972	-	-	-	-	-	-	-	-	972		
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	
19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,507	
20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	
21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	
22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	91	
23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	536	
24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	
TOTAL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23,114*	-	-	-	-	-	-	-	2,161*	25,275*	

Notice : * shows number of trips.

23,114*

Notice : * shows number of trips.

Table 5-5 Estimated OD Table of Traffic on the Sathorn Br. (Taxis) for 1975

Zone No	BANGKOK ZONE										THON BURI ZONE										INT- INT TOTAL	EXTERNAL ZONE								INT- EXT TOTAL	
	1	2	3	4	5	6	7-E	7-W	8	9	10	11	12	13	14-N	14-S	15	16	17-N	17-S		18	19	20	21	22	23	24			
1	-	-	-	-	-	-	3,543	656	-	-	-	-	-	-	-	-	-	-	-	-	4,199	-	-	-	-	-	-	-	4,199		
2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
3	-	-	-	-	-	-	-	836	-	-	-	-	-	-	-	-	-	-	-	-	836	-	-	-	-	-	-	-	836		
4	-	-	-	-	-	-	-	370	-	-	-	-	-	-	128	320	769	-	-	-	1,587	-	-	-	-	11	-	-	11	1,598	
5	-	-	-	-	-	-	-	65	-	-	-	-	-	-	132	112	469	54	-	-	832	-	68	-	-	11	-	-	79	911	
6	-	-	-	-	-	-	-	153	-	-	-	-	-	-	277	281	656	48	15	-	1,430	-	58	-	-	9	-	-	67	1,497	
7 E	-	-	-	-	-	-	-	2,488	-	-	-	-	-	-	288	242	8,673	1,183	279	1,408	18,104	-	286	-	-	10	68	-	364	18,468	
7-W	-	-	-	-	-	-	-	-	12,083	448	178	240	258	189	200	170	679	103	76	323	19,515	-	122	-	-	-	30	4	156	19,671	
8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	257	351	2,051	221	307	-	15,270	-	312	-	-	-	156	-	468	15,738	
9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	158	799	-	-	-	1,405	-	-	-	-	-	-	-	-	1,405	
10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	178	-	-	-	-	-	-	-	-	178	
11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	240	-	-	-	-	-	-	-	-	240	
12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	111	589	-	-	-	958	-	-	-	-	11	-	-	11	969	
13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	31	27	152	17	-	-	416	-	-	-	-	5	8	-	13	429	
14-N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,313	-	-	-	-	-	-	-	-	1,313	
14-S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,772	3	-	-	-	-	-	-	3	1,775	
15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14,837	8	-	-	2	-	-	-	10	14,847	
16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,626	-	-	-	-	-	-	-	-	1,626	
17-N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	677	-	-	-	-	-	-	-	-	677	
17-S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,731	-	-	-	-	-	-	-	-	1,731	
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11	11
19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	846	846
20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2
22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	46	46
23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	273	273
24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	4
TOTAL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	43,463*	-	-	-	-	-	-	-	-	1,182*	44,645*

43,463*

1,182* 44,645*

Notice • shows number of trips

Notice * shows number of trips

Table 5-6 Estimated OD Table of Traffic on the Sathorn Br. (Trucks) for 1975

Zone No	BANGKOK ZONE										THON BURI ZONE										INT. INT. TOTAL	EXTERNAL ZONE							INT. EXT. TOTAL	TOTAL	
	1	2	3	4	5	6	7-E	7-W	8	9	10	11	12	13	14-N	14-S	15	16	17-N	17-S		18	19	20	21	22	23	24			
1	-	-	-	-	-	-	3,207	851	-	-	-	-	-	-	-	-	-	-	-	-	4,058	-	-	-	-	-	-	-	4,058		
2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
3	-	-	-	-	-	-	-	884	-	-	-	-	-	-	-	-	-	-	-	-	884	-	-	-	-	-	-	-	884		
4	-	-	-	-	-	-	-	259	-	-	-	-	-	-	41	50	213	-	-	-	563	-	-	-	-	16	-	-	16	579	
5	-	-	-	-	-	-	-	35	-	-	-	-	-	-	21	11	70	17	-	-	154	-	39	-	-	4	45	-	88	242	
6	-	-	-	-	-	-	-	201	-	-	-	-	-	-	113	68	304	48	18	-	752	-	113	-	-	13	104	-	230	982	
7-E	-	-	-	-	-	-	-	3,550	-	-	-	-	-	-	313	157	3,961	943	591	927	13,649	-	382	-	-	23	334	-	739	14,388	
7-W	-	-	-	-	-	-	-	-	-	-	-	-	-	-	207	83	763	164	178	286	13,788	1	145	2	1	129	10	288	14,076		
8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	172	119	961	238	402	-	6,769	-	790	-	-	51	825	-	1,666	8,435	
9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19	124	-	-	-	319	-	-	-	-	28	-	-	28	347	
10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	123	-	-	-	-	-	-	-	-	123	
11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	492	-	-	-	-	-	-	-	-	492	
12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40	285	-	-	-	652	-	-	-	-	21	-	-	21	673	
13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	38	19	153	40	-	-	582	-	60	-	-	6	114	-	180	762	
14-N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	905	-	-	-	-	-	-	-	-	905	
14-S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	566	4	-	-	7	-	-	-	11	577	
15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6,834	-	-	-	12	-	-	-	12	6,846	
16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,450	-	-	-	-	-	-	-	-	1,450	
17-N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,189	-	-	-	-	-	-	-	-	1,189	
17-S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,213	-	-	-	-	-	-	-	-	1,213	
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	5
19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,529	1,529
20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2
21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20	20
22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	162	162
23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,551	1,551
24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	10
TOTAL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	27,471*	-	-	-	-	-	-	-	3,279*	30,750*	

Notice: * shows number of trips

27,471*

Notice: * shows number of trips

Table 5-7 - Traveling Distance (without the Sathorn Br.)

Zone No.	INTERNAL ZONE																								EXTERNAL ZONE						
	BANGKOK ZONE																	THON BURI ZONE													
	1	2	3	4	5	6	7-E	7-W	8	9	10	11	12	13	14-N	14-S	15	16	17-N	17-S	18	19	20	21	22	23	24				
1	-	-	-	-	-	-	11.89	8.72	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
2		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
3			-	-	-	-	-	8.95	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
4				-	-	-	-	4.81	-	-	-	-	-	-	6.42	9.11	7.36	-	-	-	-	-	-	-	17.36	-	-				
5					-	-	-	5.48	-	-	-	-	-	-	8.47	11.47	8.35	8.35	-	-	-	18.35	-	-	23.70	18.35	-				
6						-	-	20.53	-	-	-	-	-	-	12.56	7.17	6.55	13.69	9.66	-	-	16.55	-	-	19.20	16.55	-				
7-E							-	28.31	-	-	-	-	-	-	13.48	16.17	12.00	20.89	16.86	16.51	-	22.00	-	-	23.20	22.00	-				
7-W								-	26.97	17.75	15.21	22.21	26.38	17.87	7.97	5.68	5.06	8.13	15.36	10.07	31.38	15.06	27.21	31.38	-	15.06	27.21				
8									-	-	-	-	-	-	14.20	15.24	14.08	15.74	14.68	-	-	24.08	-	-	33.20	24.08	-				
9										-	-	-	-	-	-	11.23	9.41	-	-	-	-	-	-	-	34.20	-	-				
10											-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
11												-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
12													-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
13														-	12.33	15.02	13.20	16.59	-	-	-	23.20	-	-	38.20	23.20	-				
14-N															-	-	-	-	-	-	-	-	-	-	-	-	-				
14-S																-	-	-	-	-	-	-	-	-	-	-	-				
15																	-	-	-	-	23.02	-	-	39.70	-	-	-				
16																		-	-	-	33.49	-	-	33.49	-	-	-				
17-N																			-	-	-	-	-	-	-	-	-				
17-S																				-	-	-	-	-	-	-	-				
18																					-	-	-	-	-	-	-				
19																						-	-	-	-	-	-				
20																							-	-	-	-	-				
21																								-	-	-	-				
22																									-	-	-				
23																										-	-				
24																											-				

Table 5-8 Traveling Distance (with the Sathorn Br.)

Zone No.	INTERNAL ZONE																								EXTERNAL ZONE							
	BANGKOK ZONE												THON BURI ZONE																			
	1	2	3	4	5	6	7-E	7-W	8	9	10	11	12	13	14-N	14-S	15	16	17-N	17-S	18	19	20	21	22	23	24					
1	-	-	-	-	-	-	11.45	6.29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
2		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
3			-	-	-	-	-	6.52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
4				-	-	-	-	4.81	-	-	-	-	-	-	6.42	6.00	7.29	-	-	-	-	-	-	-	-	-	-					
5					-	-	-	5.48	-	-	-	-	-	-	6.50	6.67	7.64	10.71	-	-	-	17.64	-	-	23.00	17.64	-					
6						-	-	8.36	-	-	-	-	-	-	2.51	2.68	3.65	6.72	9.51	-	-	12.69	-	-	18.50	12.68	-					
7-E							-	14.32	-	-	-	-	-	-	7.96	8.13	9.30	11.89	14.96	12.61	-	17.40	-	-	22.50	17.45	-					
7-W								-	17.29	14.29	12.78	16.95	20.44	19.38	3.10	4.33	4.24	6.39	11.12	7.75	25.44	13.01	21.95	25.44	-	14.24	21.95					
8									-	-	-	-	-	-	10.58	10.75	11.72	13.87	17.58	-	-	20.71	-	-	32.50	20.53	-					
9										-	-	-	-	-	-	8.61	9.58	-	-	-	-	-	-	-	33.50	-	-					
10											-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
11												-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
12													-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
13														-	-	11.00	16.43	-	-	-	-	-	-	-	21.68	-	-					
14-N															15.21	13.35	14.32	16.47	-	-	-	24.32	-	-	37.50	24.32	-					
14-S																-	-	-	-	-	-	-	-	-	-	-	-					
15																	-	-	-	-	16.00	-	-	34.20	-	-	-					
16																		-	-	-	21.43	-	-	21.43	-	-	-					
17-N																			-	-	-	-	-	-	-	-	-					
17-S																				-	-	-	-	-	-	-	-					
18																					-	-	-	-	-	-	-					
19																						-	-	-	-	-	-					
20																							-	-	-	-	-					
21																								-	-	-	-					
22																									-	-	-					
23																										-	-					
24																											-					

Table 5-9 Reduction in Traveling Distance due to the Completion of the Sathorn Br.

Zone No	INTERNAL ZONE																								EXTERNAL ZONE						
	BANGKOK ZONE																	THON BURI ZONE													
	1	2	3	4	5	6	7-E	7-W	8	9	10	11	12	13	14-N	14-S	15	16	17-N	17-S	18	19	20	21	22	23	24				
1	-	-	-	-	-	-	0.44	2.43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
2		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
3			-	-	-	-	-	2.43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
4				-	-	-	-	0	-	-	-	-	-	-	0	3.11	0.07	-	-	-	-	-	-	-	-	-	-				
5					-	-	-	0	-	-	-	-	-	-	1.97	4.80	0.71	-2.36	-	-	-	0.71	-	-	0.70	0.71	-				
6						-	-	12.17	-	-	-	-	-	-	10.05	4.49	2.90	6.97	0.15	-	-	3.86	-	-	0.70	3.87	-				
7-E							-	13.99	-	-	-	-	-	-	5.52	8.04	2.70	9.00	1.90	3.90	-	4.60	-	-	0.70	4.55	-				
7-W								-	9.68	3.46	2.43	5.26	5.94	-1.51	4.87	1.35	0.82	1.74	4.24	2.32	5.94	2.05	5.26	5.94	-	0.82	5.26				
8									-	-	-	-	-	-	3.62	4.49	2.36	1.87	-2.90	-	-	3.37	-	-	0.70	3.55	-				
9										-	-	-	-	-	-	2.62	-0.17	-	-	-	-	-	-	-	0.70	-	-				
10											-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
11												-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
12													-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
13														-	-2.88	1.67	-1.12	0.12	-	-	-	-1.12	-	-	0.70	-1.12	-				
14-N															-	-	-	-	-	-	-	-	-	-	-	-	-				
14-S																-	-	-	-	-	-	-	-	-	-	-	-				
15																	-	-	-	-	7.20	-	-	5.50	-	-	-				
16																		-	-	-	12.06	-	-	12.06	-	-	-				
17-N																			-	-	-	-	-	-	-	-	-				
17-S																				-	-	-	-	-	-	-	-				
18																					-	-	-	-	-	-	-				
19																						-	-	-	-	-	-				
20																							-	-	-	-	-				
21																								-	-	-	-				
22																									-	-	-				
23																										-	-				
24																											-				

120,999

Table 5-11 Total Reduction in Traveling Distance (Taxis) for 1975

Total Reduction in Traveling Distance (Taxis) for 1975																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
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1	-	-	-	-	-	-	1,559	1,594	-	-	-	-	-	-	-	-	-	-	-	-	3,153	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 5-12 Total Reduction in Traveling Distance (Trucks) for 1975

