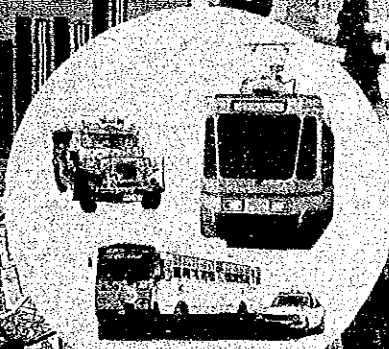
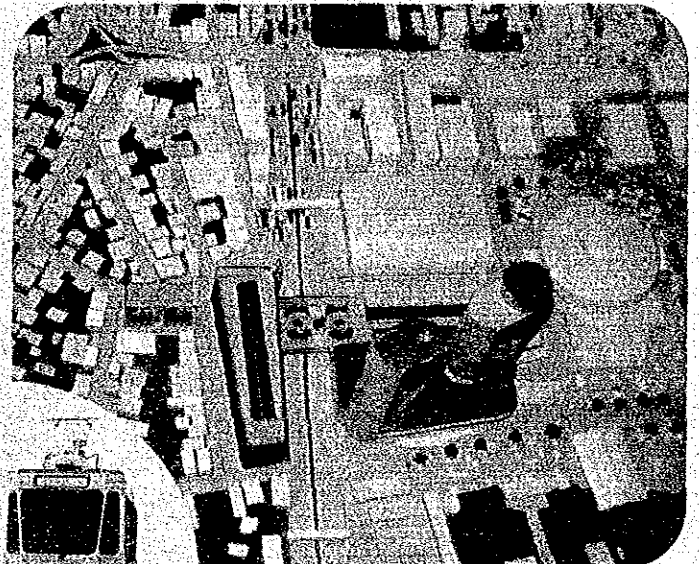
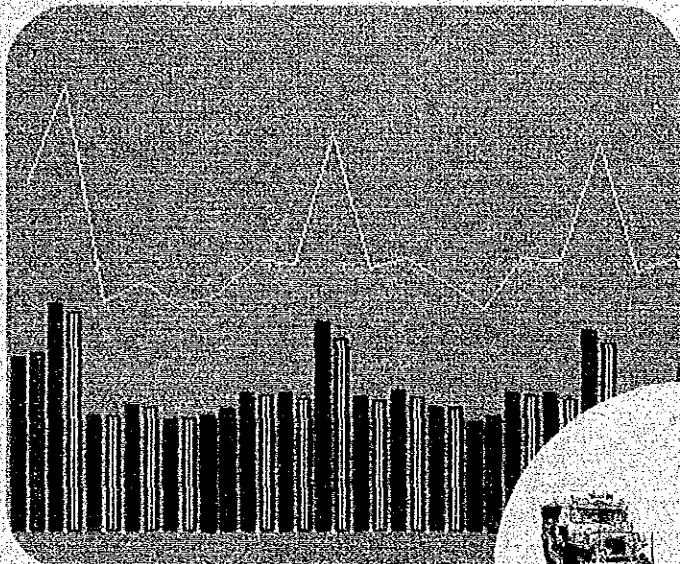


The Metro Manila Transportation Planning Study Phase II Final Report

TECHNICAL REPORT
Supplemental Surveys and Analysis



SEPTEMBER 1985

JAPAN INTERNATIONAL COOPERATION AGENCY

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**The Metro Manila
Transportation Planning Study
Phase II Final Report**

TECHNICAL REPORT
Supplemental Surveys and Analysis

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JAPAN INTERNATIONAL COOPERATION AGENCY

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1.0 INTRODUCTION

1.1 OBJECTIVES OF JUMSUT II TRANSPORTATION SURVEYS

Several transportation surveys have been conducted under MOTC mainly to generate and update data and information required for analysis and planning. These major surveys include:

- a) 1980 HIS (MMUTIP)
- b) 1980 Screenline/Cordonline Surveys (MMUTIP)
- c) 1983 Public Transportation Surveys (JUMSUT I)
- d) 1983 Supplemental HIS (JUMSUT I)

In JUMSUT II, two more surveys were designed for the purpose of generating appropriate data necessary for the improvement and rerouting of public transportation, both from the short term and mid-term planning horizons. They are:

- a) Screenline/Cordonline Surveys: results were used to update the 1980 OD tables to 1984 and determine the overall changes in road traffic.
- b) 1984 HIS: to supplement the existing 1980 MMUTIP HIS and 1983 JUMSUT I HIS by incorporating the socio-economic and trip characteristics of residents in the adjoining areas since they contribute, by and large, to the metropolitan activity.

1.2 COVERAGE AND LIMITATIONS

The study area for the surveys is presented in Figure 1.1.

A. Screenline/Cordonline Surveys: Two types of traffic surveys were conducted along 29 selected screenline and 13 cordonline stations from July 16 to August 6, 1984.

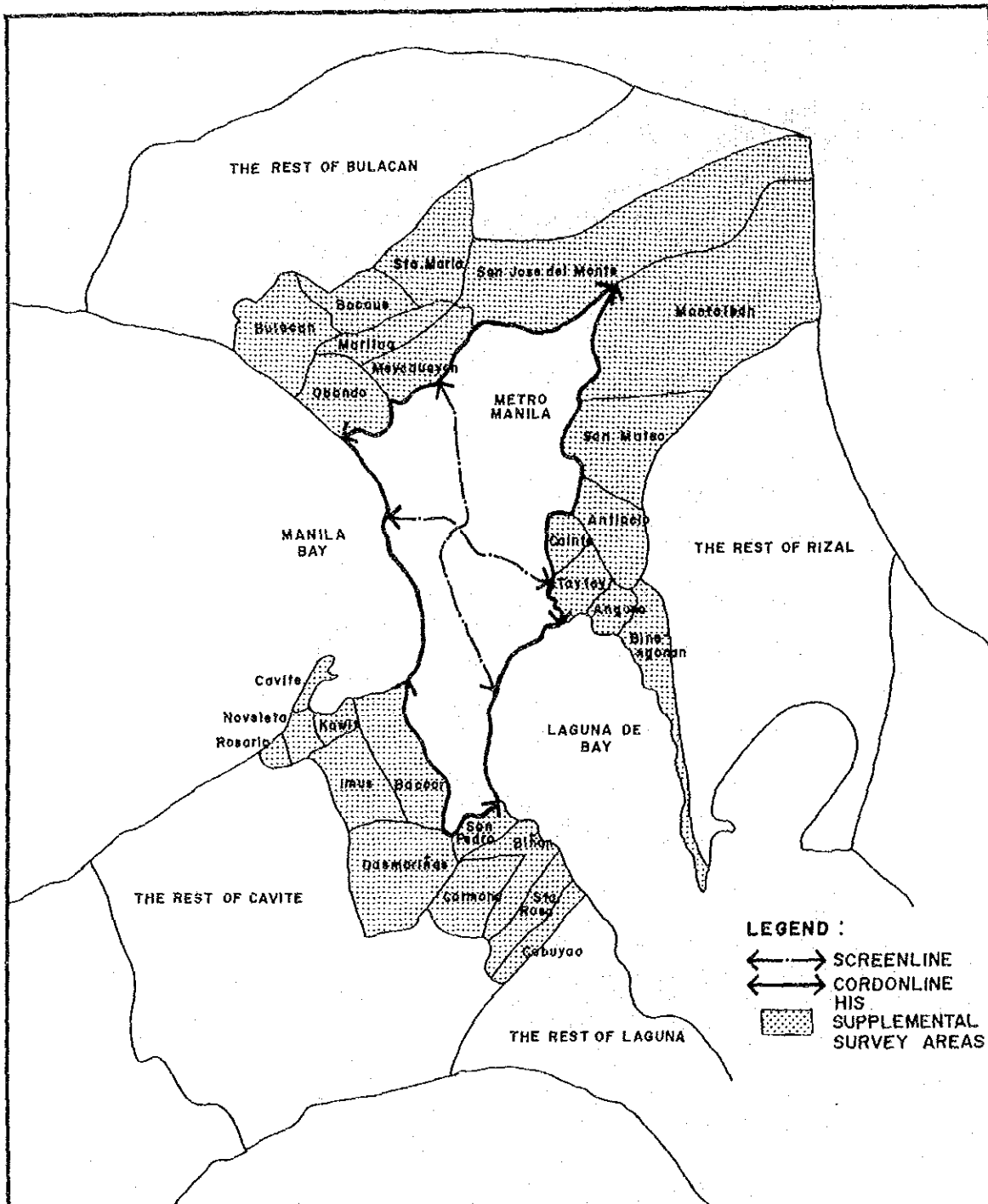
- 1) Traffic counts - conducted hourly for 16 hours (6:00 a.m. - 10:00 p.m.) using manual counters.
- 2) Vehicle occupancy - number of on-board passengers and seating capacity of sample vehicles chosen at random were counted hourly and by vehicle type.

Screenlines were located along Pasig River for the east-west direction, San Juan River and PNR for the north-south direction; while the cordonline bounded Metro Manila. Except for eight new stations, principally the same stations were used as the 1980 MMUTIP surveys to facilitate direct comparison of changes in traffic volume and flow.

B. 1984 Supplemental HIS: The scope of this survey is circumscribed by a perimeter line which is more or less within the 30-kilometer radius of Metro Manila. The areas covered are the municipalities located within the provinces of Bulacan, Laguna, Rizal and Cavite.

A total of 2,031 households were interviewed using the same procedure and questionnaire form as the 1983 Supplemental HIS.

Figure 1.1
Study Area of JUMSUT II Supplemental Surveys



2.0 SCREENLINE AND CORDONLINE SURVEYS

2.1 CONDUCT OF THE SURVEYS

2.1.1 Survey Stations

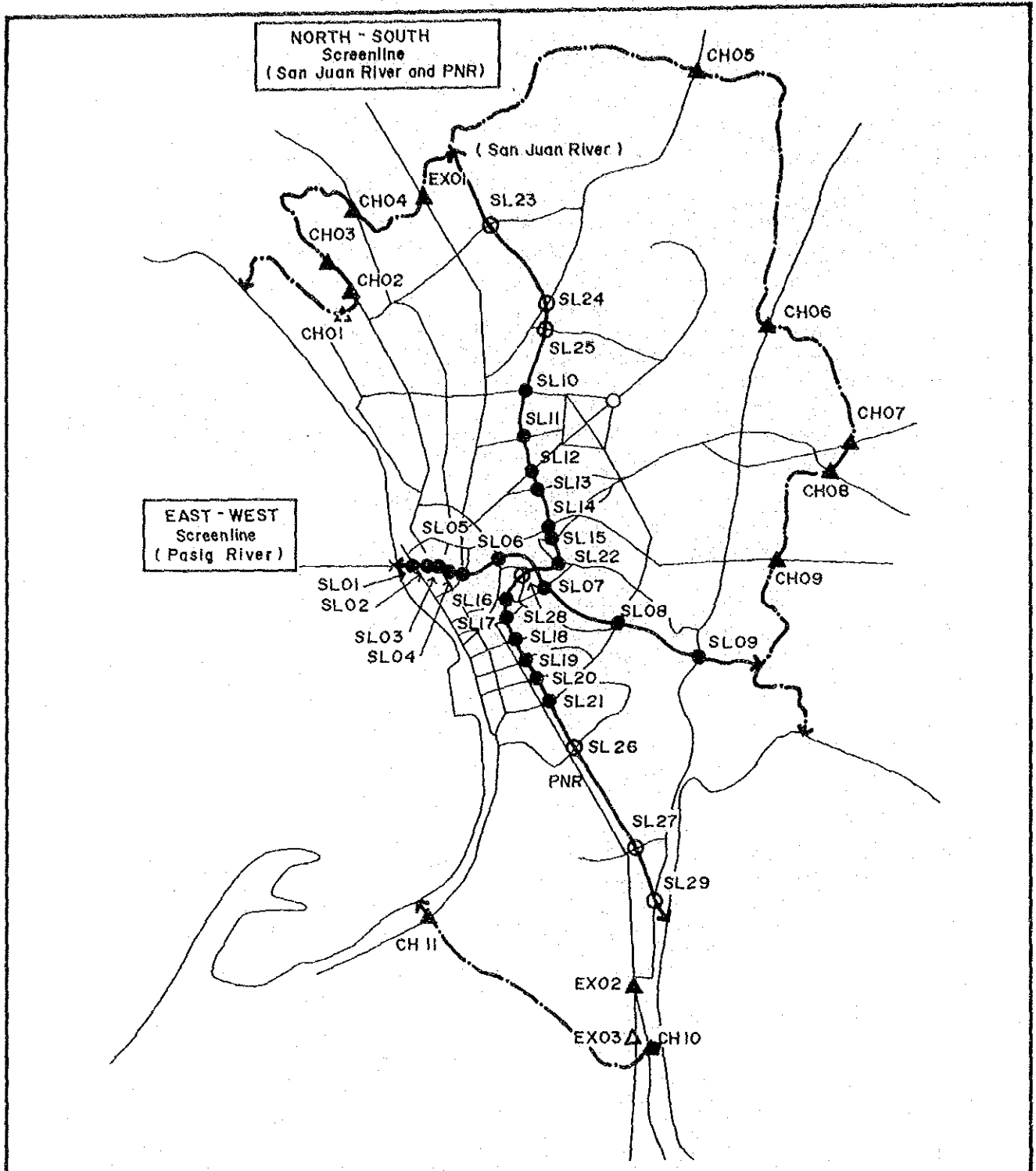
There were a total of 13 cordonline stations (with three survey stations located on expressways) and 29 screenline stations. Table 2.1 lists all the survey stations while Figure 2.1 indicates their respective location. Appendix 2.1, on the other hand, gives the specific locations of these stations.

The locations and code numbers of the survey stations are principally the same as those of the 1980 surveys conducted by MMUTIP. They only differ on the following points.

- a) SL23 - SL29 and EX03 are new stations.
- b) CH01 was integrated into CH02.
- c) The locations of CH02 and CH03 were modified in order to obtain more accurate data.

Table 2.1
List of Screenline/Cordonline Stations

Location ^{1/}	Code	Survey Station	Location ^{1/}	Code	Survey Station
EW. Screen (West)	SL01	Del Pan Bridge		SL20	Pasay Road
	SL02	Jones Bridge		SL21	EDSA/SSH ^{2/}
	SL03	McArthur Bridge		SL26	Nichols ^{2/}
	SL04	Quezon Bridge		SL27	Bicutan ^{2/}
	SL05	Ayala Bridge		SL28	Dr. M.L. Carreon ^{2/}
	SL06	Nagtahan Bridge		SL29	Bagumbayan ^{2/}
EW. Screen (East)	SL07	Panaderos	North Cordon	EX01	Malinta-Meycauayan
	SL08	Guadalupe		CH01	Malabon-Obando
	SL09	Bambang Bridge		CH02	Panghulo Road
NS. Screen (North)	SL10	EDSA near Roosevelt		CH03	Gen. Vililla
	SL11	Del Monte		CH04	McArthur Highway
	SL12	Quezon Avenue	CH05	Quirino Highway	
	SL13	E. Rodriguez	East Cordon	CH06	Marikina/San Mateo
	SL14	Aurora Boulevard		CH07	Manila-Cogeo
	SL15	N. Domingo		CH08	Antipolo Road
	SL22	Shaw Boulevard	South Cordon	EX02	Alabang-Carmona
SL23	Bagbaguin Road ^{2/}	EX03		Susana Heights ^{2/}	
SL24	Quirino Highway ^{2/}	CH10		San Pedro	
SL25	Tandang Sora ^{2/}	CH11	Bacoor		
NS. Screen (South)	SL16	P. Gil - P. Quirino	^{1/} Refer to Figure 2.1. ^{2/} New Stations added for JUMSUT II Survey		
	SL17	San Andres			
	SL18	Vito Cruz			
	SL19	Buendia			



LEGEND :

↔	CORDONLINE (Municipality Boundaries of Metro Manila)
↔	SCREENLINE
▲	SAME CORDONLINE STATIONS AS 1980
△	NEW CORDONLINE STATIONS
△	1980 CORDONLINE STATION WHICH WAS NOT SURVEYED IN 1984
●	SAME SCREENLINE STATIONS
○	NEW SCREENLINE STATIONS

Figure 2.1
Location of Screenline/
Cordonline Stations

2.1.2 Survey Method

A. Traffic Count

The hourly vehicular traffic volume by type was counted using the forms shown in Appendices 2.2A and 2.2B and summarized using the form shown in Appendix 2.2C. With the exception of SL04 Quezon Bridge, the survey was conducted for 16 hours in all stations, starting from 6:00 a.m. to 10:00 p.m.

A 24-hour survey was conducted at SL04 in order to compare the 1980 and 1984 ratios of the 24-hour and 16-hour traffic volumes.

B. Vehicle Occupancy

The number of passengers on board and the seating capacity of the sample vehicles chosen at random were observed and recorded, by the hour and by type, using the form shown in Appendix 2.3A. The results were then summarized using the forms shown in Appendix 2.3B.

The planned sample rate for vehicles was to be more than 5% of the total volume, counted by the hour, by vehicle type, and by station. The sampling rate was determined on the basis of the 1980 traffic volume and was distributed thus:

Table 2.2
Sample Rate of the Vehicle Occupancy Survey
at Screenline/Cordonline Stations

Traffic Volume by Type/Day (24 Hrs., Two-way)	Rate of Vehicles to be Counted
Less than 500	All
501 - 2,000	1 every 5 minutes
2,001 - 5,000	1 every 4 minutes
5,001 - 10,000	1 every 2 minutes
More than 10,000	1 every minute

However, due to certain changes in traffic situations, the sample rate for some of the stations was not strictly followed.

The actual average sample rate per station is shown in Appendix 2.4.

2.1.3 Survey Implementation

Six teams (Teams A to F) were formed for the Traffic Count Survey. Each team was composed of one (1) supervisor and ten (10) surveyors. For the Vehicle Occupancy Count Survey there were also six (6) teams (Teams G to L). Each team was composed of one (1) supervisor and six (6) surveyors.

Two consultants, one survey chief, and two assistants supervised the overall conduct of the survey.

The actual survey schedule is shown in Appendix 2.5.

There were two shifts for the survey: 6:00 a.m. - 2:00 p.m. and 2:00 p.m. - 10:00 p.m. Only at the Quezon Bridge station was a third shift needed (10:00 p.m. - 6:00 a.m.).

2.2 DATA PROCESSING

The screenline and cordonline stations were integrated into 7 sections.

In like manner, the survey results were presented by sections in tabular form. These results were compiled from the data processed by computer to produce the following major outputs:

- a) Vehicular Traffic Volume : 16-hour and 24-hour traffic volumes by vehicle type and by station.
- b) Passenger Traffic Volume : 16-hour and 24-hour traffic volumes by vehicle type and by station.
- c) Hourly Distribution of Traffic
- d) Load Factor
- e) Average Occupancy

These data were then stored in magnetic tapes at TTC.

2.3 RESULTS AND FINDINGS

2.3.1 Overall Traffic Volume

The total 16-hour vehicular traffic volume on screenlines and cordonlines were 990 thousand and 155 thousand, respectively. On the other hand, passenger traffic volume was estimated by multiplying vehicular traffic volume with the average vehicle occupancy, both hourly and by vehicle type. The results showed a total of 5,380 thousand and 986 thousand passenger volume on screenlines and cordonlines, respectively.

The breakdown by station of vehicular and passenger traffic volumes (16 hours) is shown in Appendices 2.6 and 2.7, respectively.

The 16-hour traffic volume was expanded to 24-hour using the 24-hour/16-hour ratios of the 1980 traffic volume by station. In fact, at SL04 (Quezon Bridge), where a 24-hour count was conducted, the 24-hour/16-hour ratios of both 1980 and 1984 traffic volumes are quite similar.

Tables 2.3 and 2.4 show the 24-hour vehicular and passenger traffic volume, while Figure 2.2 illustrates both traffic flows on screenlines and cordonlines.

A. Vehicular Traffic Volume

The total number of vehicles which crossed the EW screenline was about 465 thousand/day (WEST: 285,000, EAST: 180,000); while for the NS screenline, it was 634 thousand/day (NORTH: 314,000, SOUTH: 320,000). On the other hand, the total number of vehicles which crossed the cordonline was 176 thousand/day (NORTH: 65,000, EAST: 41,000, SOUTH: 71,000).

B. Passenger Traffic Volume

The total number of passengers that crossed the EW screenline was 2.5 million/day (WEST: 1.5-M, EAST: 1.0-M); while for the NS screenline, it was 3.4 million/day (NORTH: 1.9-M, SOUTH: 1.5-M). On the other hand, the total number of passengers that crossed the cordonline was 1.2 million/day (NORTH: 0.4-M, EAST: 0.3-M, SOUTH: 0.5-M).

The percentages of PUV passengers on screenline are as follows: 69% on EW (WEST: 70%, EAST: 67%); 70% on NS (NORTH: 75%, SOUTH: 63%). On cordonline, the percentage on PUV passengers is 76% (NORTH: 78%, EAST: 76%, SOUTH: 76%).

The 24-hour screenline and cordonline traffic volume, both vehicles and passengers, are listed in more detail in Appendices 2.8 and 2.9, respectively.

2.3.2 Traffic Volume by Station

In order to obtain a better view of the traffic situation, the traffic volume by station, both for vehicles and passengers, are presented in Tables 2.5 and 2.6, respectively.

Some highlights of the recorded traffic volumes are as follows:

A. Vehicular Traffic Volume

In screenline west, the diversion of traffic from SL03 McArthur Bridge to SL04 Quezon Bridge attributed to its high volume of public vehicles (38,000) which was about 62% of its total traffic volume. SL05 Ayala Bridge also took a share of its rerouted vehicles, but these are mostly private vehicles (37,000) and accounted for 91% of its total vehicle volume.

The total vehicular traffic volume of SL08 Guadalupe Bridge was the highest among all screenline and cordonline stations.

Table 2.3
Screenline/Cordonline Traffic Volume (ADT)
by Vehicle Type and by Section
(Number of Vehicles, Both Directions)

Section		Public Mode (000)				Private Mode (000)				Total
		Jpy	Bus ^{1/}	Tri-cycle	Sub-Total	Car/Jeep ^{2/}	Truck ^{3/}	Others ^{4/}	Sub-Total	
SCREENLINE	EW.WEST	73	7	0	79	154	42	10	206	285
	EW.EAST	13	9	10	32	116	25	7	148	179
	Sub-total	86	16	10	111	270	67	17	354	465
	NS.NORTH	81	15	2	98	155	52	9	216	314
	NS.SOUTH	47	11	5	63	202	44	12	258	320
	Sub-total	128	26	7	116	357	96	21	474	634
TOTAL		214	42	16	272	627	163	38	828	1,100
CORDONLINE	NORTH	17	4	4	25	23	15	2	40	65
	EAST	14	1	3	18	12	10	1	23	41
	SOUTH	18	6	1	25	29	14	2	45	70
	TOTAL	49	11	8	68	64	39	5	108	176