Table 5-12 Total Reduction in Traveling Distance (Trucks) for 1975																																							
Zone No.	BANGKOK ZONE														THON BURI ZONE										INT INT TOTAL	EXTERNAL ZONE					INT. EXT TOTAL	TOTAL							
	BANGKOK ZONE														THON BURI ZONE											EXTERNAL ZONE													
	1	2	3	4	5	6	7 E	7 W	8	9	10	11	12	13	14 N	14 S	15	16	17 N	17 S	18	19	20	21		22	23	24											
1	-	-	-	-	-	-	1,411	2,068	-	-	-	-	-	-	-	-	-	-	-	-	3,479	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3,479	-	-	
2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
3	-	-	-	-	-	-	-	2,148	-	-	-	-	-	-	-	-	-	-	-	-	2,148	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,148	-	-
4	-	-	-	-	-	-	-	0	-	-	-	-	-	-	0	156	15	-	-	-	171	-	-	-	-	1	-	-	-	-	-	-	-	1	172	-	-		
5	-	-	-	-	-	-	-	0	-	-	-	-	-	-	41	53	50	-40	-	-	104	-	28	-	-	3	31	-	-	-	-	-	62	166	-	-			
6	-	-	-	-	-	-	-	2,446	-	-	-	-	-	-	1,136	305	882	335	3	-	6,104	-	436	-	-	9	402	-	-	-	-	-	847	6,951	-	-			
7 E	-	-	-	-	-	-	-	49,636	-	-	-	-	-	-	1,728	1,262	10,695	9,091	1,123	3,615	76,546	-	1,758	-	-	16	1,519	-	-	-	-	-	3,293	79,839	-	-			
7 W	-	-	-	-	-	-	-	-	47,209	609	299	2,588	1,942	-501	1,008	112	626	285	755	664	55,596	6	297	11	6	-	106	53	-	-	-	479	56,075	-	-				
8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	623	534	2,268	445	-1,166	-	2,704	-	2,664	-	-	36	2,927	-	-	-	5,627	8,331	-	-	-	-			
9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50	-21	-	-	-	29	-	-	-	-	20	-	-	-	-	20	49	-	-	-	-			
10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	281	3,437	-	-	-	3,718	-	-	-	-	353	-	-	-	-	-	353	4,071	-	-	-			
13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-109	32	-171	-	-	-	-243	-	-67	-	-	4	-128	-	-	-	-	-191	-434	-	-	-			
14 N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
14 S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	29	-	-	-	-	-	-	-	-	-	29	29	-	-	-			
15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
17 N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
17 S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
TOTAL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	150,356	-	-	-	-	-	-	-	-	-	-	-	10,520	160,876	-	-	-		

Appendix

Results of the Traffic Survey

CONTENTS

OD Survey

OD Table	(Passenger Cars)
OD Table	(Taxis)
OD Table	(Trucks)
OD Table	(All Vehicles)

12 Hour Traffic Count

Hourly Traffic Vehicle by Vehicle Types
Hourly Traffic Volume
Hourly Traffic Volume at Intersection

Weekly Traffic Count

Weekly Traffic Volume at Bridges

Travel Time Study

Travel Time by Road Section

Ferry Passenger Survey

Hourly Number of Ferry Passengers and Services
Land Transportation of Ferry Passengers

Survey Method: Refer to Chapter 2.

Survey Location: Refer to Fig. 2-1.

Zoning: Refer to Fig. 2-2, 2-3 and Table 2-2.

OD Survey

75,474

O/D Table obtained by Interview

TYPE: Taxis (Including Samlor)

Zone No		BANGKOK ZONE													THON BURI ZONE				INT. INT. TOTAL	EXTERNAL ZONE								INT. EXT. TOTAL	TOTAL
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17		18	19	20	21	22	23	24			
BANGKOK ZONE																													
1	0	0	0	0	0	20	60	0	0	5	18	6	4	1,257	3,699	922	1,819	7,810	0	676	53	0	24	186	14	953	8,763		
2		0	0	0	0	7	6	0	0	0	1	0	0	295	1,095	275	422	2,101	0	177	5	0	13	41	8	244	2,345		
3			0	0	0	0	13	0	0	4	1	0	0	508	1,667	503	431	3,127	0	332	5	0	20	29	12	398	3,525		
4				0	0	0	6	0	0	0	5	5	0	321	962	299	710	2,308	0	204	49	0	12	37	5	307	2,615		
5					0	0	0	0	0	0	6	0	0	73	237	84	208	608	0	57	0	0	0	12	0	69	677		
6						0	0	0	0	4	0	0	0	192	585	176	204	1,188	0	81	0	0	10	0	0	91	1,279		
7							0	0	0	0	10	0	0	260	1,285	119	147	1,915	0	184	0	0	8	44	6	242	2,157		
8								0	0	0	0	0	0	153	593	132	370	1,248	0	112	10	0	0	46	0	168	1,416		
9									0	0	0	0	0	225	545	241	1,178	2,198	0	121	20	0	0	61	5	207	2,405		
10									0	0	9	0	0	196	376	189	1,510	2,293	0	106	116	0	4	26	4	256	2,549		
11										0	0	0	0	31	120	136	367	704	0	76	0	0	0	19	8	103	807		
12										0	0	0	0	111	222	111	377	832	0	55	1	0	5	17	4	82	914		
13										0				25	88	0	73	190	0	0	5	0	4	5	0	14	204		
THON BURI ZONE																													
14														0	0	4	42	3,693	8	0	72	0	18	5	8	111	3,804		
15															0	0	9	11,483	16	0	192	4	42	8	19	281	11,764		
16																0	15	3,206	5	0	102	0	0	0	9	116	3,322		
17																	0	7,882	13	0	257	10	60	0	49	389	8,271		
18																			0	4	0	0	0	0	0	46	46		
19																				0	45	0	8	0	5	2,243	2,243		
20																					0	0	0	5	0	937	937		
21																					0	0	0	4	0	18	18		
22																						0	4	0	0	232	232		
23																							0	4	0	553	553		
24																								0	4	160	160		
TOTAL																													

52,786

8,220

61,006

(1000/12 hr.)

O/D Table obtained by Interview

TYPE: Trucks

(trips/12 hr.)

Zone No.	BANGKOK ZONE													THON BURI ZONE					INT-INT TOTAL	EXTERNAL ZONE						INT-EXT TOTAL	TOTAL	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18		19	20	21	22	23	24			
1	0	0	0	0	0	0	37	3	0	12	17	0	0	210	648	219	572	1,718	16	279	122	16	50	371	33	887	2,605	
2		0	0	0	0	0	3	0	0	0	7	0	0	61	284	96	205	656	0	248	23	0	15	81	19	386	1,042	
3			0	0	0	0	3	3	0	0	0	0	2	88	518	97	148	859	0	321	25	6	16	162	2	532	1,391	
4				0	0	0	0	0	0	0	0	0	0	59	246	101	123	529	0	186	29	0	13	100	12	340	869	
5					0	0	0	0	0	0	0	0	0	15	39	10	36	100	0	31	0	0	4	34	0	69	169	
6						0	0	0	0	0	1	0	0	90	246	55	66	458	0	144	4	0	12	131	0	291	749	
7							0	0	0	4	8	0	0	147	700	80	87	1,069	7	263	4	3	19	232	19	547	1,616	
8								0	0	4	0	0	0	47	367	94	165	683	0	304	20	0	19	354	15	712	1,395	
9									0	0	0	0	0	39	102	68	254	463	4	54	8	0	8	135	0	209	672	
10										0	7	0	0	19	82	71	598	797	0	54	25	4	4	136	4	227	1,024	
11											0	0	0	22	137	95	385	679	0	120	19	0	22	206	1	368	1,047	
12												0	0	89	96	29	126	280	0	73	4	0	12	146	0	235	515	
13													0	3	35	7	26	73	0	30	8	0	3	49	4	94	167	
14														0	0	0	23	852	10	0	4	18	21	3	35	91	943	
15															0	0	6	3,506	0	0	81	26	83	4	58	252	3,758	
16																0	4	1,026	2	0	10	30	41	0	36	119	1,145	
17																	0	2,824	0	0	134	68	52	12	77	343	3,167	
18																			0	0	0	0	0	8	0	47	47	
19																			0	0	51	67	117	0	81	2,423	2,423	
20																				4	4	6	102	0	691	691		
21																					0	0	26	0	268	268		
22																						0	86	19	622	622		
23																							0	56	2,434	2,434		
24																								0	471	471		
TOTAL																											12,658	29,230

16,572

16,572

O/D Table obtained by Interview

TYPE: All vehicles

Zone No		BANGKOK ZONE													THON BURI ZONE					EXTERNAL ZONE										INT. TOTAL		TOTAL
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	INT. TOTAL	18	19	20	21	22	23	24	INT. TOTAL	EXT. TOTAL				
1		0	0	0	0	0	31	221	6	0	40	131	13	17	2,949	8,037	2,245	5,691	19,381	16	2,140	507	23	157	1,245	76	4,164	23,545				
2		0	0	0	0	0	11	28	0	0	4	22	5	0	815	2,740	816	1,483	5,924	0	891	74	0	46	344	31	1,386	7,310				
3		0	0	0	0	0	0	27	3	0	8	1	3	2	1,172	3,798	1,003	1,096	7,113	0	1,255	65	9	103	450	30	1,912	9,025				
4		0	0	0	0	0	0	6	0	3	0	7	5	0	845	2,491	775	1,837	5,969	0	824	122	0	67	307	17	1,337	7,306				
5		0	0	0	0	0	0	0	0	0	0	6	0	0	276	680	205	654	1,821	0	263	15	0	4	111	3	396	2,217				
6		0	0	0	0	0	0	0	0	0	7	6	0	0	631	2,105	500	968	4,259	0	661	24	0	29	243	0	957	5,216				
7		0	0	0	0	0	0	0	0	12	12	30	3	9	685	3,090	353	512	4,988	7	822	29	3	31	385	30	1,307	6,295				
8		0	0	0	0	0	0	0	0	3	4	2	0	0	508	1,959	546	1,322	4,353	0	865	68	0	33	549	23	1,538	5,891				
9		0	0	0	0	0	0	0	0	0	0	4	0	0	704	1,595	671	3,226	6,218	4	514	116	0	38	427	19	1,118	7,336				
10		0	0	0	0	0	0	0	0	0	0	43	0	0	569	1,205	573	4,161	6,626	0	378	239	11	17	302	21	968	7,594				
11		0	0	0	0	0	0	0	0	0	0	0	0	0	156	501	343	1,580	2,832	0	330	51	0	29	290	13	713	3,545				
12		0	0	0	0	0	0	0	0	0	0	0	0	0	333	752	335	1,188	2,637	0	294	25	0	32	268	10	629	3,266				
13		0	0	0	0	0	0	0	0	0	0	0	0	0	96	305	75	271	775	0	88	18	0	7	79	4	196	971				
14		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	106	9,849	28	0	103	30	81	8	50	300	10,149				
15		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	79	29,337	36	4	453	51	250	12	156	962	30,299				
16		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66	8,510	14	0	165	34	85	0	73	371	8,881				
17		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24,240	24	34	1,181	118	283	45	223	1,908	26,148				
18		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	3	0	0	25	0	183	183				
19		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	157	82	175	0	110	9,913	9,913				
20		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	6	9	167	2	3,607	3,607				
21		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	63	2	435	435				
22		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	164	19	1,662	1,662				
23		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	112	5,596	5,596				
24		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,024	1,024				
TOTAL																			144,832									42,582	187,414			

144,832

42,582

187,414

12 Hour Traffic Count

Hourly Traffic Volume by Vehicle Types

Road : Memorial Br. Date: Mar. 12 (Wed.), 1969

DIREC. TYPE TIME	Inbound							Outbound							Both
	Truck	Bus	Pass. car	Taxi	Sam'lor	Motorcycle	Sub-total	Truck	Bus	Pass. car	Taxi	Sam'lor	Motorcycle	Sub-total	
7 - 8	68	291	1,799	313	34	1,245	3,750	44	291	663	345	75	306	1,724	5,474
8 - 9	100	333	1,795	417	55	1,510	4,210	43	376	927	426	61	516	2,349	6,559
9 - 10	193	245	1,306	627	112	789	3,272	158	237	1,078	524	114	637	2,748	6,020
10 - 11	376	206	1,088	642	134	675	3,121	350	272	1,215	705	146	706	3,394	6,515
11 - 12	344	213	930	554	173	566	2,780	355	203	1,078	635	220	609	3,100	5,880
12 - 13	290	203	895	565	200	528	2,681	347	274	1,041	782	216	578	3,238	5,919
13 - 14	303	184	1,045	582	194	627	2,935	295	270	1,095	665	182	685	3,192	6,127
14 - 15	389	202	1,111	604	141	635	3,082	300	273	1,230	736	140	658	3,337	6,419
15 - 16	250	254	1,004	472	68	584	2,632	337	249	1,335	506	134	657	3,218	5,850
16 - 17	92	291	1,166	535	110	617	2,811	96	374	1,005	754	122	888	3,239	6,050
17 - 18	115	287	1,052	422	45	529	2,450	103	335	2,829	409	76	1,121	4,873	7,323
18 - 19	70	227	1,026	701	81	511	2,616	97	254	1,534	665	133	1,183	3,866	6,482
Total	2,590	2,936	14,217	6,434	1,347	8,816	36,340	2,525	3,408	15,030	7,152	1,619	8,544	38,278	74,618

Note Inbound : Traffic to C.B.D.

Outbound : Traffic from C.B.D.

Hourly Traffic Volume by Vehicle Types

Road: Memorial Br. Date: Mar. 13 (Thu.), 1969

DIREC. TYPE TIME	Inbound							Outbound							Both	
	Truck	Bus	Pass. car	Taxi	Samlor	Motorcycle	Sub-total	Truck	Bus	Pass. car	Taxi	Samlor	Motorcycle	Sub-total	Total	
7- 8	54	270	2, 031	344	58	1, 526	4, 283	48	314	643	325	69	331	1, 730	6, 013	
8- 9	78	283	1, 836	313	55	1, 389	3, 954	60	275	936	343	66	496	2, 176	6, 130	
9-10	138	225	1, 531	663	125	835	3, 517	121	273	1, 013	533	101	607	2, 648	6, 165	
10-11	338	235	1, 242	615	164	635	3, 229	367	320	1, 176	331	182	659	3, 035	6, 264	
11-12	286	204	1, 020	644	219	702	3, 075	287	309	1, 105	252	199	701	2, 853	5, 928	
12-13	305	186	984	527	189	553	2, 744	384	221	1, 304	704	232	662	3, 507	6, 251	
13-14	360	192	1, 132	630	202	550	3, 066	341	208	1, 151	620	211	667	3, 198	6, 264	
14-15	329	214	972	585	144	539	2, 783	333	218	1, 123	657	189	652	3, 172	5, 955	
15-16	275	251	1, 069	430	88	629	2, 742	292	261	1, 316	771	128	716	3, 484	6, 226	
16-17	73	298	1, 100	436	76	567	2, 550	109	246	1, 770	576	121	836	3, 658	6, 208	
17-18	81	269	1, 052	440	71	612	2, 525	92	310	1, 578	397	101	1, 093	3, 571	6, 096	
18-19	70	279	1, 122	718	95	647	2, 931	106	275	1, 321	764	173	1, 292	3, 931	6, 862	
Total	2, 387	2, 906	15, 091	6, 345	1, 486	9, 184	37, 399	2, 540	3, 230	14, 436	6, 273	1, 772	8, 712	36, 963	74, 362	

Note Inbound : Traffic to C.B.D.
Outbound : Traffic from C.B.D.

Hourly Traffic Volume by Vehicle Types

Road: Memorial Br. Date: Mar. 14 (Fri.), 1969

DIREC. TYPE TIME	Inbound							Outbound							Both	
	Truck	Bus	Pass. car	Taxi	Samlor	Motorcycle	Sub total	Truck	Bus	Pass. car	Taxi	Samlor	Motorcycle	Sub-total	Total	Total
7-8	56	303	1,973	332	16	1,343	4,023	44	317	637	382	78	328	1,786	5,809	5,809
8-9	37	301	1,884	347	56	1,372	3,997	48	273	427	577	78	518	1,921	5,918	5,918
9-10	160	254	1,554	699	113	831	3,611	178	255	1,654	337	118	677	3,219	6,830	6,830
10-11	283	225	1,175	647	168	638	3,136	316	291	1,109	740	150	682	3,288	6,424	6,424
11-12	359	198	1,293	675	184	662	3,371	373	215	1,282	687	268	649	3,474	6,845	6,845
12-13	260	227	904	507	189	517	2,604	279	290	1,171	803	190	611	3,344	5,948	5,948
13-14	326	203	1,128	532	189	615	2,993	341	192	1,129	602	195	596	3,055	6,048	6,048
14-15	213	208	871	584	147	550	2,573	374	192	1,336	554	197	646	3,299	5,872	5,872
15-16	226	205	1,119	483	79	521	2,633	274	189	1,210	494	158	650	2,975	5,608	5,608
16-17	93	191	1,052	462	74	596	2,468	101	276	1,743	371	137	858	3,486	5,954	5,954
17-18	92	333	1,146	476	53	544	2,644	220	263	1,729	434	113	991	3,750	6,394	6,394
18-19	30	220	703	671	93	720	2,437	211	298	1,798	469	214	1,121	4,111	6,548	6,548
Total	2,135	2,868	14,802	6,415	1,361	8,909	36,490	2,759	3,051	15,225	6,450	1,896	8,327	37,708	74,198	74,198

Note Inbound : Traffic to C.B.D.

Outbound : Traffic from C.B.D.

Hourly Traffic Volume by Vehicle Types

Road: Krung Thon Br. Date: Mar. 11 (Tue.), 1969

DIREC. TYPE TIME	Inbound							Outbound							(vehicles)	
	Truck	Bus	Pass. car	Taxi	Samlor	Motorcycle	Sub-total	Truck	Bus	Pass. car	Taxi	Samlor	Motorcycle	Sub-total	Both Total	
7 - 8	48	127	1, 102	229	73	256	1, 835	32	100	343	168	53	86	782	2, 617	
8 - 9	55	80	892	274	66	178	1, 545	48	77	425	218	55	93	916	2, 461	
9 - 10	252	51	479	215	60	104	1, 161	353	69	397	220	49	72	1, 160	2, 321	
10 - 11	223	51	339	210	45	70	938	213	55	408	219	60	92	1, 047	1, 985	
11 - 12	177	51	524	218	54	83	1, 107	234	39	413	208	57	89	1, 040	2, 147	
12 - 13	162	60	205	181	57	67	732	230	54	431	205	64	103	1, 087	1, 819	
13 - 14	201	50	372	180	49	104	956	217	66	363	233	49	69	997	1, 953	
14 - 15	231	66	409	245	48	74	1, 073	214	51	494	259	57	81	1, 156	2, 229	
15 - 16	197	85	394	243	59	77	1, 055	229	107	474	270	60	90	1, 230	2, 285	
16 - 17	39	94	423	225	53	97	931	61	116	770	234	47	150	1, 378	2, 309	
17 - 18	54	83	371	282	60	114	964	45	118	785	280	62	175	1, 465	2, 429	
18 - 19	206	75	420	245	40	99	1, 085	288	91	628	334	52	163	1, 556	2, 641	
Total	1, 845	873	5, 930	2, 747	664	1, 323	13, 382	2, 164	943	5, 931	2, 848	665	1, 263	13, 814	27, 196	

Note Inbound : Traffic to C.B.D.

Outbound : Traffic from C.B.D.

Hourly Traffic Volume by Vehicle Types

Road: Krung Thep Br. Date: Mar. 18 (Tue.), 1969

DIREC. TYPE TIME	Inbound							Outbound							Both Total
	Truck	Bus	Pass. car	Taxi	Samlor	Motorcycle	Sub-total	Truck	Bus	Pass. car	Taxi	Samlor	Motorcycle	Sub-total	
7-8	147	82	497	157	46	240	1,169	103	17	160	75	39	95	489	1,658
8-9	139	23	321	164	66	147	860	131	32	202	75	56	117	613	1,473
9-10	260	33	269	123	56	109	858	315	32	208	86	35	97	773	1,631
10-11	189	22	155	85	47	114	612	262	31	215	56	37	98	699	1,311
11-12	180	36	198	104	53	95	666	262	21	183	81	36	108	691	1,357
12-13	238	30	181	112	50	93	704	257	24	201	93	45	83	703	1,407
13-14	226	22	197	99	63	93	700	185	18	201	104	42	87	637	1,337
14-15	246	24	190	153	52	119	784	257	35	178	87	65	85	707	1,491
15-16	300	28	256	143	76	90	893	236	20	203	80	42	77	658	1,551
16-17	240	40	282	159	74	118	913	202	36	236	83	38	102	697	1,610
17-18	180	24	292	95	58	76	725	132	12	290	51	40	122	647	1,372
18-19	137	18	207	130	61	115	668	171	39	295	98	52	136	791	1,459
Total	2,490	382	3,045	1,524	702	1,409	9,552	2,513	317	2,572	969	527	1,207	8,105	17,657

Note Inbound : Traffic to C.B.D.

Outbound : Traffic from C.B.D.

Hourly Traffic Volume by Vehicle Types

Road: Rama 6 Br. Date: Mar. 19 (Wed.), 1969

DIREC. TYPE TIME	Inbound							Outbound							(vehicles)	
	Truck	Bus	Pass. car	Taxi	Samlor	Motorcycle	Sub-total	Truck	Bus	Pass. car	Taxi	Samlor	Motorcycle	Sub-total	Both Total	
7 - 8	58	47	86	6	3	32	232	50	42	191	31	3	30	347	579	
8 - 9	28	41	139	42	7	14	271	65	31	232	56	14	46	444	715	
9 - 10	45	44	107	37	10	19	262	64	45	104	36	10	22	281	543	
10 - 11	69	24	60	51	4	24	232	111	45	74	59	6	38	333	565	
11 - 12	69	29	100	37	2	23	260	58	36	82	40	6	31	253	513	
12 - 13	36	28	109	25	5	15	218	82	28	70	22	12	30	244	462	
13 - 14	37	26	54	46	4	16	183	61	38	85	36	8	22	250	433	
14 - 15	50	22	73	25	13	7	190	70	13	80	35	6	18	222	412	
15 - 16	53	47	76	21	2	15	214	78	61	110	47	5	25	326	540	
16 - 17	37	68	92	41	8	35	281	38	68	117	36	5	32	296	577	
17 - 18	33	45	123	29	4	8	242	43	52	95	62	7	89	348	590	
18 - 19	38	45	103	34	4	15	239	72	54	123	47	12	25	333	572	
Total	553	466	1, 122	394	66	223	2, 824	792	513	1, 363	507	94	408	3, 677	6, 501	

Note Inbound : Traffic to C.B.D.

Outbound : Traffic from C.B.D.

Hourly Traffic Volume by Vehicle Types

Station No. A-1 Road: Phra Chao Tak Sin Date: Mar. 18 (Tue.), 1969

DIREC. TYPE TIME	Inbound							Outbound							Both (vehicles)
	Truck	Bus	Pass. car	Taxi	Samlor	Motorcycle	Sub-total	Truck	Bus	Pass. car	Taxi	Samlor	Motorcycle	Sub-total	
7 - 8	102	92	196	108	36	136	670	51	93	368	91	44	173	820	1,490
8 - 9	132	83	260	107	34	168	784	130	54	377	117	33	182	893	1,677
9 - 10	479	63	204	85	32	166	1,029	158	70	260	99	26	130	743	1,772
10 - 11	90	42	148	27	34	137	478	98	27	140	46	24	137	472	950
11 - 12	163	23	152	34	30	135	537	133	48	179	60	28	139	587	1,124
12 - 13	211	42	187	89	31	122	682	145	54	149	37	30	90	505	1,187
13 - 14	198	49	200	93	24	114	678	492	20	375	32	21	128	1,068	1,746
14 - 15	398	42	192	75	34	124	865	244	35	297	81	25	126	808	1,673
15 - 16	185	64	243	114	32	129	767	258	86	391	103	22	134	994	1,761
16 - 17	128	88	236	82	48	143	725	249	162	321	146	37	132	1,047	1,772
17 - 18	115	51	316	116	53	105	756	159	80	353	108	62	130	892	1,648
18 - 19	118	101	275	115	69	131	809	105	48	281	97	48	159	738	1,547
Total	2,319	740	2,609	1,045	457	1,610	8,780	2,222	777	3,491	1,017	400	1,660	9,567	18,347

Note Inbound : Traffic to C.B.D.

Outbound : Traffic from C.B.D.

Hourly Traffic Volume by Vehicle Types

Station No. A-2 Road: Phra Chao Tak Sin Date: Mar. 20 (Thu.), 1969

DIREC. TYPE TIME	Inbound							Outbound							Both
	Truck	Bus	Pess. car	Taxi	Samlor	Motorcycle	Sub-total	Truck	Bus	Pess. car	Taxi	Samlor	Motorcycle	Sub-total	
7 - 8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8 - 9	13	45	135	64	54	97	408	21	55	355	123	60	222	836	1, 244
9 - 10	39	41	276	75	54	172	657	48	45	330	152	81	207	863	1, 520
10 - 11	87	42	232	104	92	163	720	50	41	198	130	59	129	607	1, 327
11 - 12	60	29	140	110	72	155	566	82	32	184	132	80	133	643	1, 209
12 - 13	72	38	206	125	76	117	634	63	39	201	136	87	87	613	1, 247
13 - 14	92	24	125	56	76	129	502	74	42	267	151	75	101	710	1, 212
14 - 15	70	31	165	64	63	103	496	61	44	208	118	72	110	613	1, 109
15 - 16	70	38	186	89	57	134	574	57	53	160	100	76	101	547	1, 121
16 - 17	27	41	295	86	87	170	706	14	54	216	99	76	148	607	1, 313
17 - 18	21	56	340	81	66	202	766	33	60	197	124	112	168	694	1, 460
18 - 19	19	52	249	75	63	153	611	27	41	156	108	99	164	595	1, 206
Total	570	437	2, 349	929	760	1, 595	6, 640	530	506	2, 472	1, 373	877	1 570	7, 328	13, 968

Note Inbound : Traffic to C.B.D.
Outbound : Traffic from C.B.D.

Hourly Traffic Volume by Vehicle Types

Station No. A-3 Road: Phet Kasem Date: Mar. 20 (Thu.), 1969

DIREC. TYPE TIME	Inbound						Outbound						(vehicles)		
	Truck	Bus	Pass. car	Taxi	Samlor	Motorcycle	Sub-total	Truck	Bus	Pass. car	Taxi	Samlor	Motorcycle	Sub-total	Total
7 - 8	175	85	667	207	48	198	1,380	105	81	303	143	25	86	743	2,123
8 - 9	258	51	501	218	43	164	1,235	174	97	360	157	36	127	951	2,186
9 - 10	312	56	506	158	47	101	1,180	146	143	467	150	43	125	1,074	2,254
10 - 11	318	45	447	114	48	92	1,064	230	51	421	145	41	99	987	2,051
11 - 12	337	34	376	91	43	117	998	336	60	345	162	42	109	1,054	2,052
12 - 13	291	45	334	103	29	75	877	263	66	341	151	36	108	965	1,842
13 - 14	312	49	360	155	37	71	984	287	81	413	134	35	74	1,024	2,008
14 - 15	326	48	381	148	52	88	1,043	290	61	312	114	37	82	896	1,939
15 - 16	242	61	317	148	59	107	934	272	42	382	103	38	90	927	1,861
16 - 17	262	45	379	152	41	93	972	282	94	566	178	35	140	1,295	2,267
17 - 18	189	52	409	127	56	111	944	265	84	600	166	58	161	1,334	2,278
18 - 19	203	43	449	115	48	137	995	214	113	571	181	45	171	1,295	2,290
Total	3,225	614	5,126	1,736	551	1,354	12,606	2,864	973	5,081	1,784	471	1,372	12,545	25,151

Note Inbound : Traffic to C.B.D.
Outbound : Traffic from C.B.D.