Source: 1984 Screenline/Cordonline Surveys

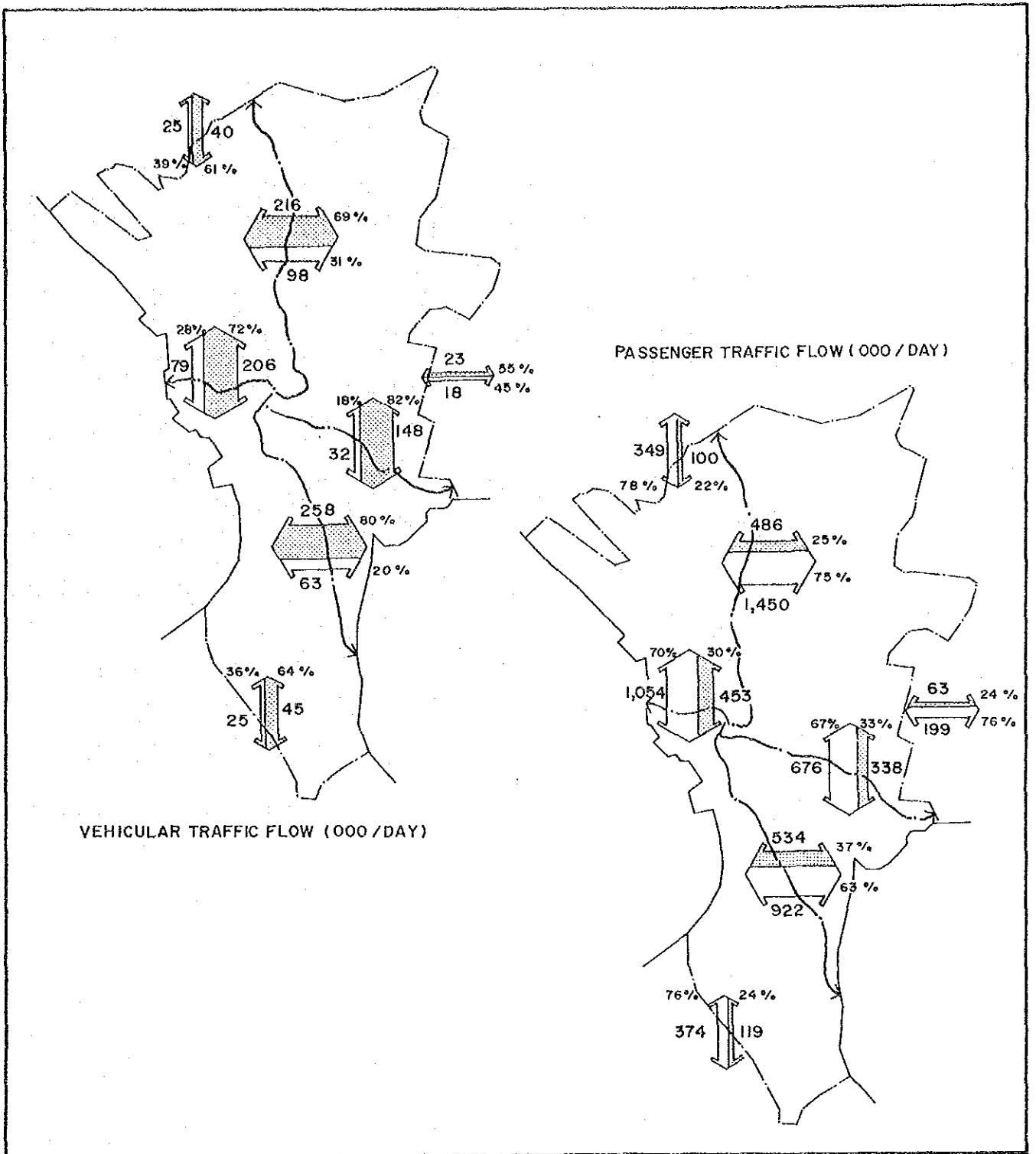
- 1/ Includes all types
2/ Includes taxi
3/ Includes van/pick-up
4/ Includes motorcycle

Table 2.4
Screenline/Cordonline Traffic Volume (ADT)
by Vehicle Type and by Section
(Number of Passengers, Both Directions)

Section		Public Mode				Private Mode				Total
		Jpy	Bus ^{1/}	Tri-cycle	Sub-Total	Car/Jeep ^{2/}	Truck ^{3/}	Others ^{4/}	Sub-Total	
SCREENLINE	EW.WEST	803	251	0	1,054	319	122	12	453	1,507
	EW.EAST	123	541	12	676	255	71	12	338	1,014
	Sub-total	926	792	12	1,730	574	193	24	791	2,521
	NS.NORTH	876	572	2	1,450	319	154	13	486	1,936
	NS.SOUTH	425	490	7	922	397	119	18	534	1,456
	Sub-total	1,301	1,062	9	2,372	716	273	31	1,020	3,392
TOTAL		2,227	1,854	21	4,102	1,290	466	55	1,811	5,913
CORDONLINE	NORTH	160	183	6	349	53	45	2	100	449
	EAST	145	50	3	199	30	28	5	63	262
	SOUTH	164	209	1	374	70	43	6	119	493
	TOTAL	469	442	10	922	153	116	13	282	1,204

Source: 1984 Screenline/Cordonline Surveys

- 1/ Includes all types
2/ Includes taxi
3/ Includes van/pick-up
4/ Includes motorcycle



LEGEND:

← → SCREENLINE

— CORDONLINE

▬ PRIVATE

▬ PUBLIC

SOURCE : 1984 SCREENLINE / CORDONLINE SURVEYS

Figure 2.2
Vehicular and Passenger
Traffic Flow Across
Screenlines and Cordonlines

Table 2.5
Screenline/Cordonline Traffic Volume (ADT)
by Vehicle Type and by Station
(Number of Vehicles, Both Directions)

Station Name	Public Mode				Private Mode				Total
	Jeepney	Bus	Tricycle	Sub-total	Cat/Jeep	Truck	Others	Sub-total	
SL01 Del Pan Bridge	2,780	29	12	2,821	19,000	13,362	1,859	34,221	37,042
SL02 Jones Bridge	12,211	616	30	12,857	28,605	4,406	2,510	35,521	48,378
SL03 McArthur Bridge	18,448	638	0	19,086	12,641	1,850	620	15,111	34,197
SL04 Quezon Bridge	35,383	2,350	8	37,741	19,657	2,770	543	22,970	60,711
SL05 Ayala Bridge	521	2,856	11	3,388	30,149	5,851	1,144	37,144	40,532
SL06 Nagtahan Bridge	3,232	68	4	3,304	43,990	13,707	2,867	60,564	63,868
EW Screen (West) Sub-total	72,575	6,557	65	79,197	154,042	41,946	9,543	205,531	284,728
SL07 Panaderos	6,763	22	60	6,845	11,289	4,979	2,440	18,708	25,553
SL08 Guadalupe	817	9,101	7	9,925	101,765	17,626	3,076	122,467	132,392
SL09 Bambang Bridge	5,727	330	9,438	15,495	2,515	2,206	1,221	5,942	21,437
EW Screen (East) Sub-total	13,307	9,453	9,505	32,265	115,569	24,811	6,737	147,117	179,382
SL10 EDSA near Roosevelt	0	9,741	28	9,769	23,398	12,459	1,082	36,939	46,708
SL11 DeI Monte	6,419	93	810	7,322	10,092	4,308	940	15,340	22,662
SL12 Quezon Avenue	19,769	831	28	20,628	44,741	10,014	1,299	56,054	76,682
SL13 E. Rodriguez	12,473	77	60	12,610	17,953	5,127	1,077	24,157	36,767
SL14 Aurora Boulevard	12,437	534	30	13,001	31,142	6,496	1,468	39,106	52,107
SL15 N. Domingo	5,215	605	37	5,857	4,511	1,590	270	6,371	12,228
SL22 Shaw Boulevard	13,002	1,138	105	14,245	14,316	4,873	1,332	20,521	34,766
SL23 Bagbaguin Road	2,079	1,401	272	3,752	2,017	2,254	276	4,547	8,299
SL24 Quirino Highway	8,154	776	108	9,038	5,195	3,937	924	10,056	19,094
SL25 Tandang Sora	1,817	14	234	2,065	1,295	1,255	194	2,744	4,809
NS Screen (North) Sub-total	81,365	15,210	1,712	98,287	154,660	52,313	8,862	215,835	314,122
SL16 P. Gil - P. Quirino	12,660	1,235	110	14,005	12,152	3,267	2,362	17,781	31,786
SL17 San Andres	8,928	75	31	9,034	6,661	1,365	518	8,544	17,578
SL18 Vito Cruz	4,121	194	63	4,378	38,752	5,830	2,038	46,620	50,998
SL19 Buendia	5,662	3,561	27	9,250	28,319	4,355	1,707	34,381	43,631
SL20 Pasay Road	3,686	118	72	3,876	20,393	4,085	1,032	25,510	29,386
SL21 EDSA/SSH	0	4,489	1	4,490	72,623	14,135	1,354	88,112	92,602
SL26 Nichols	6,306	1,020	15	7,341	12,776	4,778	1,542	19,096	26,437
SL27 Bicutan	4,600	499	62	5,161	4,576	3,373	883	8,832	13,993
SL28 Dr. M. L. Carreon	72	18	3,954	4,044	5,360	2,284	414	8,058	12,102
SL29 Bagumbayan	915	11	441	1,367	148	102	55	305	1,672
NS Screen (South) Sub-total	46,950	11,220	4,776	62,946	201,760	43,574	11,905	257,239	320,185
EX01 Malinta - Meycauayan	2,240	3,577	0	5,817	16,659	10,409	0	27,068	32,885
CH01 Malabon - Obando									
CH02 Panghulo Road	3,266	0	1,752	5,018	1,230	493	490	2,213	7,231
CH03 Gen. Vililla	2,384	2	1,661	4,047	523	318	87	928	4,975
CH04 McArthur Highway	8,717	130	681	9,528	3,672	3,098	666	7,436	16,964
CH05 Quirino Highway	685	701	83	1,469	855	922	227	2,004	3,473
Cordon (North) Sub-total	17,292	4,410	4,177	25,879	22,939	15,240	1,470	39,649	65,528
CH06 Marikina/San Mateo	2,748	128	231	3,107	1,014	1,891	246	3,151	6,258
CH07 Manila - Cogeo	2,468	188	447	3,103	1,753	1,587	423	3,763	6,866
CH08 Antipolo Road	890	58	1,328	2,276	3,268	1,677	185	5,130	7,406
CH09 Ortigas Avenue	8,275	1,084	823	10,182	6,168	4,347	509	11,024	21,206
Cordon (East) Sub-total	14,381	1,458	2,829	18,668	12,203	9,502	1,363	23,068	41,736
EX02 Alabang - Carmona	899	3,525	0	4,424	19,301	7,892	674	27,867	32,291
EX03 Susana Heights	783	3,438	0	4,221	16,867	7,321	674	24,862	29,083
CH10 San Pedro	6,739	921	737	8,397	4,669	3,305	704	8,678	17,075
CH11 Bacoor	10,655	1,741	112	12,508	7,843	3,357	690	11,890	24,398
Cordon (South) Sub-total ^{1/}	18,177	6,100	849	25,126	29,379	13,983	2,068	45,430	70,556
SCREENLINE TOTAL	214,197	42,440	16,058	272,695	626,031	162,644	37,047	825,722	1,098,417
CORDONLINE TOTAL	49,850	11,968	7,855	69,673	64,521	38,725	4,901	108,147	177,820
GRAND TOTAL	264,047	54,408	23,913	342,368	690,552	201,369	41,948	933,869	1,276,237

Source: 1984 Screenline/Cordonline Surveys

1/ Exclusive of EX02

Table 2.6
Screenline/Cordonline Traffic Volume (ADT)
by Vehicle Type and by Station
(Number of Passengers, Both Directions)