Hourly Traffic Volume by Vehicle Types

Station No. A-4 Road: Charan Sanit Wong Date: Mar. 20 (Thu.), 1969

DIREC. TYPE TIME	Inbound							Outbound							Both
	Truck	Bus	Pass. car	Taxi	Samlor	Motorcycle	Sub total	Truck	Bus	Pass. car	Taxi	Sanlor	Motorcycle	Sub-total	
7 - 8	104	48	170	96	11	35	464	117	71	394	151	13	85	831	1,295
8 - 9	187	41	185	88	16	42	559	156	48	347	136	21	77	785	1,344
9 - 10	278	26	407	117	19	42	889	188	50	204	151	29	44	666	1,555
10 - 11	215	36	188	109	19	38	605	163	21	182	99	13	29	507	1,112
11 - 12	228	32	156	121	21	40	598	236	35	201	141	18	46	677	1,275
12 - 13	234	33	147	91	16	30	551	166	37	191	89	14	25	522	1,073
13 - 14	197	34	382	106	13	45	777	174	47	95	97	14	35	462	1,239
14 - 15	228	51	190	128	9	43	649	167	34	220	106	10	36	573	1,222
15 - 16	256	47	191	139	23	27	683	170	41	190	120	20	28	569	1,252
16 - 17	215	64	314	93	15	69	770	174	36	227	121	19	27	604	1,374
17 - 18	203	56	481	112	16	63	931	136	42	229	119	10	34	570	1,501
18 - 19	148	37	243	122	16	52	618	109	36	209	83	9	26	472	1,090
Total	2,493	505	3,054	1,322	194	526	8,094	1,956	498	2,689	1,413	190	492	7,238	15,332

Note Inbound : Traffic to C.B.D.

Outbound : Traffic from C.B.D.

Hourly Traffic Volume by Vehicle Types

Station No. A-5 Road: Pracharai Sai Thii Date: Mar. 19 (Wed.), 1969

DIREC. TYPE TIME	Inbound							Outbound							Both	
	Truck	Bus	Pass. car	Taxi	Samlor	Motorcycle	Sub-total	Truck	Bus	Pass. car	Taxi	Samlor	Motorcycle	Sub-total	Total	
7- 8	31	41	260	75	27	105	539	33	34	135	88	27	51	368	907	
8- 9	76	47	737	187	44	117	1,208	89	52	265	108	46	79	639	1,847	
9-10	126	44	261	157	55	57	700	139	66	293	180	47	75	800	1,500	
10-11	116	64	441	141	41	95	898	142	76	296	170	60	96	840	1,738	
11-12	101	109	241	185	26	52	714	110	56	262	177	44	87	736	1,450	
12-13	100	64	252	174	44	105	739	110	69	304	171	43	53	750	1,489	
13-14	91	83	488	107	47	98	914	137	70	269	186	59	81	802	1,716	
14-15	104	68	224	130	46	80	652	143	58	298	173	42	62	776	1,428	
15-16	90	92	200	177	35	65	659	124	58	279	179	43	85	768	1,427	
16-17	99	83	243	166	57	101	749	101	70	470	158	55	113	967	1,716	
17-18	82	84	280	179	47	71	743	86	94	504	178	69	120	1,051	1,794	
18-19	48	57	199	181	55	100	640	81	82	337	187	65	119	874	1,514	
Total	1,064	836	3,826	1,859	524	1,046	9,155	1,295	785	3,712	1,955	600	1,021	9,371	18,526	

Note Inbound : Traffic to C.B.D.

Outbound : Traffic from C.B.D.

Hourly Traffic Volume by Vehicle Types

Station No. A-6 Road: Rama 5 Date: Mar. 24 (Mon.), 1969

DIREC. TYPE TIME	Inbound							Outbound							Both	
	Truck	Bus	Pas. car	Taxi	Samlor	Motorcycle	Sub total	Truck	Bus	Pas. car	Taxi	Samlor	Motorcycle	Sub-total	Total	
7 - 8	97	92	110	113	127	148	687	71	142	229	87	198	79	806	1,493	
8 - 9	129	111	408	131	164	77	1,020	83	70	196	106	171	59	685	1,705	
9 - 10	118	82	305	127	133	90	855	121	116	249	162	130	66	844	1,699	
10 - 11	90	57	210	121	72	69	619	145	49	289	116	83	77	759	1,378	
11 - 12	109	60	207	129	93	65	663	125	50	284	147	198	62	866	1,529	
12 - 13	78	83	263	148	80	60	712	101	72	262	165	38	66	704	1,416	
13 - 14	98	61	334	143	54	41	731	117	93	290	152	154	63	869	1,600	
14 - 15	72	58	290	128	56	42	646	133	103	353	186	74	100	949	1,595	
15 - 16	111	98	261	173	69	44	756	132	61	308	186	125	73	885	1,641	
16 - 17	105	79	318	99	71	69	741	75	64	262	144	96	66	707	1,448	
17 - 18	74	97	317	128	64	57	737	75	124	571	172	134	134	1,210	1,947	
18 - 19	72	87	366	186	64	70	845	81	56	361	205	105	130	938	1,783	
Total	1,153	965	3,389	1,626	1,047	832	9,012	1,259	1,000	3,654	1,828	1,506	975	10,222	19,234	

Note Inbound : Traffic to C.B.D.

Outbound : Traffic from C.B.D.

Hourly Traffic Volume by Vehicle Types

Station No. A-7 Road: Phahon Yothin Date: Mar. 24 (Mon.), 1969

DIREC. TYPE TIME	Inbound										Outbound						Both
	Truck	Bus	Pass. car	Taxi	Samlor	Motorcycle	Sub-total	Truck	Bus	Pass. car	Taxi	Samlor	Motorcycle	Sub-total	Total		
7 - 8	163	196	1, 350	366	131	193	2, 399	182	168	831	296	100	164	1, 741	4, 140		
8 - 9	223	110	1, 212	396	143	164	2, 248	209	148	1, 016	379	98	156	2, 006	4, 254		
9 - 10	295	129	880	384	122	126	1, 936	324	113	853	379	92	153	1, 914	3, 850		
10 - 11	341	180	977	473	139	146	2, 256	499	103	985	278	123	159	2, 147	4, 403		
11 - 12	381	141	683	383	107	135	1, 830	370	89	779	170	97	123	1, 628	3, 458		
12 - 13	280	142	803	356	108	111	1, 800	294	69	747	109	92	97	1, 408	3, 208		
13 - 14	265	106	764	371	95	120	1, 721	304	93	808	356	80	80	1, 721	3, 442		
14 - 15	257	131	821	391	107	135	1, 842	319	96	699	349	91	112	1, 666	3, 508		
15 - 16	187	124	764	379	95	130	1, 679	297	74	651	384	83	104	1, 593	3, 272		
16 - 17	258	223	1, 169	406	122	171	2, 349	300	91	1, 037	129	113	164	1, 834	4, 183		
17 - 18	186	219	961	377	128	183	2, 054	253	32	1, 478	84	139	189	2, 175	4, 229		
18 - 19	145	166	740	450	134	191	1, 826	232	81	972	146	127	108	1, 666	3, 492		
Total	2, 981	1, 867	11, 124	4, 732	1, 431	1, 805	23, 940	3, 583	1, 157	10, 856	3, 059	1, 235	1, 609	21, 499	45, 439		

Note Inbound : Traffic to C.B.D.

Outbound : Traffic from C.B.D.

Hourly Traffic Volume by Vehicle Types

Station No. A-8 Road: Mittraphap Date: Mar. 24 (Mon.), 1969

DIREC. TYPE TIME	Inbound							Outbound							Both	
	Truck	Bus	Pass. car	Taxi	Samlor	Motorcycle	Sub-total	Truck	Bus	Pass. car	Taxi	Samlor	Motorcycle	Sub-total	Total	
7- 8	113	6	660	84	7	96	966	160	13	455	90	27	101	846	1, 812	
8- 9	129	3	514	99	19	51	815	41	7	507	116	18	88	777	1, 592	
9-10	153	10	336	80	5	37	621	143	6	393	90	18	69	719	1, 340	
10-11	133	8	330	63	16	43	593	169	12	344	96	25	60	706	1, 299	
11-12	127	1	409	79	18	35	669	117	11	376	91	19	45	659	1, 328	
12-13	130	2	276	67	12	45	532	130	24	323	108	21	40	646	1, 178	
13-14	72	1	355	62	9	33	532	113	13	336	73	21	49	605	1, 137	
14-15	128	21	513	60	16	39	777	113	10	370	97	24	46	660	1, 437	
15-16	117	2	447	48	16	48	678	162	16	361	47	23	94	703	1, 381	
16-17	113	4	407	48	12	29	613	112	5	492	102	13	54	778	1, 391	
17-18	91	5	653	66	31	97	943	111	10	571	101	25	78	896	1, 839	
18-19	81	4	410	84	13	84	656	114	7	500	109	31	77	838	1, 494	
Total	1, 387	67	5, 310	820	174	637	8, 395	1, 485	134	5, 028	1, 120	265	801	8, 833	17, 228	

Note Inbound *Traffic to C.B.D.

Outbound : Traffic from C.B.D.

Hourly Traffic Volume by Vehicle Types

Station No. A-9 Road: Phet Buri Date: Mar. 21 (Fri.), 1969

DIREC. TYPE TIME	Inbound						Outbound						(vehicles)		
	Truck	Bus	Pass. car	Taxi	Samlor	Motorcycle	Sub-total	Truck	Bus	Pass. car	Taxi	Samlor	Motorcycle	Sub-total	Both Total
7 - 8	82	67	1, 334	224	113	164	1, 984	90	70	650	263	89	191	1, 353	3, 337
8 - 9	78	45	1, 108	304	105	167	1, 807	122	51	647	317	88	143	1, 368	3, 175
9 - 10	157	46	830	365	124	103	1, 625	136	45	660	352	81	141	1, 415	3, 040
10 - 11	164	36	819	396	45	59	1, 519	133	41	584	351	115	148	1, 372	2, 891
11 - 12	136	68	664	346	89	149	1, 452	104	34	694	291	79	168	1, 370	2, 822
12 - 13	102	36	616	353	100	127	1, 334	122	79	658	309	105	141	1, 414	2, 748
13 - 14	115	39	738	389	57	96	1, 434	138	40	677	308	63	102	1, 328	2, 762
14 - 15	132	91	686	398	92	135	1, 534	109	41	679	287	69	107	1, 292	2, 826
15 - 16	103	70	608	356	112	135	1, 384	101	37	623	288	79	104	1, 232	2, 616
16 - 17	165	45	754	381	103	144	1, 592	81	53	950	251	89	165	1, 589	3, 181
17 - 18	111	76	923	277	101	131	1, 619	101	183	927	215	68	155	1, 649	3, 268
18 - 19	85	49	884	425	114	186	1, 743	81	112	843	250	57	111	1, 454	3, 197
Total	1, 430	668	9, 964	4, 214	1, 155	1, 596	19, 027	1, 318	786	8, 592	3, 482	982	1, 676	16, 836	35, 863

Note Inbound : Traffic to C.B.D.

Outbound : Traffic from C.B.D.

Hourly Traffic Volume by Vehicle Types

Station No.A-10 Road: Rama I Date: Mar. 21 (Fri.), 1969

DIREC. TYPE TIME	Inbound							Outbound							Both	
	Truck	Bus	Pass. car	Taxi	Samlor	Motorcycle	Sub-total	Truck	Bus	Pass. car	Taxi	Samlor	Motorcycle	Sub-total	Total	Total
7- 8	66	134	2,132	269	67	200	2,868	50	150	1,002	480	86	290	2,058	4,926	4,926
8- 9	169	123	2,082	340	101	214	3,029	165	140	1,391	561	70	292	2,619	5,648	5,648
9-10	283	100	1,581	547	89	196	2,796	223	126	1,157	541	104	276	2,427	5,223	5,223
10-11	264	89	1,239	579	113	240	2,524	244	118	1,416	587	108	343	2,816	5,340	5,340
11-12	245	90	1,551	495	100	288	2,769	148	104	1,275	521	83	241	2,372	5,141	5,141
12-13	177	86	1,021	391	68	179	1,922	168	100	1,380	549	79	176	2,452	4,374	4,374
13-14	242	97	1,269	519	81	201	2,409	189	106	1,244	455	86	246	2,326	4,735	4,735
14-15	215	126	1,180	528	95	219	2,363	228	92	1,503	541	81	233	2,678	5,041	5,041
15-16	186	115	1,259	606	89	258	2,513	191	110	1,424	596	106	265	2,692	5,205	5,205
16-17	172	98	1,230	482	93	251	2,326	115	94	1,615	455	88	263	2,630	4,956	4,956
17-18	146	113	1,268	439	107	310	2,383	125	109	2,133	493	109	240	3,209	5,592	5,592
18-19	383	110	782	576	87	235	2,173	74	213	1,895	642	99	235	3,158	5,331	5,331
Total	2,548	1,281	16,594	5,771	1,090	2,791	30,075	1,920	1,462	17,435	6,421	1,099	3,100	31,437	61,512	61,512

Note Inbound : Traffic to C.B.D.

Outbound : Traffic from C.B.D.

Hourly Traffic Volume by Vehicle Types

Station No. A-11 Road: Rama 4 Date: Mar. 25 (Tue.), 1969

DIREC. TYPE TIME	Inbound							Outbound							Both
	Truck	Bus	Pass. car	Taxi	Samlor	Motorcycle	Sub-total	Truck	Bus	Pass. car	Taxi	Samlor	Motorcycle	Sub-total	
7 - 8	112	91	821	200	102	296	1, 622	179	138	518	193	96	228	1, 352	2, 974
8 - 9	189	83	734	129	97	178	1, 410	189	111	432	122	71	119	1, 124	2, 534
9 - 10	291	80	504	160	92	206	1, 333	299	109	605	227	123	271	1, 634	2, 967
10 - 11	337	83	378	153	157	147	1, 255	277	87	491	217	135	302	1, 509	2, 764
11 - 12	251	53	339	123	95	235	1, 096	281	85	571	187	114	257	1, 495	2, 591
12 - 13	307	77	552	171	111	137	1, 355	283	86	545	213	164	203	1, 492	2, 847
13 - 14	338	79	624	219	119	241	1, 620	360	90	615	205	156	304	1, 730	3, 350
14 - 15	281	66	309	105	85	99	945	295	88	506	154	144	261	1, 448	2, 393
15 - 16	310	61	401	76	65	161	1, 074	271	72	353	114	124	171	1, 105	2, 179
16 - 17	232	79	390	103	100	227	1, 131	289	75	604	154	81	222	1, 425	2, 556
17 - 18	181	103	654	200	152	375	1, 665	192	93	640	193	109	185	1, 412	3, 077
18 - 19	97	65	201	108	71	223	765	183	122	559	236	106	210	1, 416	2, 181
Total	2, 926	920	5, 907	1, 747	1, 246	2, 525	15, 271	3, 098	1, 156	6, 437	2, 215	1, 423	2, 813	17, 142	32, 413

Note Inbound : Traffic to C.B.D.

Outbound : Traffic from C.B.D.

Hourly Traffic Volume

STATION DIREC. TIME	B-1 (Lat Ya)			B-2 (Inthara Phithak)			B-3 (Charan Sanit Wong)			B-4 (Sam Sen)		
	Inbound	Outbound	Sub-total	Inbound	Outbound	Sub-total	Inbound	Outbound	Sub-total	Inbound	Outbound	Sub-total
7 - 8	478	426	904	1,535	1,149	2,684	370	496	866	1,031	905	1,936
8 - 9	550	500	1,050	1,642	1,443	3,085	484	497	981	1,469	1,199	2,668
9 - 10	438	443	881	1,129	1,337	2,466	540	475	1,015	1,100	1,181	2,281
10 - 11	440	396	836	1,632	1,342	2,974	416	504	920	1,190	1,145	2,335
11 - 12	394	364	758	1,163	1,313	2,476	486	428	914	1,104	1,131	2,235
12 - 13	326	337	663	1,265	1,300	2,565	494	470	964	1,115	1,049	2,164
13 - 14	359	340	699	1,334	1,391	2,725	480	405	885	1,101	1,260	2,361
14 - 15	381	342	723	1,350	1,135	2,485	504	441	945	1,075	1,119	2,194
15 - 16	331	298	629	1,241	1,340	2,581	451	386	837	1,068	1,041	2,109
16 - 17	372	354	726	1,421	1,450	2,871	511	501	1,012	977	1,255	2,232
17 - 18	407	445	852	1,263	1,610	2,873	585	444	1,029	943	1,166	2,109
18 - 19	445	400	845	1,410	1,454	2,864	547	406	953	921	1,038	1,959
Total	4,921	4,645	9,566	16,385	16,264	32,649	5,868	5,453	11,321	13,094	13,489	26,583
DATE	Mar. 20 (Thu.), 1969			Mar. 20 (Thu.), 1969			Mar. 20 (Thu.), 1969			Mar. 24 (Mon.), 1969		

Note Inbound :Traffic to C.B.D.

Outbound :Traffic from C.B.D.

Hourly Traffic Volume

STATION DIREC TIME	B-5			B-6 (Ratchadamnoen Nok)			B-7 (Nakhon Pathom)			B-8 (Nakhon Sawan)		
	Inbound	Outbound	Sub-total	Inbound	Outbound	Sub-total	Inbound	Outbound	Sub-total	Inbound	Outbound	Sub-total
7-8	1,125	657	1,782	1,680	1,118	2,798				657	691	1,348
8-9	1,195	743	1,938	2,224	1,411	3,635	292	235	527	777	775	1,552
9-10	1,138	1,079	2,217	1,708	1,808	3,516	292	320	612	954	833	1,787
10-11	1,080	1,029	2,109	1,801	1,701	3,502	205	210	415	918	675	1,593
11-12	901	1,102	2,003	1,699	1,656	3,355	177	301	478	759	890	1,649
12-13	932	927	1,859	1,449	1,603	3,052	138	226	364	714	576	1,290
13-14	839	969	1,808	1,202	1,290	2,492	144	206	350	731	960	1,691
14-15	890	1,094	1,984	1,406	1,523	2,929	148	195	343	895	585	1,480
15-16	902	1,012	1,914	1,526	1,919	3,445	170	235	405	795	840	1,635
16-17	925	1,280	2,205	1,624	2,195	3,819	141	172	313	1,020	684	1,704
17-18	805	1,101	1,906	1,466	2,031	3,497	151	284	435	1,017	650	1,667
18-19	509	762	1,271	990	1,150	2,140	115	146	261	841	536	1,377
Total	11,241	11,755	22,996	18,775	19,405	38,180	1,973	2,530	4,503	10,078	8,695	18,773
DATE	Mar. 24 (Mon.), 1969			Mar. 24 (Mon.), 1969			Mar. 26 (Wed.), 1969			Mar. 24 (Mon.), 1969		

(vehicles)

Note Inbound : Traffic to C.B.D.

Outbound : Traffic from C.B.D.

Hourly Traffic Volume

STATION DIREC. TIME	B-9 (Lan Luang)			B-10 (Rama 1)			B-11 (Rama 4)			B-12 (Charoen Krung)		
	Inbound	Outbound	Sub-total	Inbound	Outbound	Sub-total	Inbound	Outbound	Sub-total	Inbound	Outbound	Sub-total
7-8	2,588	1,784	4,372	1,890	1,908	3,798	2,852	2,026	4,878	1,328	1,018	2,346
8-9	2,508	1,408	3,916	2,176	2,011	4,187	4,304	1,402	5,706	1,787	2,147	3,934
9-10	2,279	1,392	3,671	2,005	2,494	4,499	4,281	1,365	5,646	1,340	1,821	3,161
10-11	2,129	1,775	3,904	2,213	2,455	4,668	5,440	1,434	6,874	2,213	1,863	4,076
11-12	2,194	1,870	4,064	2,251	2,294	4,545	2,974	1,391	4,365	1,528	1,746	3,274
12-13	1,819	1,719	3,538	1,797	2,028	3,825	2,753	1,248	4,001	1,940	2,089	4,029
13-14	2,163	1,593	3,756	1,376	2,228	3,604	3,612	1,451	5,063	712	823	1,535
14-15	2,201	1,726	3,927	1,493	2,177	3,670	3,614	1,408	5,022	1,475	1,386	2,861
15-16	1,682	1,846	3,528	964	1,540	2,504	4,589	1,399	5,988	1,381	1,728	3,109
16-17	1,917	1,971	3,888	1,300	2,393	3,693	3,931	1,462	5,393	1,722	1,965	3,687
17-18	2,225	1,897	4,122	1,205	2,120	3,325	4,480	1,711	6,191	1,297	2,274	3,571
18-19	2,320	1,873	4,193	1,735	5,202	6,937	4,612	1,546	6,158	1,243	1,306	2,549
Total	26,025	20,854	46,879	20,405	28,850	49,255	47,442	17,843	65,285	17,966	20,166	38,132
DATE	Mar. 25 (Tue.), 1969			Mar. 25 (Tue.), 1969			Mar. 25 (Tue.), 1969			Mar. 25 (Tue.), 1969		

Note Inbound :Traffic to C.B.D.

Outbound :Traffic from C.B.D.

Hourly Traffic Volume

STATION DIREC. TIME	B-13 (Maha Chai)			B-14 (New Road Yaowart)			B-15 (Bamrung Muang)			B-16 (On Saphn Pan Per)		
	Inbound	Outbound	Sub-total	Inbound	Outbound	Sub-total	Inbound	Outbound	Sub-total	Inbound	Outbound	Sub-total
7 - 8	2,033	700	2,733	1,626	1,111	2,737	440	858	1,298	2,081	2,017	4,098
8 - 9	2,068	1,166	3,234	2,545	1,648	4,193	714	1,092	1,806	3,112	3,168	6,280
9 - 10	2,067	1,584	3,651	2,563	2,064	4,627	875	1,045	1,920	3,367	2,890	6,257
10 - 11	1,505	1,505	3,010	3,094	2,328	5,422	788	1,145	1,933	3,273	2,760	6,033
11 - 12	1,902	1,620	3,522	3,087	2,152	5,239	793	796	1,589	3,010	2,941	5,951
12 - 13	1,568	1,630	3,198	2,826	2,003	4,829	809	803	1,612	2,838	2,589	5,427
13 - 14	1,984	1,519	3,503	2,833	2,130	4,963	891	1,467	2,358	3,031	2,759	5,790
14 - 15	1,345	1,427	2,772	3,068	2,225	5,293	783	981	1,764	2,767	3,101	5,868
15 - 16	1,821	2,167	3,988	2,832	2,178	5,010	810	1,247	2,057	2,622	3,531	6,153
16 - 17	1,360	1,972	3,332	2,775	2,065	4,840	788	1,526	2,314	2,605	3,835	6,440
17 - 18	1,669	2,407	4,076	2,752	1,835	4,587	733	964	1,697	2,562	3,414	5,976
18 - 19	1,743	3,365	5,108	2,740	1,852	4,592	660	965	1,625	2,738	3,004	5,742
Total	21,065	21,062	42,127	32,741	23,591	56,332	9,084	12,889	21,973	34,006	36,009	70,015
DATE	Mar. 20 (Thu.), 1969			Mar. 26 (Wed.), 1969			Mar. 26 (Wed.), 1969			Mar. 26 (Wed.), 1969		

Note Inbound :Traffic to C.B.D.

Outbound :Traffic from C.B.D.

Hourly Traffic Volume

STATION DIREC. TIME	B-17			B-18 (Phaya Thai)			B-19 (Rat Damri)			B-20 (Soi Chit Lom)		
	Inbound	Outbound	Sub-total	Inbound	Outbound	Sub-total	Inbound	Outbound	Sub-total	Inbound	Outbound	Sub-total
7-8	1,265	1,230	2,495	2,686	1,663	4,349	1,701	1,484	3,185	593	353	946
8-9	1,644	2,015	3,659	2,521	2,068	4,589	1,728	1,521	3,249	549	467	1,016
9-10	1,478	1,745	3,223	2,925	2,259	5,184	1,516	1,874	3,390	519	470	989
10-11	1,412	1,866	3,278	2,335	2,195	4,530	1,633	1,829	3,462	496	427	923
11-12	1,364	1,653	3,017	2,563	2,916	5,479	1,622	1,842	3,464	520	401	921
12-13	1,353	1,691	3,044	2,328	2,238	4,566	1,764	1,600	3,364	353	377	730
13-14	1,301	1,600	2,901	2,612	2,114	4,726	1,479	2,146	3,625	449	393	842
14-15	1,258	1,540	2,798	2,410	2,276	4,686	1,380	1,716	3,096	489	422	911
15-16	1,321	1,640	2,961	2,250	2,182	4,432	1,557	2,078	3,635	486	423	909
16-17	1,459	1,903	3,362	2,239	2,353	4,592	1,513	1,427	2,940	603	507	1,110
17-18	1,329	1,909	3,238	1,810	2,246	4,056	1,158	2,483	3,641	518	499	1,017
18-19	1,508	2,092	3,600	2,524	2,380	4,904	1,686	1,801	3,487	419	411	830
Total	16,692	20,884	37,576	29,203	26,890	56,093	18,737	21,801	40,538	5,994	5,150	11,144
DATE	Mar. 25 (Tue.), 1969			Mar. 25, (Tue.), 1969			Mar. 21 (Fri.), 1969			Mar. 21 (Fri.), 1969		

Note Inbound : Traffic to C.B.D

Outbound : Traffic from C.B.D.

Hourly Traffic Volume

STATION DIREC. TIME	B-21 (Sukhum Wit Soi 3)			B-22 (Sukhum Wit Soi 21)			B-23 (Sukhum Wit Soi 63)			B-24 (Rama 1)		
	Inbound	Outbound	Sub-total	Inbound	Outbound	Sub-total	Inbound	Outbound	Sub-total	Inbound	Outbound	Sub-total
7-8	646	554	1,200	1,030	1,139	2,169	493	882	1,375	1,800	1,830	3,630
8-9	588	677	1,265	977	1,052	2,029	657	968	1,625	2,280	2,387	4,667
9-10	645	665	1,310	1,035	1,163	2,198	582	662	1,244	2,619	2,443	5,062
10-11	572	719	1,291	853	960	1,813	745	710	1,455	2,534	2,674	5,208
11-12	549	655	1,204	926	955	1,881	587	624	1,211	2,401	2,158	4,559
12-13	579	680	1,259	982	886	1,868	674	655	1,329	2,057	2,188	4,245
13-14	529	569	1,098	834	845	1,679	539	602	1,141	2,397	2,357	4,754
14-15	658	719	1,377	1,018	1,025	2,043	503	543	1,046	2,292	2,358	4,650
15-16	644	671	1,315	1,002	901	1,903	617	669	1,286	2,948	2,825	5,773
16-17	616	747	1,363	1,016	1,050	2,066	525	596	1,121	2,478	2,471	4,949
17-18	562	870	1,432	1,187	1,158	2,345	888	670	1,558	2,250	2,625	4,875
18-19	602	756	1,358	2,408	1,882	4,290	850	824	1,674	2,194	1,919	4,113
Total	7,190	8,282	15,472	13,268	13,016	26,284	7,660	8,405	16,065	28,250	28,235	56,485
DATE	Mar. 21 (Fri.), 1969			Mar. 21 (Fri.), 1969			Mar. 21 (Fri.), 1969			Mar. 21 (Fri.), 1969		

Note Inbound :Traffic to C.B.D.