Station Name	Public Mode				Private Mode				Total
	Jeepney	Bus	Tricycle	Sub-total	Car/Jeep	Truck	Others	Sub-total	
SL01 Del Pan Bridge	26,407	427	0	26,834	36,495	34,734	2,221	73,450	100,284
SL02 Jones Bridge	124,297	11,435	0	135,732	57,297	14,021	3,165	74,483	210,215
SL03 McArthur Bridge	226,297	12,348	0	238,645	26,169	4,789	883	31,841	270,486
SL04 Quezon Bridge	389,029	89,441	2	478,472	41,310	6,776	648	48,734	527,206
SL05 Ayala Bridge	1,874	135,816	19	137,709	61,595	15,666	1,399	78,660	216,369
SL06 Naqtahan Bridge	35,093	1,816	7	36,916	96,176	46,001	3,577	145,754	182,670
EW Screen (West) Sub-total	802,997	251,283	28	1,054,308	319,042	121,987	11,893	452,922	1,507,230
SL07 Panaderos	59,480	466	72	60,018	19,898	16,186	2,845	38,929	98,947
SL08 Guadalupe	10,824	532,325	0	543,149	230,067	48,268	7,758	286,093	329,242
SL09 Bambang Bridge	52,646	8,058	11,569	72,273	5,295	6,674	1,487	13,456	85,729
EW Screen (East) Sub-total	122,950	540,849	11,641	675,440	255,260	71,126	12,090	338,478	1,013,918
SL10 EDSA near Roosevelt	0	346,414	5	346,419	46,195	39,382	1,743	87,320	433,739
SL11 Del Monte	51,987	2,056	770	54,813	19,093	14,344	1,213	34,650	89,463
SL12 Quezon Avenue	233,217	33,142	24	266,383	98,016	27,813	1,632	127,461	393,844
SL13 E. Rodriguez	149,878	2,038	54	151,970	35,288	15,849	1,409	52,546	204,516
SL14 Aurora Boulevard	135,452	24,728	38	160,218	65,719	17,133	1,714	84,566	244,784
SL15 N. Domingo	49,445	33,921	39	83,405	8,430	4,257	352	13,039	96,444
SL22 Shaw Boulevard	143,398	54,236	55	197,689	24,732	12,719	1,614	39,065	236,754
SL23 Bagbaguin Road	15,429	44,604	356	60,389	5,245	7,154	550	12,949	73,338
SL24 Quirino Highway	83,718	30,146	87	113,951	13,006	11,593	2,415	27,014	140,965
SL25 Tandang Sora	13,497	217	155	13,869	2,986	3,623	239	6,848	20,717
NS Screen (North) Sub-total	876,021	571,502	1,583	1,449,106	318,710	153,867	12,881	485,458	1,934,564
SL16 P. Gil - P. Quirino	134,762	71,920	115	206,797	24,604	9,515	3,551	37,670	244,467
SL17 San Andres	73,265	1,226	31	74,522	12,896	3,587	697	17,180	91,702
SL18 Vito Cruz	26,249	7,320	58	33,627	73,429	17,108	2,528	93,065	126,692
SL19 Buendia	44,147	154,744	33	198,924	52,703	11,952	2,017	66,672	265,596
SL20 Pasay Road	32,484	1,818	73	34,375	41,369	10,181	1,254	52,804	87,179
SL21 EDSA/SSH	0	203,849	0	203,849	143,418	32,792	1,493	177,703	381,552
SL26 Nichols	66,317	38,598	26	104,941	27,157	17,106	4,097	48,360	153,301
SL27 Alcutan	42,616	10,667	70	53,353	10,086	10,689	1,944	22,719	76,072
SL28 Dr. M. L. Carreon	187	74	5,987	6,248	10,812	5,630	669	17,111	23,359
SL29 Bagumbayan	4,878	191	700	5,769	356	273	89	718	6,487
NS Screen (South) Sub-total	424,905	490,407	7,093	922,405	396,830	118,833	18,339	534,002	1,456,407
EX01 Malinta - Meycauayan	26,190	158,805	0	184,995	37,878	31,859	0	69,737	254,732
CH01 Malabon - Obando									
CH02 Panghulo Road	29,652	0	2,517	32,169	3,012	1,458	581	5,051	37,220
CH03 Gen. Villilla	21,165	40	2,390	23,595	1,236	840	132	2,208	25,803
CH04 McArthur Highway	76,600	2,015	754	79,369	8,584	8,283	889	17,756	97,125
CH05 Quirino Highway	6,033	22,243	102	23,378	2,305	2,701	300	5,306	33,684
Cordon (North) Sub-total	159,640	183,103	5,763	348,506	53,015	45,141	1,902	100,058	448,564
CH06 Marikina/San Mateo	35,315	4,390	317	40,022	2,028	5,795	1,047	8,870	48,892
CH07 Manila - Cogeo	21,051	4,346	450	25,847	4,625	4,504	3,526	12,655	38,502
CH08 Antipolo Road	10,029	1,111	1,488	12,628	8,980	5,389	235	14,604	27,232
CH09 Ortigas Avenue	79,093	40,461	931	120,485	14,541	12,653	665	27,859	148,344
Cordon (East) Sub-total	145,488	50,308	3,186	198,982	30,174	28,341	5,473	63,988	262,970
EX02 Alabang - Carmona	9,982	117,534	0	127,516	42,090	25,993	6,305	74,388	201,904
EX03 Susana Heights	8,597	113,748	0	122,345	36,600	24,177	4,294	65,071	187,416
CH10 San Pedro	69,898	28,782	730	99,410	10,293	8,991	1,008	20,292	119,702
CH11 Sacoor	85,744	66,362	87	152,193	23,547	10,310	813	34,670	186,863
Cordon (South) Sub-total ^{1/}	164,239	208,892	817	373,948	70,440	43,478	6,115	120,033	493,981
SCREENLINE TOTAL	2,226,873	1,854,041	20,345	4,101,259	1,289,842	465,815	55,203	1,810,860	5,912,119
CORDONLINE TOTAL	469,367	442,303	9,766	921,436	153,629	116,960	13,490	284,079	1,205,516
GRAND TOTAL	2,696,240	2,296,344	30,111	5,022,695	1,443,471	582,773	68,693	2,094,939	7,117,634

Source: 1984 Screenline and Cordonline Survey

^{1/} Exclusive of EX02

Moreover, its volume of private vehicles (122,000) constitutes about 92% of its total traffic volume and about 68% of the total vehicular traffic volume of screenline EW-East.

In NS screenline north, SL12 Quezon Avenue had the highest traffic volume (77,000) followed by SL14 Aurora Blvd. (52,000) and SL22 Shaw Blvd. (35,000).

SL16 P. Gil/P. Quirino showed a high volume of public vehicles (14,000) in NS screenline south, while for private vehicles, it was SL18 Vito Cruz (47,000).

In NS screenline, SL10 EDSA near Roosevelt in the north and SL21 EDSA/SSH in the south both reflected high private vehicle volumes (37,000 and 88,000) which are about 79% and 95% of their respective total traffic volume.

In cordonline north, CH04 McArthur Highway recorded the highest volume (17,000); in cordonline east, it was CH09 Ortigas Ave. (21,000); and in cordonline south, it was EX03 Susana Heights (29,000).

B. Passenger Traffic Volume

As expected, in EW screenline west, SL04 Quezon Bridge showed the highest volume of passengers (527,000), followed by SL03 McArthur Bridge (270,000).

SL08 Guadalupe Bridge once again showed the highest number of passengers (829,000) in EW screenline east, which was about 82% of the total passenger volume of that section.

SL12 Quezon Avenue had the highest vehicle volume (public: 266,000; private: 127,000) in NS screenline north; however, it was SL20 EDSA near Roosevelt which had the highest total passenger volume (434,000).

In NS screenline south, SL16 P. Gil/P. Quirino had the highest volume of public passengers (207,000), which was about 85% of its total passenger volume; but it was SL21 EDSA/SSH which had the highest volume of private vehicles (178,000), which was about 47% of its total passenger volume.

On cordonlines, the following stations showed the highest passenger volumes: EX01 Malinta - Meycauayan in the north (255,000); CH09 Ortigas Avenue in the east (148,000); EX03 Susana Heights in the south.

2.3.3 Vehicle Composition

Table 2.7 shows the comparison of vehicles by type on screenlines and cordonlines.

The characteristics of the share of PUVs are as follows:

- 1) Jeepneys dominate the overall composition of PUVs on screenlines, recording the highest share (79%) of the total traffic volume. The shares of the other modes are too wide apart: bus (16%) and tricycle (6%).
- 2) The same condition exists in cordonlines. Jeepneys again had the highest share - 67% and above in all sections.

The composition of private vehicles may be summarized thus:

- 1) On screenlines, the share of car/taxi range from 70 to 80% in all sections. The total share of the other modes greatly varies: truck (20%) and others (5%).
- 2) The total share of car/taxi on cordonlines surpasses all other modes anew.

Overall, the share of private vehicles is much higher than that of public. Appendix 2.10 gives a detailed list of vehicle composition by station.

Table 2.7
Vehicle Composition by Vehicle Type
and by Section (%)

Section		Public				Private				Total
		Jpy ^{1/}	Bus ^{1/}	Tri- ^{1/} cycle	Sub- ^{2/} Total	Car/ Taxi ^{3/}	Truck ^{3/}	Others ^{3/}	Sub- ^{2/} Total	
SCREENLINE	EW.WEST	91.6	8.3	0.1	27.8	74.9	20.4	4.6	72.2	100.0
	EW.EAST	41.2	29.3	29.5	18.0	78.6	16.9	4.6	82.0	100.0
	Sub-total	66.4	18.8	14.8	22.9	76.7	18.7	4.6	77.1	100.0
	NS.NORTH	82.4	15.5	1.7	31.3	71.7	24.2	4.1	68.7	100.0
	NS.SOUTH	74.6	17.8	7.6	19.7	78.4	17.0	4.6	80.3	100.0
	Sub-total	78.6	16.7	4.7	25.5	75.9	20.6	4.4	74.5	100.0
TOTAL		78.5	15.6	5.9	24.8	75.8	19.7	4.5	75.2	100.0
CORDONLINE	NORTH	66.8	17.0	16.1	39.5	57.9	38.4	3.7	60.5	100.0
	EAST	77.0	7.8	15.2	44.7	52.9	41.2	5.9	55.3	100.0
	SOUTH	72.3	24.3	3.4	35.6	64.7	30.8	4.6	64.4	100.0
	TOTAL	71.5	17.2	11.3	39.2	59.7	35.8	4.5	60.8	100.0

Source: 1984 Screenline/Cordonline Surveys

1/ Ratio to public sub-total

2/ Ratio to total

3/ Ratio to private sub-total

2.3.4 Hourly Fluctuation of Traffic Volume

The total screenline and cordonline hourly fluctuations of vehicular and passenger traffic volumes (16 hrs.) are presented in Figure 2.3.

A. Vehicular Traffic Volume

The hourly fluctuation of vehicular traffic volume was determined in terms of PCU. Consequently, private peak hours were reflected late in the morning and mid-afternoon due to the high number of trucks and vans. The morning and evening peak hours of private vehicles, nevertheless, were at 9:00 - 10:00 a.m. and 5:00 - 6:00 p.m., respectively. On the other hand, the volume of public vehicles crossing the screenlines and cordonlines was heaviest at 7:00 - 8:00 a.m., with a share of 7.7% of total public vehicular volume.

B. Passenger Traffic Volume

Figure 2.3 also shows that public and private passengers' morning and evening peak hours differ: 7:00 - 8:00 a.m. for public and 8:00 - 9:00 a.m. for private; 6:00 - 7:00 p.m. for public and 5:00 - 6:00 p.m. for private. As supported by private vehicular morning and evening peak hours, private passengers tend to start their trip later in the morning and earlier in the evening. This shows their reluctance to go with public vehicles/passengers during rush hours.

Generally, the number of public passengers fluctuates more than that of private passengers.

The peak hour and peak hour ratio of each station is shown in Table 2.8, both for vehicles and passengers.

Morning vehicle peak hour varies for each section; on the other hand, evening peak hours may be fixed at 5:00 - 6:00 p.m. with the exception of screenline north and cordonline south, which both have the same evening peak hour: 6:00 - 7:00 p.m.

Generally, passenger morning peak hour is at 7:00 - 8:00 a.m., generating about 6% to 8% of total passengers. Evening peak hour may be set at 5:00 - 6:00 p.m.