Outbound :Traffic from C.B.D.

Hourly Traffic Volume

STATION DIREC. TIME	B-25 (Rama 4)			B-26 (Si Phaya)			B-27 (Si Lom)			B-28 (Sathorn)		
	Inbound	Outbound	Sub-total	Inbound	Outbound	Sub-total	Inbound	Outbound	Sub-total	Inbound	Outbound	Sub-total
7 - 8	1,832	1,866	3,698	690	650	1,340	1,348	1,753	3,101	1,543	1,515	3,058
8 - 9	3,014	2,460	5,474	845	907	1,752	1,983	2,042	4,025	1,947	1,668	3,615
9 - 10	2,595	2,140	4,735	720	886	1,606	1,455	2,183	3,638	1,676	1,591	3,267
10 - 11	3,058	2,580	5,638	852	1,108	1,960	1,770	2,096	3,866	1,927	1,673	3,600
11 - 12	2,767	2,397	5,164	789	1,056	1,845	1,794	2,125	3,919	2,080	2,260	4,340
12 - 13	2,418	2,507	4,925	657	869	1,526	1,515	1,601	3,116	1,757	1,797	3,554
13 - 14	2,611	1,959	4,570	718	905	1,623	1,626	1,919	3,545	1,430	1,242	2,672
14 - 15	2,473	2,083	4,556	787	1,018	1,805	1,509	1,835	3,344	1,648	1,449	3,097
15 - 16	2,225	2,076	4,301	749	1,037	1,786	1,611	2,058	3,669	1,597	1,558	3,155
16 - 17	2,647	2,608	5,255	651	1,077	1,728	1,572	1,946	3,518	1,992	1,717	3,709
17 - 18	2,682	2,906	5,588	718	964	1,682	1,550	2,076	3,626	2,216	1,726	3,942
18 - 19	2,689	2,764	5,453	569	787	1,356	1,178	1,569	2,747	2,238	1,804	4,042
Total	31,011	28,346	59,357	8,745	11,264	20,009	18,911	23,203	42,114	22,051	20,000	42,051
DATE	Mar. 25 (Tue.), 1969			Mar. 25 (Tue.), 1969			Mar. 21 (Fri.), 1969			Mar. 25 (Tue.), 1969		

Note Inbound : Traffic to C.B.D.

Outbound : Traffic from C.B.D.

Hourly Traffic Volume

STATION DIREC. TIME	B-29 (Si Lom)																		(vehicles)		
	Inbound	Outbound	Sub-total	Inbound	Outbound	Sub-total	Inbound	Outbound	Sub-total	Inbound	Outbound	Sub-total	Inbound	Outbound	Sub-total	Inbound	Outbound	Sub-total	Inbound	Outbound	Sub-total
7 - 8	1,247	737	1,984																		
8 - 9	1,527	928	2,455																		
9 - 10	1,453	874	2,327																		
10 - 11	1,551	1,261	2,812																		
11 - 12	1,402	1,015	2,417																		
12 - 13	1,370	1,358	2,728																		
13 - 14	1,344	1,037	2,381																		
14 - 15	1,256	1,145	2,401																		
15 - 16	1,507	1,557	3,064																		
16 - 17	1,265	1,221	2,486																		
17 - 18	1,193	1,255	2,448																		
18 - 19	1,295	1,512	2,807																		
Total	16,410	13,900	30,310																		
DATE	Mar. 25 (Tue.), 1969																				

Note Inbound : Traffic to C.B.D.

Outbound : Traffic from C.B.D.

Hourly Traffic Volume at Intersection

Station No. C-1

Date: Mar. 26 (Wed.), 1969

FROM * TO * TIME	2	3,4,5,6,7	1	3,4,5,6,7	1	2	3	4	6	5, 6, 7
	1	1	2	2	3,4,5,6,7	3,4,5,6,7	1, 2	1, 2	1, 2	1, 2
7-8	262	108	197	491	244	708	76	146	325	336
8-9	305	144	224	648	314	900	134	217	331	434
9-10	210	140	223	684	257	880	157	218	219	333
10-11	193	98	215	729	263	863	161	225	390	330
11-12	209	153	204	699	304	945	143	220	464	433
12-13	154	75	199	612	229	889	99	239	299	347
13-14	242	121	183	588	262	870	126	310	188	379
14-15	141	74	191	612	252	952	111	237	288	347
15-16	193	110	166	616	237	773	114	390	336	405
16-17	173	71	251	638	328	905	125	191	338	642
17-18	248	80	199	546	211	738	87	311	335	416
18-19	125	60	185	464	170	694	99	125	303	341
Total	2,455	1,234	2,437	7,327	3,071	10,117	1,432	2,829	3,816	4,713

(vehicles)

Note * : Ref. to Page 36

Hourly Traffic Volume at Intersection

Station No. C-1

Date: Mar. 26 (Wed.), 1969

FROM * TO *	1, 2	4	5, 6, 7	1, 2	3	5, 6, 7	5	6	7	1, 2, 3, 4
TIME	3	3	3	4	4	4	1, 2, 3, 4	1, 2, 3, 4	1, 2, 3, 4	5
7 - 8	403	247	609	242	240	0	53	780	77	90
8 - 9	522	273	904	269	478	0	117	888	109	210
9 - 10	418	280	1,151	294	452	0	182	1,092	91	146
10 - 11	488	252	1,019	322	321	0	221	1,280	104	130
11 - 12	602	320	790	398	278	8	192	1,150	159	120
12 - 13	421	249	838	270	245	4	154	925	105	78
13 - 14	527	302	856	237	306	4	196	914	107	166
14 - 15	481	226	914	231	340	3	208	1,062	100	195
15 - 16	470	236	1,016	345	205	11	191	902	97	59
16 - 17	617	253	1,134	342	229	10	356	1,159	221	50
17 - 18	373	210	1,037	328	279	14	77	1,833	152	22
18 - 19	442	195	799	224	292	11	38	857	192	17
Total	5,764	3,043	11,067	3,502	3,665	65	1,985	12,842	1,514	1,283

Note * : Ref. to Page 36

Hourly Traffic Volume at Intersection

Station No. C-1

Date: Mar. 26 (Wed.), 1969

FROM* TO* TIME	(vehicles)												
	3	6	7	1, 2, 3, 4	5	7	1, 2, 3, 4	5	6	1, 2			
	5	5	5	6	6	6	7	7	7	5, 6, 7			
7 - 8	65	1	40	690	10	50	279	23	34	302			
8 - 9	142	0	45	1, 110	7	44	374	46	61	415			
9 - 10	89	0	47	1, 127	12	43	283	17	51	361			
10 - 11	106	1	44	1, 098	13	48	228	20	29	367			
11 - 12	86	0	37	907	18	41	200	26	42	335			
12 - 13,	36	1	35	795	22	45	193	8	53	289			
13 - 14	86	4	48	1, 018	20	45	216	4	37	346			
14 - 15	71	1	45	951	24	40	215	5	28	348			
15 - 16	35	0	38	876	14	49	173	8	43	297			
16 - 17	31	1	44	950	18	60	287	5	77	350			
17 - 18	11	1	49	779	18	63	335	28	117	294			
18 - 19	11	0	46	611	10	47	246	30	163	213			
Total	769	10	518	10, 912	186	575	3, 029	220	735	3, 917			

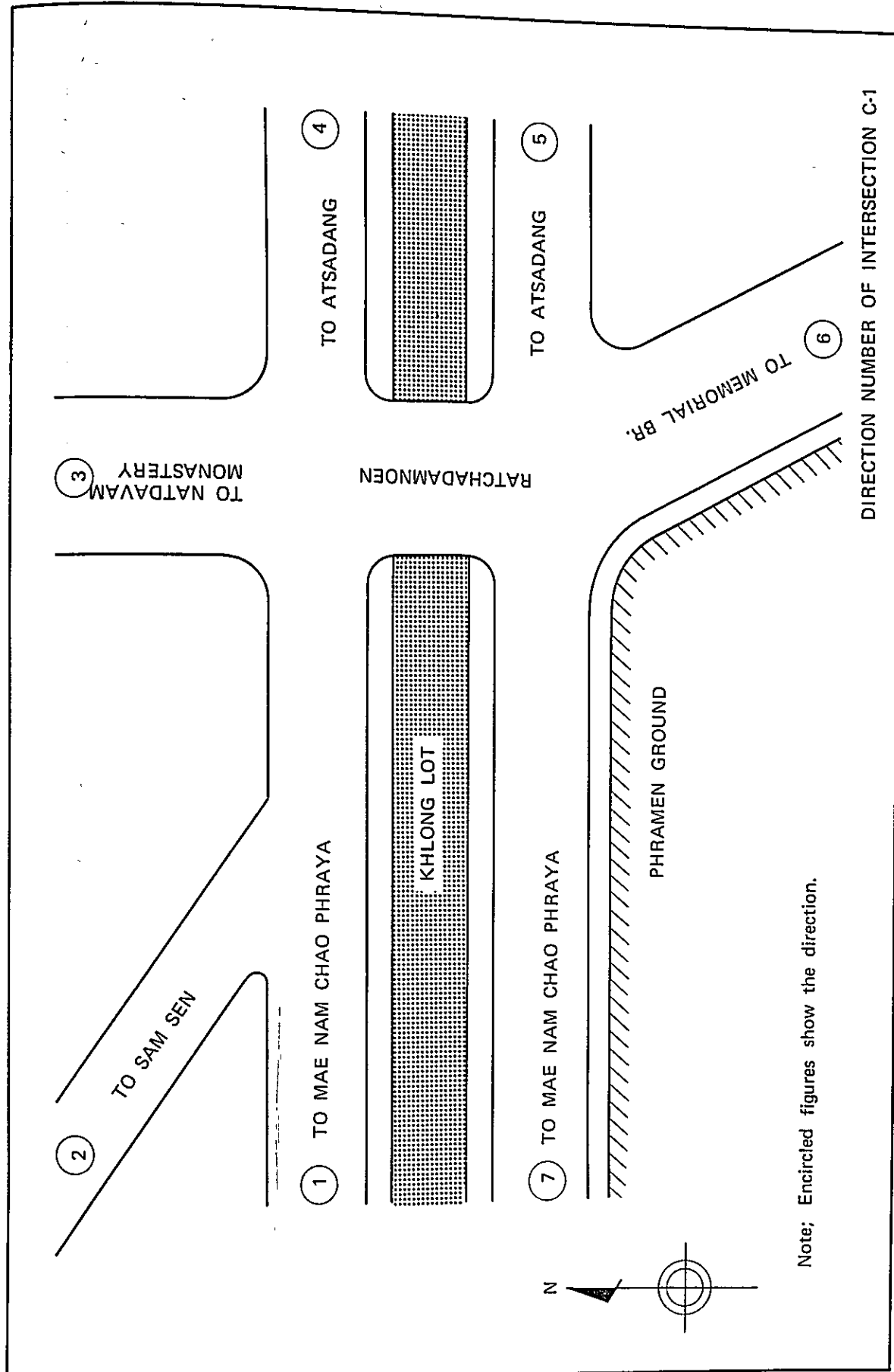
Note * : Ref. to Page 36

Station No. C-1

Date: Mar. 26 (Wed.), 1969

[illegible]

Note * : Ref. to Page 36



Hourly Traffic Volume at Intersection

Station No. C-2

Date: Mar. 27 (Thu.), 1969

DIREC. TYPE TIME	3 → 1						4 → 1						(vehicles)	
	Truck	Bus	Pass. car	Taxi	Samlor	Motorcycle	Total	Truck	Bus	Pass. car	Taxi	Samlor		Motorcycle
7 - 8	2	26	55	56	80	18	237	8	91	292	75	169	295	930
8 - 9	1	17	43	42	61	50	214	6	24	268	130	200	243	871
9 - 10	2	13	62	46	139	32	294	16	71	260	75	172	201	795
10 - 11	1	18	33	41	133	13	239	9	34	160	70	163	166	602
11 - 12	0	11	43	44	135	11	244	12	47	105	52	111	120	447
12 - 13	2	9	43	51	105	12	222	18	39	204	66	169	81	577
13 - 14	7	17	40	49	75	11	199	26	49	163	127	177	135	677
14 - 15	1	9	20	61	99	25	215	50	45	146	117	168	204	730
15 - 16	3	13	31	49	39	9	144	40	53	169	167	166	187	782
16 - 17	2	13	33	31	145	25	249	20	64	154	153	208	113	712
17 - 18	1	7	41	24	90	10	173	23	59	137	112	175	122	628
18 - 19	3	11	62	10	110	27	223	43	50	128	127	170	79	597
Total	25	164	506	504	1,211	243	2,653	271	626	2,186	1,271	2,048	1,946	8,348

Note * : Ref. to Page 40

Hourly Traffic Volume at Intersection

Station No. C-2

Date: Mar. 27 (Thu.), 1969

DIREC. TYPE TIME	1 → 2						3 → 2						(vehicles)	
	Truck	Bus	Pass. car	Taxi	Samlor	Motorcycle	Total	Truck	Bus	Pass. car	Taxi	Samlor		Motorcycle
7 - 8	5	82	42	87	186	41	443	9	9	55	32	52	4	161
8 - 9	10	90	55	82	230	35	502	14	7	54	34	49	28	186
9 - 10	22	68	86	72	188	50	486	7	7	25	20	29	7	95
10 - 11	17	60	85	59	162	76	459	14	8	32	24	52	2	132
11 - 12	29	49	81	57	147	54	417	21	6	23	9	47	2	108
12 - 13	14	57	66	69	151	48	405	14	4	76	27	5	12	138
13 - 14	19	80	73	52	152	45	421	10	4	44	34	1	5	98
14 - 15	10	44	76	61	149	83	423	0	1	16	16	5	6	44
15 - 16	23	51	78	62	203	51	468	8	4	28	6	4	1	51
16 - 17	11	68	106	61	208	77	531	6	4	48	29	19	8	114
17 - 18	28	92	143	42	175	124	604	6	5	41	11	16	8	87
18 - 19	16	77	110	90	230	103	626	2	3	61	20	5	12	103
Total	204	818	1, 001	794	2, 181	787	5, 785	111	62	503	262	284	95	1, 317

Note * : Ref. to Page 40

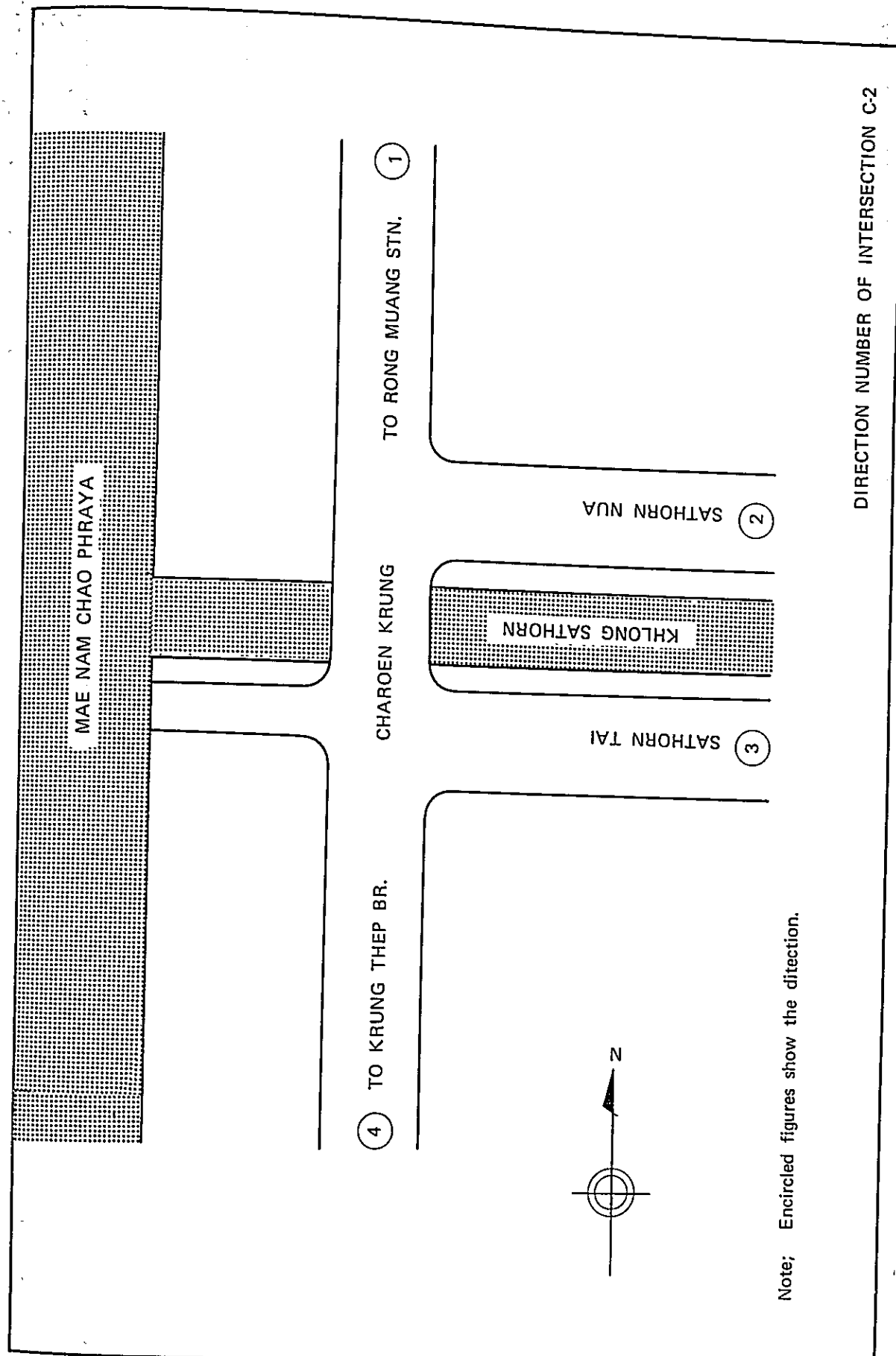
Hourly Traffic Volume at Intersection

Station No. C-2

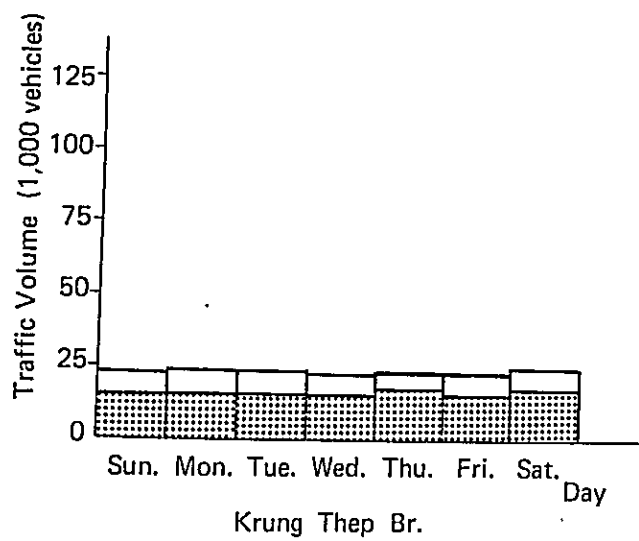
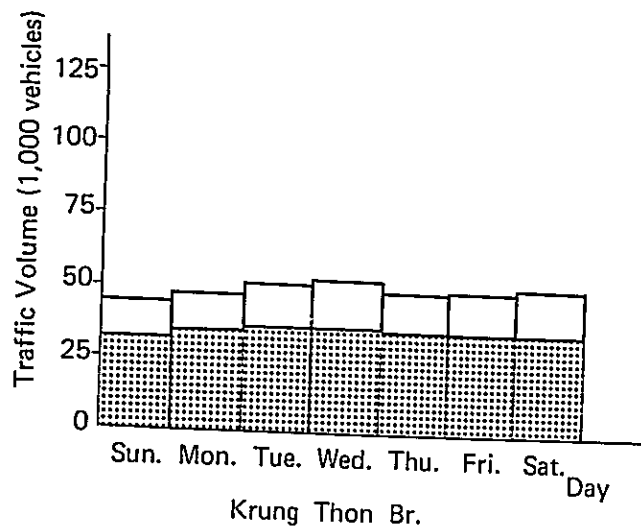
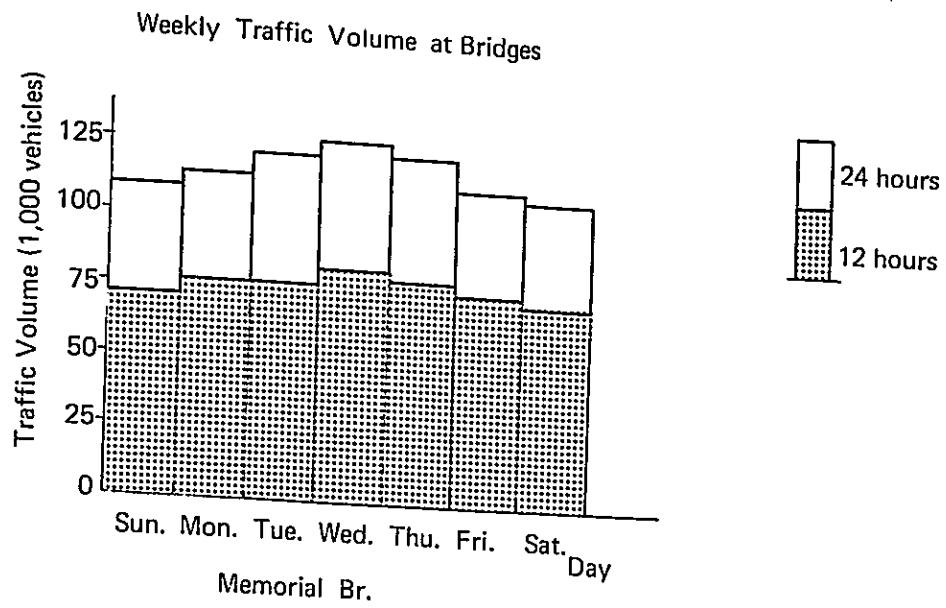
Date: Mar. 27 (Thu.), 1969

DIREC. TIME	4 → 2						3 → 4						(vehicles)	
	Truck	Bus	Pass. car	Taxi	Samlor	Motorcycle	Total	Truck	Bus	Pass. car	Taxi	Samlor		Motorcycle
7 - 8	110	39	444	47	44	141	825	125	81	317	135	217	159	1,034
8 - 9	159	24	293	48	50	102	676	190	96	323	111	213	124	1,057
9 - 10	218	20	261	54	70	81	704	258	86	272	96	175	197	1,084
10 - 11	264	21	85	31	24	31	456	251	60	326	107	175	164	1,083
11 - 12	258	15	160	36	19	21	509	255	42	268	142	183	176	1,066
12 - 13	256	33	145	17	31	35	517	216	46	237	139	187	124	949
13 - 14	241	18	155	56	26	43	539	216	65	302	153	198	166	1,100
14 - 15	205	16	142	52	25	30	470	229	93	317	164	124	129	1,056
15 - 16	144	16	89	55	31	49	384	212	70	320	126	157	151	1,036
16 - 17	229	28	219	60	29	38	603	249	156	468	208	185	199	1,465
17 - 18	154	27	205	47	23	43	499	166	105	613	96	208	321	1,509
18 - 19	86	32	174	66	43	47	448	73	84	381	147	156	165	1,006
Total	2,324	289	2,372	569	415	661	6,630	2,440	984	4,144	1,624	2,178	2,075	13,445

Note * : Ref. to Page 40



Weekly Traffic Count



Travel Time Study

Travel Time by Road Sections

Date: Apr. 2 (Wed.), 1969

Used Car: Microbus (Volkswagen)

Starting Time: 15:10

[illegible]

Note * : Ref. to Page 63

Travel Time by Road Sections

Date: Apr. 2 (Wed.), 1969

Used Car: Microbus (Volkswagen)

Starting Time: 14:20

[illegible]

Note * : Ref. to Page 63

Travel Time by Road Sections

Date: Apr. 4 (Fri.), 1969

Used Car: Van (Toyota Crown)

Starting Time: 14:08

[illegible]

Note * : Ref. to Page 63

Travel Time by Road Sections

Date: Apr. 4 (Fr.), 1969

Used Car: Van (Toyota Crown)

Starting Time: 15:27

[illegible]

Note * : Ref. to Page 63

Travel Time by Road Sections

Date: Apr. 8 (Tue.), 1969

Used Car: Landrover

Starting Time: 9:45

Route	Check Point *	Distance (Km)	One Way				Return Way				Average Speed (Km/hr.)	The Number of Lanes
			Travel Time (Sec.)	Stopping Time (Sec.)	Running Time (Sec.)	Travel Speed (Km/hr.)	Travel Time (Sec.)	Stopping Time (Sec.)	Running Time (Sec.)	Travel Speed (Km/hr.)		
Charoen Krung	2	0.38	78"	18"	60"	17.5					17.5	
	3-1	0.32	110"	33"	77"	10.5					10.5	
	4-1	0.32	85"	34"	51"	13.6					13.6	
	5-1	0.34	107"	44"	85"	11.4					11.4	
	6	0.25	75"	22"	53"	12.0					12.0	
	7-1	0.35	70"	0	70"	18.0					18.0	
	8-1	0.34	225"	65"	160"	5.4					5.4	
	8-2	0.19	72"	10"	62"	9.5					9.5	
	8-3	0.51	333"	123"	210"	5.5					5.5	
	9	0.82	153"	8"	145"	19.3					19.3	
	10	0.44	47"	0	47"	33.7					33.7	
	11	0.91	120"	13"	107"	27.3					27.3	
	12	0.34	133"	44"	89"	9.2					9.2	
	13	1.74	79"	0	79"	22.0					22.0	
	14-1	0.51	57"	0	57"	32.2					32.2	
	15-1	0.51	1,106"	798"	308"	11.7					15.8	
	14-2	3.16	1,945"	824"	1,121"	5.8					5.8	
Krug Thap Br.	16	1.27	95"	0	95"	48.1					48.1	
	208	0.35	32"	0	32"	39.4					39.4	
	202											