Table 2.8
Peak Hour and Peak Hour Ratio
of Screenline/Cordonline Traffic by Station

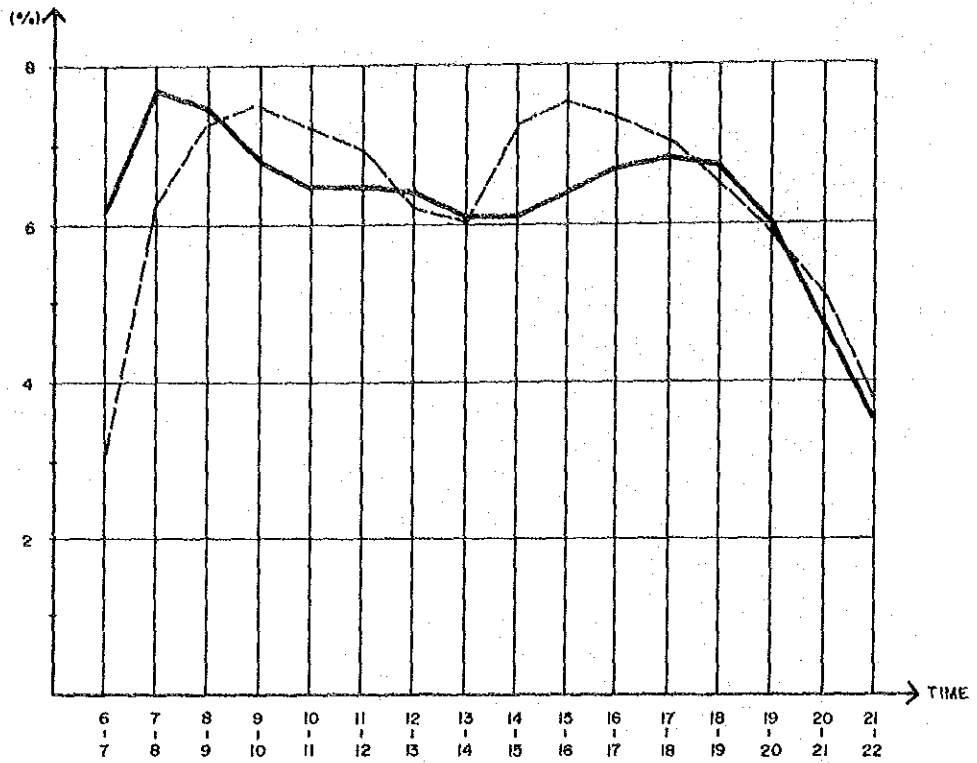
Station Name	Morning Peak Time	Morning Peak %	Evening Peak Time	Evening Peak %	Morning Peak Time	Morning Peak %	Evening Peak Time	Evening Peak %
SL01 Del Pan Bridge	9-10	8.6	5-6	6.6	7- 8	8.6	5-6	8.3
SL02 Jones Bridge	9-10	8.0	5-6	7.3	8- 9	8.3	5-6	8.4
SL03 McArthur Bridge	9-10	7.9	5-6	7.4	8- 9	7.2	5-6	8.4
SL04 Quezon Bridge	7- 8	7.5	5-6	6.8	7- 8	7.6	5-6	8.0
SL05 Ayala Bridge	10-11	8.4	5-6	8.4	7- 8	9.6	5-6	10.2
SL06 Nagtahan Bridge	7- 8	8.8	5-6	7.3	7- 8	11.9	5-6	8.2
EW Screen (West) Sub-total	9-10	7.7	5-6	7.3	7- 8	8.3	5-6	8.4
SL07 Panaderos	10-11	8.4	5-6	8.4	7- 8	8.2	5-6	10.0
SL08 Guadalupe	8- 9	7.3	5-6	8.1	8- 9	7.7	5-6	8.5
SL09 Bambang Bridge	8- 9	6.6	5-6	8.1	10-11	6.9	5-6	7.9
EW Screen (East) Sub-total	8- 9	7.2	5-6	8.2	8- 9	7.0	5-6	7.9
SL10 EDSA near Roosevelt	9-10	8.1	7-8	6.3	9-10	8.9	7-8	10.1
SL11 Del Monte	8- 9	8.1	7-8	6.3	8- 9	8.1	6-7	8.3
SL12 Quezon Avenue	10-11	7.7	6-7	6.9	7- 8	6.2	7-8	8.6
SL13 E. Rodriguez	7- 8	6.3	5-6	8.0	7- 8	7.8	5-6	8.5
SL14 Aurora Boulevard	7- 8	7.3	6-7	6.9	7- 8	7.8	5-6	8.5
SL15 N. Domingo	9-10	8.5	6-7	5.9	9-10	7.8	6-7	6.9
SL22 Shaw Boulevard	7- 8	6.9	5-6	8.5	7- 8	8.2	5-6	9.0
SL23 Bagbaguin Road	7- 8	7.1	5-6	8.5	7- 8	10.4	5-6	9.5
SL24 Quirino Highway	7- 8	7.5	5-6	6.8	7- 8	9.0	5-6	7.1
SL25 Tandang Sora	8- 9	6.9	5-6	8.3	7- 8	9.0	5-6	9.9
NS Screen (North) Sub-total	7- 8	7.0	6-7	6.0	7- 8	7.1	6-7	6.2
SL16 P. Gil-P. Quirino	7- 8	6.8	5-6	6.9	7- 8	7.8	5-6	8.0
SL17 San Andres	7- 8	8.0	6-7	7.6	7- 8	7.5	6-7	9.9
SL18 Vito Cruz	7- 8	8.2	5-6	7.2	7- 8	7.1	5-6	9.8
SL19 Buendia	8- 9	8.5	5-6	7.4	8- 9	10.9	5-6	8.7
SL20 Pasay Road	10-11	7.7	6-7	6.2	7- 8	8.6	6-7	7.1
SL21 EDSA/SSH	8- 9	9.1	6-7	7.3	8- 9	9.1	5-6	7.2
SL26 Nichols	9-10	6.9	5-6	8.5	7- 8	7.7	5-6	9.8
SL27 Bicutan	7- 8	6.0	7-8	7.9	7- 8	8.3	6-7	9.3
SL28 Dr. M.L. Carreon	8- 9	8.0	5-6	7.3	7- 8	9.9	5-6	3.9
SL29 Bagumbayan	10-11	9.6	5-6	9.3	9-10	8.7	5-6	7.7
NS Screen (South) Sub-total	8- 9	7.7	5-6	6.9	8- 9	7.4	5-6	7.5
EX01 Palinta-Meycauayan	9-10	7.3	5-6	7.1	10-11	7.1	5-6	7.9
CH01 Malabon-Obando								
CH02 Panghulo Road	7- 8	8.7	5-6	7.7	7- 8	8.9	6-7	9.3
CH03 Gen. Villilla	7- 8	8.9	6-7	7.7	7- 8	8.4	5-6	10.1
CH04 McArthur Highway	8- 9	7.6	5-6	9.1	7- 8	9.7	5-6	8.0
CH05 Quirino Highway	7- 8	8.7	6-7	6.5	7- 8	12.2	7-8	6.4
Cordon (North) Sub-total	9-10	7.1	5-6	7.7	7- 8	6.1	5-6	6.9
CH06 Marikina/San Mateo	8- 9	8.6	5-6	6.7	6- 7	10.6	5-6	7.2
CH07 Manila - Cogeo	6- 7	7.7	5-6	7.1	10-11	14.2	6-7	7.9
CH08 Antipolo Road	8- 9	8.0	5-6	8.5	8- 9	9.4	5-6	8.1
CH09 Ortigas Avenue	10-11	7.3	5-6	7.4	7- 8	7.4	5-6	8.3
Cordon (East) Sub-total	8- 9	7.5	5-6	7.4	7- 8	7.1	5-6	6.8
EX02 Alabang-Carmona	8- 9	7.5	6-7	7.9	8- 9	7.1	6-7	10.6
EX03 Susana Heights	9-10	7.6	6-7	8.1	8- 9	7.0	6-7	11.0
CH10 San Pedro	7- 8	8.0	5-6	7.6	7- 8	8.9	6-7	10.2
CH11 Bacoor	8- 9	7.2	5-6	7.7	6- 7	8.3	5-6	8.8
Cordon (South) Sub-total	8- 9	7.3	6-7	7.6	7- 8	6.0	6-7	8.8

Source: 1984 Screenline/Cordonline Surveys

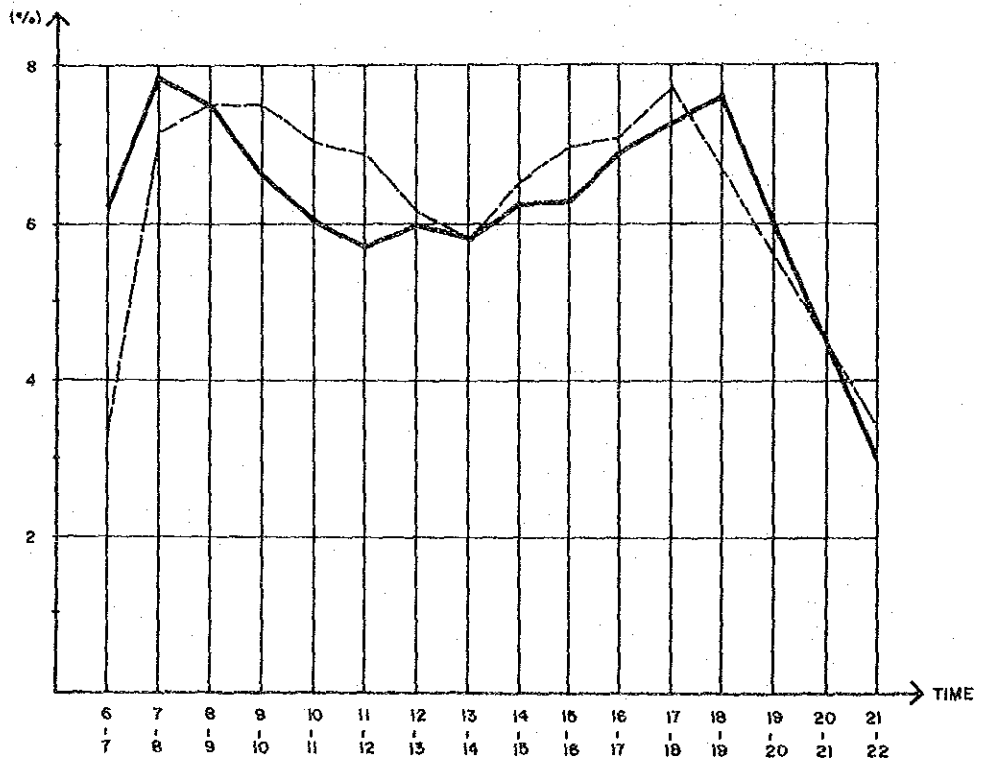
1/ Ratio to 16-hour traffic volume in terms of PCU

Jeepney : 1.5 Big Bus : 2.5 Car : 1.0 Truck : 2.5
Minibus : 2.0 Tricycle : 0.5 Van/Pick-up : 1.5 Motorcycle : 0.5

(A) VEHICULAR TRAFFIC



(B) PASSENGER TRAFFIC



LEGEND:

- PUBLIC
- - - PRIVATE

SOURCE: 1984 SCREENLINE / CORDONLINE SURVEYS

Figure 2.3
Hourly Fluctuation of
Screenline and Cordonline
Traffic Volume

2.3.5 Average Vehicle Occupancy

Generally the average occupancy of jeepneys ranges from 9 to 11; that of car/jeeps ranges from 2 to 3. The average occupancy of buses, on the other hand, was deemed too high (60), especially at Guadalupe Bridge (EW.East), where the number of passengers recorded during evening peak hours was too high.

Therefore, a resurvey at Guadalupe Bridge was conducted in order to further investigate the abovementioned phenomenon.

Table 2.9 shows the average occupancy by section using the results of the resurvey.

Table 2.9
Average Occupancy by Section

Section	Public Mode				Private Mode				Total	
	Jpy	Bus ^{1/}	Tri-cycle	Sub-Total	Car/Jeep ^{2/}	Truck ^{3/}	Others ^{4/}	Sub-Total		
SCREENLINE	EW. WEST	11.0	38.1	0.8	13.2	2.0	2.9	1.2	2.2	5.4
	EW. EAST	8.6	37.8	1.2	21.6	2.2	2.9	1.2	2.3	4.6
	Sub-total	10.7	37.9	1.2	15.4	2.1	2.9	1.5	2.2	5.5
	NS. NORTH	10.7	37.8	0.9	14.7	2.1	2.9	1.4	2.3	6.2
	NS. SOUTH	9.1	40.8	1.5	15.0	2.0	2.7	1.5	2.1	4.5
	Sub-total	10.2	39.1	1.3	14.8	2.0	2.8	1.5	2.2	5.3
TOTAL	10.3	38.7	1.3	15.1	2.1	2.9	1.5	2.2	5.1	
CORDONLINE	NORTH	9.4	41.1	1.4	14.3	2.3	3.0	1.3	2.5	6.9
	EAST	10.5	35.1	1.1	11.1	2.5	3.0	1.8	2.7	6.3
	SOUTH	9.4	34.8	1.0	15.3	2.4	3.1	3.0	2.6	7.1
	TOTAL	9.7	37.2	1.2	13.5	2.3	3.0	2.2	2.6	6.9

Source: 1984 Screenline/Cordonline Surveys

- 1/ Includes all types
- 2/ Includes taxis
- 3/ Includes vans/pick-ups
- 4/ Includes motorcycles

3.0 1984 SUPPLEMENTAL HIS

3.1 PREPARATION AND SURVEY PROPER

3.1.1 Approach and Methodology

Since the data to be derived from the 1984 HIS survey is supplemental to the 1980 HIS, naturally the same sampling design as in the previous surveys was used (refer to Appendix 3.1). Nevertheless, a pilot survey was conducted to pretest the validity of the 1983 survey methods for the peripheral areas.

A few changes, however, were required in preparation for the survey, namely:

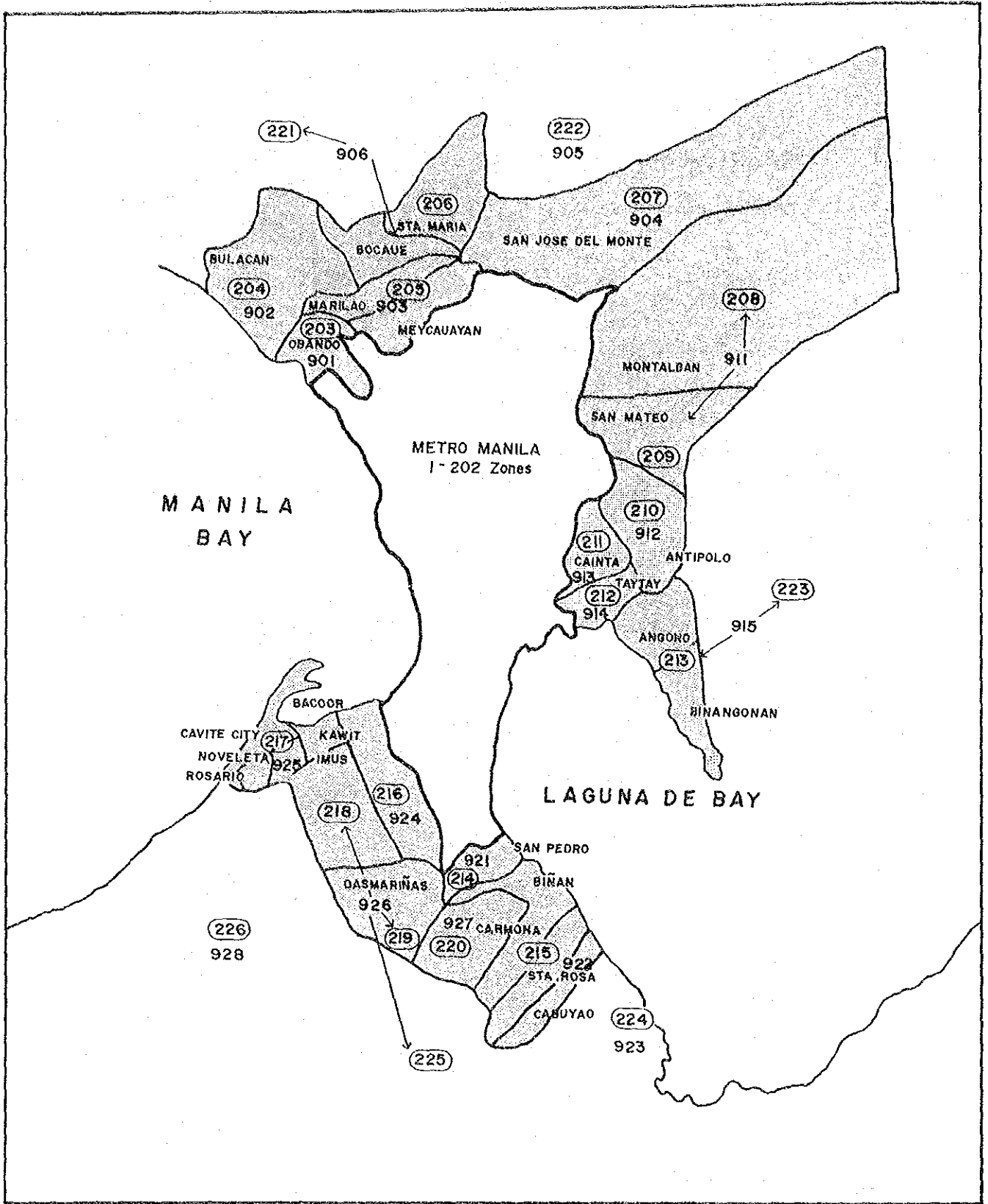
- a) Assistance from various government agencies in terms of preliminary working data in view of the change in the study area:

<u>Government Agency</u>	<u>Nature of Data/Support</u>
1) National Barangay Operation Office	List of Barangay Captains of Bulacan, Laguna, Cavite, and Rizal
2) National Economic and Development Authority (NEDA)	HIS Questionnaire Forms' Review and Approval
3) National Census and Statistics Office (NCSO)	Household Sample List of Selected Areas

- b) Zoning: The same 202-zone system was maintained for the areas within Metro Manila proper. A comparison of the zoning system used for the three (3) Home Interview Surveys is presented in Table 3.1. The nineteen (19) zones in four provinces outside Metro Manila used in the 1980 and 1983 HIS were disaggregated into 24 zones in the 1984 Supplemental HIS as illustrated in Figure 3.1. The revised zone system of 1984 is also shown in Appendix 3.1.
- c) Questionnaire Form: The same forms as in the 1983 survey were used in 1984. The only change was the inclusion of NEDA's clearance notation (see Appendix 3.1).

3.1.2 Survey Organization

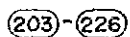
The implementing survey organization is shown in Figure 3.2.



LEGEND:



1984 SUPPLEMENTAL HIS SURVEY AREA



1984 SUPPLEMENTAL HIS ZONING SYSTEM

901 - 928 1980 HIS ZONING SYSTEM

Figure 3.1
1984 Supplemental HIS
Survey Area and
Zoning System

Table 3.1
Comparison of HIS Zoning Systems

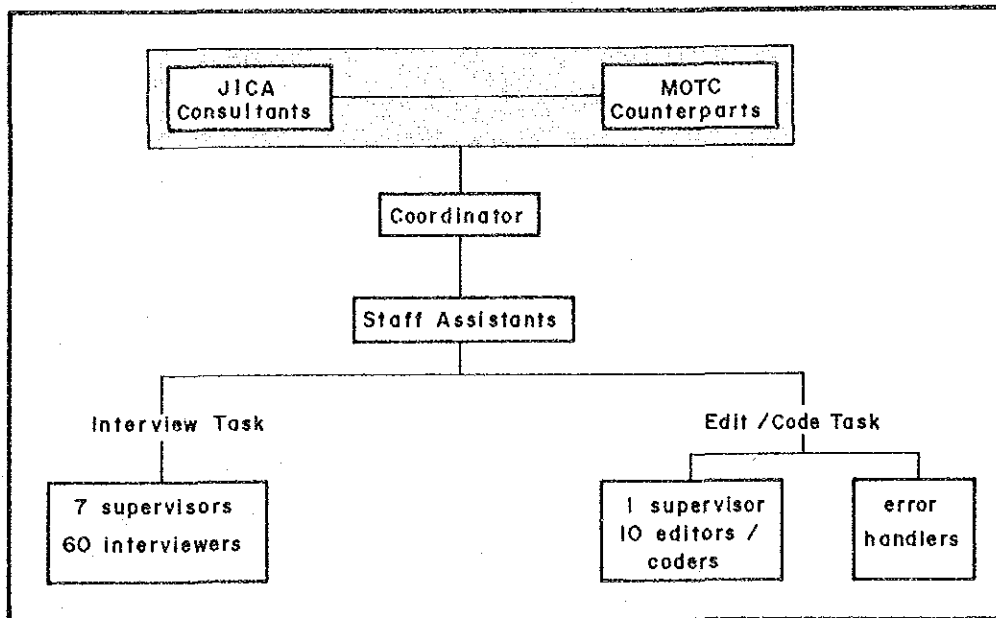
Survey	Inside M.Mla ^{1/}	Outside Metro Manila		Total
		4 Provinces ^{2/}	Rest of Phils.	
1980 HIS	214	19	35	268
1983 Supplemental HIS	214	19	35	268
1984 Supplemental HIS	214	24 ^{3/}	35	273

1/ 202 zones for Metro Manila, plus 12 zones for the Reclamation Area

2/ Bulacan, Rizal, Laguna and Cavite

3/ 18 zones for the survey area, plus 6 zones representing the rest of the 4 provinces

Figure 3.2
1984 Supplemental HIS Organization Chart



3.1.3 Survey Procedure and Schedule

The same procedure was used as in the 1983 Supplemental HIS. It is outlined as follows:

- a) Sufficient training of interviewers and editors/coders;

- b) Distribution of questionnaire forms and direct interview of samples;
- c) Quota regulated output;
- d) Frequent checking and reporting of work progress.

The work responsibilities and activities for the supervisors, interviewers, editors and coders are documented in the 1983 JUMSUT I Supporting Manual No. 1. The same manual was used for the 1984 survey.

The total number of samples interviewed is 2,031. Breakdown by zone is given below.

Table 3.2
1984 Supplemental HIS Proposed and Actual
Number of Samples Interviewed

Zone No./Province	Proposed No. of Samples	Actual No. of Samples	Completion (%)
203 Obando	53	54	101
204 Bulacan	46	52	113
205 Meycauayan, Marilao	156	166	106
206 Bocaue, Sta. Maria	144	144	100
207 San Jose del Monte	121	121	100
208 Montalban	56	66	118
209 San Mateo	69	72	104
210 Antipolo	92	92	100
211 Cavite	78	64	82
212 Taytay	100	114	114
213 Angono, Binangonan	144	144	100
214 San Pedro	98	98	100
215 Binan, Sta. Rosa, Cabuyao	259	260	100
216 Bacoor	120	120	100
217 Cavite, Kawit, Noveleta, and Rosario	232	232	100
218 Imus	78	78	100
219 Dasmariñas	68	68	100
220 Carmona	86	86	100
Total	2,000	2,031	102

Source: 1984 Supplemental HIS

3.2 DATA PROCESSING

The same data processing procedure as in the previous HIS was likewise adopted. It is outlined as follows:

- a) Manual editing and coding of questionnaire forms;
- b) Key punching of coded forms;
- c) Transfer of data from card to print;
- d) Thorough data check;
- e) Development of expanded sample master tape.

3.3 RESULTS AND FINDINGS

3.3.1 General

The primary data generated by the 1984 Supplemental HIS have been tabulated in various ways in accordance with the study's requirements for the socio-economic and trip characteristics parameters of the area. Most of the tabulations were done either on a provincial or municipality level.

The findings focused on the four provinces (Bulacan, Laguna, Rizal, Cavite), particularly the municipalities covered in the HIS. Secondary data from other government agencies were also used as supplemental information on the socio-economic characteristics of the four provinces. The data sources referred to include the 1980 NCSO Reports and BLT Statistical Report.