Note * : Ref. to Page 63

Travel Time by Road Sections

Date: Apr. 8 (Tue.), 1969

Used Car: Landrover

Starting Time: 9:45

[illegible]

Note * : Ref. to Page 63

Travel Time by Road Sections

Date: Apr. 8 (Tue) , 1969

Used Car: Van (Toyota Crown)

Starting Time: 14:11

Route	Check Point *	Distance (Km)	One Way				Return Way				Average Speed (Km/hr.)	The Number of Lanes
			Travel Time (Sec.)	Stopping Time (Sec.)	Running Time (Sec.)	Travel Speed (Km/hr.)	Travel Time (Sec.)	Stopping Time (Sec.)	Running Time (Sec.)	Travel Speed (Km/hr.)		
Maha Chai	3-1	0.23	210"	140"	70"	39.4					39.4	
	3-2	0.89	26"	8"	18"	12.3					12.3	
	3-3	0.42	71"	7"	64"	21.3					21.3	
Memorial Br.	17	0.49	120"	16"	104"	14.7					14.7	
	18	0.57	49"	0	49"	41.8					38.9	
	205	0.42	53"	8"	45"	28.5					29.4	
Phra Chao Tak Sin	204	0.53	60"	9"	51"	31.8					29.2	
	203	0.25	323"	0	323"	27.8					28.3	
	202	11.1	173"	12"	161"	23.0					23.7	
Phra Chao Tak Sin	201	11.1					165"	20"	145"	24.3	24.3	
	202	0.25					311"	33"	278"	28.8	28.8	
	203	0.53					72"	14"	58"	26.5	26.5	
Memorial Br.	204	0.42					50"	0	50"	30.3	30.3	
	205	0.57					58"	0	58"	35.4	35.4	
	18	0.63					99"	0	99"	23.0	23.0	
106	106	0.33					59"	0	59"	20.1	20.1	2/4
	107	0.20					40"	0	40"	18.0	18.0	2
	1	0.38					61"	7"	54"	22.4	22.4	4
2	2	0.38					115"	0	115"	13.8	13.8	4 3/5
	3-1											

Note * : Ref. to Page 63

Travel Time by Road Sections

Date: Apr. 8 (Tue.), 1969

Used Car: Van (Toyota Crown)

Starting Time: 14:55

Route	Check Point *	Distance (Km)	One Way				Return Way				Average Speed (Km/hr.)	The Number of Lanes
			Travel Time (Sec.)	Stopping Time (Sec.)	Running Time (Sec.)	Travel Speed (Km/hr.)	Travel Time (Sec.)	Stopping Time (Sec.)	Running Time (Sec.)	Travel Speed (Km/hr.)		
Rama 5	87											
		0.33	27"	0	27"	44.0	22"	0	22"	54.0	49.0	2
	88											
		0.40	62"	19"	43"	23.2	31"	0	31"	46.4	34.8	2
	80											
		0.89	81"	25"	56"	39.5	76"	11"	65"	42.1	40.8	2
	85											
		0.71	232"	36"	196"	11.0	248"	18"	230"	10.3	10.7	
	89											
		0.49	43"	0	43"	41.0	70"	18"	52"	25.2	33.1	2
	90											
		2.03	156"	0	156"	47.5	175"	0	175"	42.4	45.0	2
	56											
		0.63	77"	0	77"	29.4	140"	0	140"	16.2	22.8	2/4
	57											
		0.57	67"	0	67"	30.6	71"	0	71"	28.9	29.8	2/4
	58											
*1		2.66	274"	3"	271"	35.0	228"	0	228"	42.0	38.5	2
	59											
		1.79	186"	0	186"	34.4	136"	0	136"	47.5	41.0	2
	60											
*2		1.41	156"	0	156"	32.6	164"	0	164"	31.4	32.0	2
	213											
*3		3.54	345"	0	345"	37.0	301"	0	301"	42.4	39.7	2
	82											

Note * : Ref. to Page 63

Travel Time by Road Sections

Date: Apr. 9 (Wed.), 1969

Used Car: Landrover

Starting Time: 10:10

Route	Check Point *	Distance (Km)	One Way				Return Way				Average Speed (Km/hr.)	The Number of Lanes
			Travel Time (Sec.)	Stopping Time (Sec.)	Running Time (Sec.)	Travel Speed (Km/hr.)	Travel Time (Sec.)	Stopping Time (Sec.)	Running Time (Sec.)	Travel Speed (Km/hr.)		
Sam Sen	91	0.63	126"	23"	103"	18.0	83"	0	83"	27.4	22.7	2/4
	92	0.51	71"	0	71"	25.6	128"	31"	97"	14.4	20.0	2/4
	93	0.42	62"	0	62"	24.3	61"	0	61"	24.8	24.6	2/4
	94	0.20	39"	7"	32"	18.4	54"	11"	43"	13.3	15.9	4
	77	0.89	144"	38"	106"	22.3	88"	0	88"	36.4	29.4	$\frac{2}{4} - \frac{4}{4}$
	83	0.87	114"	0	114"	27.5	279"	159"	120"	12.4	20.0	2/4
	95	0.56	79"	9"	70"	25.5	61"	0	61"	33.0	29.3	2/4
Pracharat Sai Thii	96	1.14	134"	0	134"	30.6	140"	18"	122"	26.1	28.4	2/4
	97	1.01	118"	0	118"	30.8	136"	0	136"	26.8	28.9	2
	98	0.89	131"	0	131"	24.5	117"	0	117"	27.4	26.0	2
	99	0.89	123"	0	123"	26.0	122"	7	115"	26.3	26.1	2
	60											

Note * : Ref. to Page 63

Travel Time by Road Sections

Date: Apr. 9 (Wed.), 1969

Used Car: Van (Toyota Crown)

Starting Time: 13:45

[illegible]

Note * : Ref. to Page 63

Travel Time by Road Sections

Date: Apr. 9 (Wed.), 1969

Used Car: Van (Toyota Crown)

Starting Time: 14:10

Route	Check Point *	Distance (Km)	One Way				Return Way				Average Speed (Km/hr.)	The Number of Lanes
			Travel Time (Sec.)	Stopping Time (Sec.)	Running Time (Sec.)	Travel Speed (Km/hr.)	Travel Time (Sec.)	Stopping Time (Sec.)	Running Time (Sec.)	Travel Speed (Km/hr.)		
Atsadang	106	0.33	32"	0	32	37.1	98"	0	98"	12.1	24.6	2/4
	107	0.38	23"	0	23	59.6	29"	0	29"	47.1	53.4	2/4
	1	0.44	38"	0	38	41.7	26"	0	26"	60.9	51.3	2/4
	61	0.65	66"	0	66	35.4	-	-	-	22.0	28.7	4
	108	0.11	-	-	-	-	-	-	-	22.0	22.0	4
	91	0.43	48"	0	48	32.3	90"	0	90"	22.0	27.2	4
	109											

Note * : Ref. to Page 63

Travel Time by Road Sections

Date: Apr. 9 (Wed.), 1969

Used Car: Landrover

Starting Time: 10:08

[illegible]

Note * : Ref. to Page 63

Travel Time by Road Sections

Date: Apr. 9 (Wed.), 1969

Used Car: Landrover

Starting Time: 11:00

Route	Check Point *	Distance (Km)	One Way				Return Way				Average Speed (Km/hr.)	The Number of Lanes
			Travel Time (Sec.)	Stopping Time (Sec.)	Running Time (Sec.)	Travel Speed (Km/hr.)	Travel Time (Sec.)	Stopping Time (Sec.)	Running Time (Sec.)	Travel Speed (Km/hr.)		
Si Ayutthaya	77											
	78	0.38	70"	31"	39"	19.5	39"	0	39"	35.1	27.3	4
	79	0.39	35"	0	35"	40.0	51"	0	51"	23.9	32.0	2
	80	0.46	45"	0	45"	36.8	53"	14"	39"	31.2	34.0	4
	81	0.95	101"	0	101"	33.9	117"	28"	89"	29.1	31.5	2
	52	0.32	40"	0	40"	28.8	32"	0	32"	36.0	32.4	6
	43	1.02	96"	5"	91"	38.2	94"	6"	88"	39.1	38.7	6
	32	0.91	133"	40"	93"	24.6	87"	0	87"	37.6	31.1	6

Note * : Ref. to Page 63

Travel Time by Road Sections

Date: Apr. 9 (Wed.), 1969

Used Car: Van (Toyota Crown)

Starting Time: 15:45

[illegible]

Note * : Ref. to Page 63

Travel Time by Road Sections

Date: Apr. 9 (Wed.), 1969

Used Car: Van (Toyota Crown)

Starting Time: 14:30

[illegible]

Note * : Ref. to Page 63

Travel Time by Road Sections

Date: Apr. 10 (Thu.), 1969

Used Car: Van (Toyota Crown)

Starting Time: 13:30

Route	Check Point *	Distance (Km)	One Way				Return Way				Average Speed (Km/hr.)	The Number of Lanes
			Travel Time (Sec.)	Stopping Time (Sec.)	Running Time (Sec.)	Travel Speed (Km/hr.)	Travel Time (Sec.)	Stopping Time (Sec.)	Running Time (Sec.)	Travel Speed (Km/hr.)		
Somdet Chao Phraya	205	0.72	63"	0	63	41.1	59"	0	59	43.9	42.5	
	206	0.76	59"	0	59	46.4	59"	0	59	46.4	46.4	
	207	4.65	343"	0	343	48.8	325"	0	325	51.5	50.2	
	208											
*												

Note * : Ref. to Page 63

Travel Time by Road Sections

Date: Apr. 10 (Thu.), 1969

Used Car: Van (Toyota Crown)

Starting Time: 10:00

[illegible]

Note * : Ref. to Page 63

Travel Time by Road Sections

Date: Apr. 10 (Thu.), 1969

Used Car: Van (Toyota Crown)

Starting Time: 13:50

Route	Check Point *	Distance (Km)	One Way				Return Way				Average Speed (Km/hr.)	The Number of Lanes
			Travel Time (Sec.)	Stopping Time (Sec.)	Running Time (Sec.)	Travel Speed (Km/hr.)	Travel Time (Sec.)	Stopping Time (Sec.)	Running Time (Sec.)	Travel Speed (Km/hr.)		
Lat Ya	207											
	210	0.77	50"	0"	50"	55.5	60"	0"	60"	46.2	50.9	2
	203	0.99	117"	21"	96"	34.0	84"	0"	84"	42.4	38.2	2
	212	0.85	106"	0"	106"	28.8	113"	0"	113"	27.0	27.9	4/6
	211	1.27	68"	0"	68"	67.3	85"	0"	85"	54.0	60.7	4/6
Inthara Phithak												

Travel Time by Road Sections

Date: Apr. 10 (Thu.), 1969

Used Car: Van (Toyota Crown)

Starting Time: 14:04

[illegible]

Note * : Ref. to Page 63

Ferry Passenger Survey

Hourly Number of Ferry Passengers and Services

Date: Apr. 1 (Tue.), 1969

STATION FROM TIME	1				2				3			
	Thon Buri	Bangkok	Sub-total	The no. of services	Thon Buri	Bangkok	Sub-total	The no. of services	Thon Buri	Bangkok	Sub-total	The no. of services
7 - 8	1,526	143	1,669	32	365	28	393	14	2,263	143	2,406	53
8 - 9	2,050	209	2,259	37	285	74	359	23	1,791	189	1,980	50
9 - 10	681	247	928	15	71	50	121	10	473	257	730	28
10 - 11	506	261	767	12	89	83	172	15	360	235	595	16
11 - 12	340	264	604	12	46	60	106	11	258	230	488	16
12 - 13	357	291	648	12	78	84	162	16	310	285	595	18
13 - 14	311	298	609	11	53	80	133	16	286	244	530	14
14 - 15	294	345	639	10	58	57	115	12	263	293	556	13
15 - 16	259	228	487	13	46	73	119	14	203	389	592	18
16 - 17	308	680	988	21	59	144	203	19	237	745	982	33
17 - 18	298	985	1,283	28	65	242	307	27	253	1,401	1,654	49
18 - 19	398	1,022	1,420	20	83	205	288	20	226	820	1,046	32
Total	7,328	4,973	12,301	223	1,298	1,180	2,478	197	6,923	5,231	12,154	340

Note * : Ref. to Page 67

Unit of passengers : persons

Unit of services : times

Hourly Number of Ferry Passengers and Services

STATION FROM TIME		4				5				6			
		Thon Buri	Bangkok	Sub-total	The no. of services	Thon Buri	Bangkok	Sub-total	The no. of services	Thon Buri	Bangkok	Sub-total	The no. of services
7 - 8		325	65	390	30	350	120	470	23	324	57	381	11
8 - 9		210	42	252	24	320	84	404	34	265	64	329	13
9 - 10		132	98	230	15	166	78	244	9	108	90	198	7
10 - 11		24	43	67	6	94	98	192	7	88	105	193	8
11 - 12		66	49	115	9	26	20	46	4	82	127	209	6
12 - 13		80	62	142	23	77	83	160	8	54	64	118	6
13 - 14		37	47	84	9	73	118	191	9	74	64	138	7
14 - 15		51	55	106	10	62	75	137	7	71	67	138	5
15 - 16		49	100	149	9	79	102	181	10	66	100	166	8
16 - 17		58	89	147	28	82	98	180	10	46	109	155	8
17 - 18		95	215	310	22	115	204	319	24	100	167	267	10
18 - 19		52	134	186	15	85	96	181	12	59	108	167	5
Total		1,179	999	2,178	200	1,529	1,176	2,705	157	1,337	1,122	2,459	94

Note * : Ref. to Page 67

Unit of passengers : persons
Unit of services : times