3.3.2 Socio-Economic Profile

The socio-economic characteristics of the study area are discussed under three categories, namely: Population, Household, and Car ownership.

A. Population

The combined population of all four provinces reached 3,396 thousand in 1980. On the whole, annual growth rates jumped from 3.9% in the first half of the decade (1970 to 1975) to 4.3% during the second half (1975 to 1980). Laguna and Cavite showed higher and upward increments than Bulacan and Rizal. The latter two provinces managed to maintain just about the same historical trend (see Table 3.3).

Table 3.3
Historical Trends in Population Growth^{1/}
(4 Provinces)

Province	1970	1975	1980	Annual Growth (%)	
				(1970-1975)	(1975-1980)
Bulacan	737,975	899,529	1,096,046	4.0	4.0
Laguna	699,736	803,750	973,104	2.8	3.9
Rizal	307,238	414,192	555,533	6.2	6.0
Cavite	520,180	628,321	771,320	3.8	4.2
Total	2,265,129	2,745,792	3,396,003	3.9	4.3

Source: 1980 NCSO Population and Housing Census

^{1/} Provincial Level

The population pyramid for male and female population tends to follow an expansive profile of age-sex distribution (see Figure 3.3). It can be noted also that the study area has a high proportion of the younger age group (0-14 years). From this age groups to the 80 years old and above, male and female population decrease as their age groups grow older. Also it can be generally noted that the ratio of male to female is 0.99:1.

The 1980 NCSO Population and Housing Census shows that among the 4 provinces included in the study area, the province of Cavite has the highest population density with an average of 16.3 persons per hectare (see Table 3.4). This is followed by Laguna with 14.2 persons per hectare. Both Bulacan and Rizal have the least density of 7.6 and 4.9 persons per hectare, respectively.

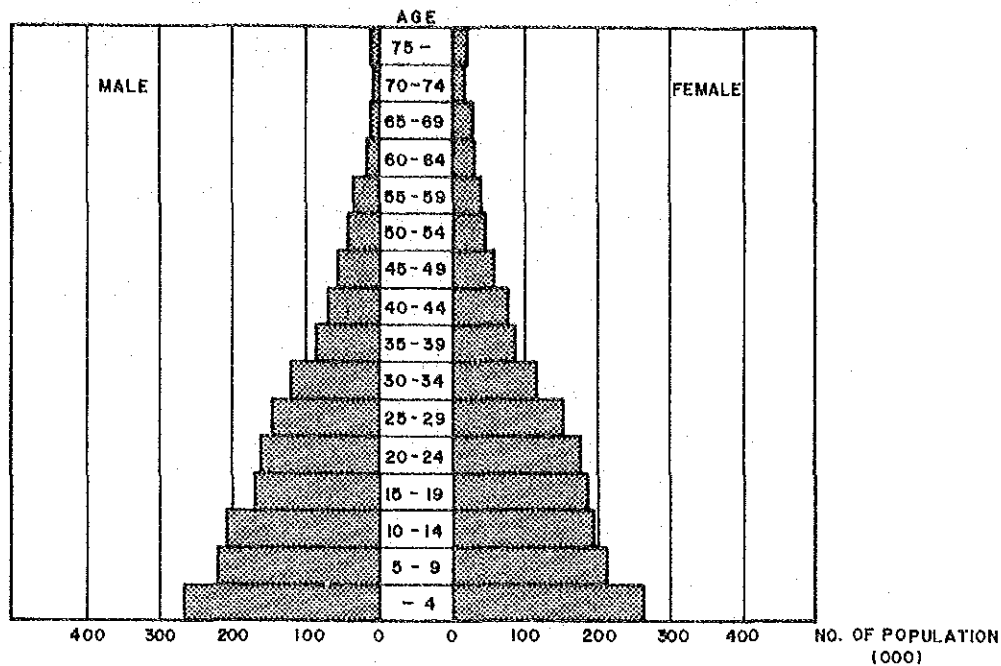
Table 3.4
Population Density of Surveyed Areas

Province	Zone	Area	Area (ha.)	Population (1980)	Density (per ha.)
Bulacan	203	Obando	5,210	39,618	7.6
	204	Bulacan	7,290	34,920	4.8
	205	Meycauayan, Marilao	5,800	118,648	20.5
	206	Bocaue, Sta. Maria	10,350	108,441	10.5
	207	San Jose del Monte	22,750	90,732	4.0
	Sub-total		51,400	392,359	7.6
Rizal	208	Montalban	31,280	41,859	1.3
	209	San Mateo	6,490	51,910	8.0
	210	Antipolo	20,610	68,912	2.3
	211	Cavite	1,020	59,025	57.9
	212	Taytay	3,880	75,328	19.4
	213	Angono, Binagonan	9,870	107,551	10.9
	Sub-total		83,150	404,585	4.9
Laguna	214	San Pedro	2,260	74,556	33.0
	215	Biñan, Sta. Rosa, Cabuyao	16,720	194,295	11.6
	Sub-total		18,980	268,851	14.2
Cavite	216	Bacoor	2,500	90,364	36.1
	217	Cavite, Kawit, Noveleta, and Rosario	3,400	174,806	50.8
	218	Imus	8,900	59,103	6.6
	219	Dasmariñas	8,230	51,894	6.3
	220	Carmona	4,020	65,014	16.2
	Sub-total		27,620	441,181	16.3
Grand Total			180,620	1,506,976	8.3

Source: 1980 NCSO Population and Housing Census

However, on a per zone breakdown, the highest density level is recorded for zone 211 representing Cainta, Rizal with 57.9 persons per hectare. This is followed by Zone 217 encompassing the areas of Cavite, Kawit, Noveleta and Rosario, in the province of Cavite, with 50.8 persons per hectare. The area with the lowest density is Montalban (Zone 208) with 1.3 persons per hectare. The low density figures suggest higher potential for future absorption of population growth.

Figure 3.3
Age Structure of Population/
(4 Provinces)



Age Group	Male	%	Female	%	Total	%	Male to Female Ratio
under 1	62,820	3.7	60,453	3.6	123,273	3.6	1.0
1 - 4	208,116	12.3	196,303	11.5	404,419	11.9	1.1
5 - 9	222,813	13.1	212,276	12.5	435,089	12.8	1.0
10 - 14	205,816	12.1	198,901	11.7	404,717	11.9	1.0
15 - 19	178,649	10.5	185,734	10.9	364,383	10.7	.96
20 - 24	167,803	9.9	174,958	10.3	342,761	10.1	.96
25 - 29	147,711	8.7	150,550	8.9	298,261	8.8	.98
30 - 34	120,741	7.1	119,205	7.0	239,946	7.1	1.0
35 - 39	87,208	5.1	85,653	5.0	172,861	5.1	1.0
40 - 44	72,620	4.3	73,308	4.3	145,928	4.3	.99
45 - 49	56,105	3.3	57,660	3.4	113,765	3.3	.97
50 - 54	45,593	2.7	48,372	2.9	93,965	2.8	.94
55 - 59	34,697	2.1	40,089	2.4	74,786	2.2	.87
60 - 64	28,864	1.7	32,675	1.9	61,539	1.8	.88
65 - 69	25,253	1.5	29,103	1.7	54,356	1.6	.86
70 - 74	14,559	0.9	16,545	0.9	31,104	0.9	.87
75 over	16,469	1.0	18,381	1.1	34,850	1.0	.90
TOTAL	1,695,837	(100.0)	1,700,166	(100.0)	3,396,003	(100.0)	.99

Source: 1980 NCSO Population and Housing Census

1/ Combined population of males and females for
Bulacan, Rizal, Cavite and Laguna

The occupation structure derived from the 1984 HIS results (Table 3.5) indicates that students have the highest population share in the study area, accounting for approximately 34% of total population. This is partly explained by the fact that the survey covered persons 7 years old and above. The next highest groups are those of the jobless persons (16.4%) and housewives (12.8%). These trends also apply to the occupation structure within each province.

Table 3.5
Occupation Structure by Province 1/

Occupation	Bulacan		Rizal		Laguna		Cavite		Total	(%)
	No.	(%)	No.	(%)	No.	(%)	No.	(%)		
1) Service Workers	28,180	(9.0)	19,414	(6.1)	9,460	(4.5)	27,585	(7.7)	84,639	(7.1)
2) Adm. & Exec. Workers	3,421	(1.1)	1,782	(0.6)	561	(0.3)	3,874	(1.1)	9,638	(0.8)
3) Sales Workers	19,681	(6.3)	20,344	(6.4)	16,848	(8.0)	21,602	(6.1)	78,475	(6.6)
4) Clerical & Related Workers	7,341	(2.3)	9,271	(2.9)	4,776	(2.3)	9,037	(2.5)	30,425	(2.5)
5) Factory Workers	26,786	(8.5)	35,769	(11.3)	25,478	(12.1)	18,626	(5.2)	106,659	(8.9)
6) Transport Workers	9,525	(3.0)	10,363	(3.3)	7,711	(3.7)	10,822	(3.0)	38,421	(3.2)
7) Professional Workers	11,642	(3.7)	12,030	(3.8)	7,063	(3.4)	13,132	(3.7)	43,867	(3.7)
8) Student/Elem.	56,618	(18.0)	59,336	(18.7)	42,073	(20.0)	63,674	(17.9)	221,701	(18.5)
9) Student/H.S., Univ.	46,812	(14.9)	50,511	(15.9)	29,561	(14.1)	56,369	(15.8)	183,253	(15.3)
10) Housewife	40,306	(12.8)	38,789	(12.2)	22,595	(10.7)	51,627	(14.5)	153,317	(12.8)
11) Jobless	51,368	(16.4)	51,354	(16.2)	32,009	(15.2)	61,923	(17.4)	196,654	(16.4)
12) Others	12,421	(4.0)	8,536	(2.7)	12,236	(5.8)	17,688	(5.0)	50,881	(4.2)
TOTAL ^{2/}	314,101	(100.0)	317,499	(100.0)	210,371	(100.0)	355,959	(100.0)	1,197,930	(100.0)

Source: 1984 Supplemental HIS

1/ 7 years old and above for surveyed areas only

2/ Figures in parentheses are percentages (%) of provincial workers to total workers in the study area

The employment by industry sector is given in Table 3.6. Reflecting its urban character, majority of the population in the 4 provinces is engaged in the tertiary industry sector, accounting for more than half (50%) of the employed persons per province. This is more apparent in Cavite where 62% of the surveyed population belong to the tertiary sector. The secondary industry sector claims approximately from 30% to 45% of the total employment force.

The population per province was estimated both at daytime and at night (see Table 3.7). As indicated by ratio of day to night population, all zones of the study area have lesser population recorded during the day than during the night. On the whole, the ratio of day to night population is 0.82:1. This implies that the study area has less daytime attraction.

Table 3.6
Employment by Industry Sector

Industry Sector	Provincial Level ^{1/}				Total (%)
	Bulacan (%)	Rizal (%)	Laguna (%)	Cavite (%)	
Primary	8201 (6.9)	4927 (4.2)	5812 (6.9)	9718 (8.0)	28658 6.5
Secondary	46495 (39.1)	52437 (44.7)	34738 (41.3)	36882 (30.1)	170552 38.5
Tertiary	64301 (54.0)	60074 (51.2)	43583 (51.8)	75766 (61.9)	243724 55.0
TOTAL	118997 (100.0)	117438 (100.0)	84133 (100.0)	122366 (100.0)	442934 (100.0)

Source: 1984 Supplemental HIS

^{1/} Inclusive of the surveyed areas only.

^{2/} Exclusive of unknown employment.

Table 3.7
Estimated Population at Night and Daytime by Areal/

Province	Zone	Area	Population		Ratio of Day to Night Pop.
			at Night	at Daytime	
Bulacan	203	Obando	31,392	21,047	0.67
	204	Bulacan	28,139	25,385	0.90
	205	Meycauayan, Marilao	97,431	84,733	0.87
	206	Bocaue, Sta. Maria	86,076	70,587	0.82
	207	San Jose del Monte	71,063	56,313	0.79
	Sub-total			314,101	258,065
Rizal	208	Montalban	32,345	22,329	0.69
	209	San Mateo	40,724	29,633	0.73
	210	Antipolo	52,916	38,680	0.73
	211	Cavite	46,897	39,487	0.84
	212	Taytay	59,636	52,151	0.87
	213	Angono, Binangonan	84,981	66,913	0.79
Sub-total			317,499	249,193	0.78
Laguna	214	San Pedro	58,816	42,533	0.72
	215	Biñan, Sta. Rosa, Cabuyao	151,555	140,086	0.92
	Sub-total			210,371	182,619
Cavite	216	Bacoor	71,852	47,840	0.67
	217	Cavite, Kawit, Noveleta, and Rosario	143,308	124,357	0.87
	218	Imus	47,952	43,864	0.91
	219	Dasmariñas	41,095	37,442	0.91
	220	Carmona	51,752	40,875	0.79
	Sub-total			355,959	294,378
GRAND TOTAL			1,197,930	984,255	0.82

Source: 1984 Supplemental HIS

^{1/} 7 years old and above for surveyed areas only

B. Household

Table 3.8 shows the number of households per zone and province. Comparing it with the population, the average number of persons per household can be derived. It is shown that all the provinces, except Laguna, have an average of 5.6 persons per household. On a per zone basis, 213 (Binangonan and Angono), and 219 (Dasmariñas) have a higher average of 5.8 persons while 224 (rest of Laguna province) has the least average of 5.0 persons per household.

Table 3.8
Household Population
(4 Provinces)

PROVINCE	ZONE	AREA	Population (1980)	No. of House- holds (1980)	No. of Persons per Household
Bulacan	203	Obando	39,618	7,690	5.2
	204	Bulacan	34,920	6,403	5.5
	205	Meycauayan, Marilao	118,648	22,572	5.3
	206	Bocaue, Sta. Maria	108,441	19,695	5.5
	207	San Jose del Monte	90,732	16,414	5.5
	222	Norzagaray	26,032	4,589	5.7
	221	Rest of Bul. Prov.	677,655	119,407	5.7
	Sub-total			1,096,046	196,770
Rizal	208	Montalban	41,859	7,694	5.4
	209	San Mateo	51,910	9,439	5.5
	210	Antipolo	68,912	13,120	5.3
	211	Cainta	59,025	10,966	5.4
	212	Taytay	75,328	13,182	5.7
	213	Angono, Binangonan	107,551	18,525	5.8
	223	Rest of Rizal Prov.	150,948	26,717	5.6
	Sub-total			555,533	99,643
Laguna	214	San Pedro	74,556	13,462	5.5
	215	Biñan, Sta. Rosa Cabuyao	194,295	34,057	5.7
	224	Rest. Laguna Prov.	704,253	141,959	5.0
	Sub-total			973,104	176,016
Cavite	216	Bacoor	90,364	16,082	5.6
	217	Cavite, Kawit, Noveleta, Rosario	174,806	32,427	5.4
	218	Imus	59,103	11,029	5.4
	219	Dasmariñas	51,894	8,872	5.8
	220	Carmona	65,014	11,428	5.7
	225	Silang	52,321	9,285	5.6
	226	Rest of Cavite Prov.	277,818	49,312	5.6
	Sub-total			771,320	138,435
Grand Total			3,396,003	610,864	5.6

Source: 1980 NCSO Population and Housing Census

In terms of household income, the same declining pattern of household distribution as income rises can be observed in all provinces in the study area (see Table 3.9). However, a slight difference is seen for Laguna since it has a larger share and greater number of households in the high income bracket. The bulk or 57.7% of the households in the study area is concentrated in the ₱501 to ₱2,000 per month bracket.

The average household income for the study area is ₱1,954. Among the provinces, Laguna accounts for the highest average income of ₱2,270, thus reinforcing previous observation that more households in this province belong to the higher income groups. The province of Rizal has the lowest average household income of ₱1,846 per month.

Table 3.9
Distribution of Households by Income Level

Income Level (₱/mo.)	Bulacan		Rizal		Laguna		Cavite		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
0 - 500	4,689	6.4	4,672	6.4	3,419	7.2	5,892	7.4	18,672	6.8
501 - 1,000	18,969	26.1	19,512	26.8	11,439	24.1	23,035	28.9	72,955	26.7
1,001 - 1,500	13,960	19.2	13,148	18.0	6,595	13.9	11,288	14.1	44,991	16.5
1,501 - 2,000	11,235	15.4	11,691	16.0	6,774	14.3	9,862	12.4	39,562	14.5
2,001 - 2,500	6,526	9.0	6,521	8.9	4,269	9.0	7,408	9.3	24,724	9.1
2,501 - 3,000	4,240	5.8	6,148	8.4	3,324	7.0	5,590	7.0	19,302	7.1
3,001 - 3,500	4,457	6.1	3,622	5.0	2,127	4.5	4,509	5.6	14,715	5.4
3,501 - 4,000	2,837	3.9	2,365	3.2	2,815	6.0	5,233	6.6	13,250	4.9
4,001 - 5,000	2,331	3.2	2,308	3.2	2,171	4.6	3,582	4.5	10,392	3.8
5,001 - 7,000	2,298	3.2	2,057	2.8	2,155	4.5	2,742	3.4	9,252	3.4
7,001 - above	954	1.3	880	1.2	2,430	5.1	695	0.9	4,959	1.8
Unknown	274	0.4	0	0.0	0	0.0	0	0.0	274	0.1
Total	72,770	100.0	72,924	100.0	47,518	100.0	79,836	100.0	273,048	100.0
Average Income per Household	₱ 1,875		₱ 1,846		₱ 2,270		₱ 1,934		₱ 1,954	

Source: 1984 Supplemental HIS

C. Vehicle Ownership

The number of registered vehicles for 1983 for the provinces of Bulacan, Rizal, Laguna and Cavite are given in Table 3.10. It assumes that the residences of vehicle owners coincide with the territorial coverage of the BLT agencies in the provinces. Among the four provinces, Bulacan has the most number of registered vehicles accounting for 38.3% of total vehicles.

This is followed by Laguna with 32.6%; Cavite and Rizal with 16.2% and 12.9%, respectively. On a per capita basis, vehicle ownership is highest in Bulacan (38.9 vehicles per thousand population) followed by Laguna (37.4), Rizal (25.9) and Cavite (23.5).

Table 3.10
Number of Registered Vehicles by Type

Type of Vehicle	Bulacan (%)	Rizal (%)	Laguna (%)	Cavite (%)	Total (%)
Cars	8,558 (31.6)	7,459 (27.5)	6,636 (24.5)	4,457 (16.4)	27,110 (100.0)
Utility Vehicles	17,499 (35.2)	4,882 (9.8)	18,665 (37.6)	8,615 (17.3)	49,661 (100.0)
Buses	467 (27.4)	48 (2.8)	638 (37.2)	558 (32.6)	1,713 (100.0)
Motorcycle/Tricycle	8,697 (42.1)	1,499 (7.3)	6,991 (33.9)	3,447 (16.7)	20,634 (100.0)
Trailers	2,638 (73.1)	93 (2.6)	602 (16.7)	276 (7.6)	3,609 (100.0)
Total	42,672 (38.3)	14,413 (12.9)	36,346 (32.6)	18,100 (16.2)	111,531 (100.0)

Source: 1984 Supplemental HIS

Based on the distribution of vehicles by type among provinces, Bulacan has the most number of registered cars, trucks, motorcycles/tricycles and trailers with 31.6%, 54.6%, 42.1% and 73.1% shares to total vehicles, respectively. The high incidence of trucks and trailers can be attributed to the presence of many businesses and industries related to hauling, trucking, freight, mills, factories and agribusiness in Bulacan. Laguna, on the other hand, accounts for the most number of utility vehicles with 37.6% share and buses with 37.2% share.

Indicative of the area's reliance on jeepneys, the biggest number of vehicles in all four provinces belong to the utility vehicles category with 44.5% share of total registered vehicles (see Table 3.11). This is followed by cars and motorcycles/tricycles occupying 24.3% and 18.5% shares, respectively.

On the provincial level, Bulacan, Laguna and Cavite recorded high percentages of utility vehicles ranging from 41.0% to 51.4% of provincial totals. Rizal was different in that a percentage of cars (51.8% of total) emerged.

Based on the 1984 HIS results on vehicle ownership, only around 14% of the households in the study area own 4-wheeled vehicles while the rest do not (see Table 3.12). Among the provinces, the surveyed areas in Laguna posted the highest share (17.2%) of vehicle-owning households, while those in Cavite had the lowest share (12.6%).

A comparison across provinces shows that the extent of 4-wheeled vehicle ownership is evenly distributed among the four provinces - ranging from 21.4% to 26.6% of the households (see Table 3.13).

Table 3.11
Composition of Registered Vehicles
by Province

Type of Vehicles	Bulacan	Rizal	Laguna	Cavite	Total
Cars	20.1	51.8	18.3	24.6	24.3
Utility Vehicles	41.0	33.9	51.4	47.6	44.5
Buses	1.1	0.3	1.8	3.1	1.5
Trucks	11.3	3.0	7.7	4.1	7.9
Motorcycle/ Tricycle	20.4	10.4	19.2	19.0	18.5
Trailers	6.2	0.6	1.7	1.5	3.2
Total	100.0	100.0	100.0	100.0	100.0

Source: 1983 BLT Statistics

Table 3.12
Vehicle Ownership
(Comparison Within Provinces)

Province	% of Households Owning 4-Wheeled Vehicles	% of Households Not Owning 4-Wheeled Vehicles	% Distribution of Households
Bulacan	25.6	26.8	26.7
Rizal	26.6	26.7	26.7
Laguna	21.4	16.7	17.4
Cavite	26.3	29.7	29.2
Total	100.0	100.0	100.0

Source: 1984 Supplemental HIS

Table 3.13
Vehicle Ownership
(Comparison Across Provinces)

Province	Households Owning 4-Wheeled Vehicles		Households Not Owning 4-Wheeled Vehicles		Total	
	No. of Households	%	No. of Households	%	No. of Households	%
Bulacan	9,789	13.5	62,981	86.5	72,770	100.0
Rizal	10,177	14.0	62,747	86.0	72,924	100.0
Laguna	8,196	17.2	39,322	82.8	47,518	100.0
Cavite	10,049	12.6	29,787	87.4	79,836	100.0
Total	38,211	14.0	234,837	86.0	273,048	100.0

Source: 1984 Supplemental HIS

Of the surveyed households found to be owning 4-wheeled vehicles, majority (70%) own passenger cars and a relatively significant percentage (31%) own jeepneys (see Table 3.14). Among the provinces, Bulacan accounted for the greatest proportion of households owning passenger cars as against households owning jeepneys.

Table 3.14
Vehicle Ownership Ratio by Area

Province/Zone		All 4-wheeled Vehicles		Passenger Car			Jeepney		
		No. of H.H. ^{1/}	% to Total H.H.	No. of H.H. ^{2/}	% to Total H.H.	Average No. Owned/ H.H.	No. of H.H. ^{3/}	% to Total H.H.	Average No. Owned/ H.H.
Bulacan	203	998	13.0	855	11.1	1.0	286	3.7	1.0
	204	616	9.6	616	9.6	1.0	0	0.0	0.0
	205	3,535	15.6	2,992	13.3	1.2	272	1.2	1.0
	206	3,009	15.2	2,053	10.4	1.1	956	4.8	1.0
	207	1,631	10.0	1,359	8.3	1.1	272	1.6	1.0
	Sub-total	9,789	13.4	7,875	10.8	1.1	1,786	2.4	0.8
Rizal	208	1,046	13.5	813	10.6	1.0	349	4.5	1.0
	209	1,048	11.1	655	6.9	1.0	262	2.8	1.5
	210	2,424	18.5	1,855	14.1	1.2	426	3.2	2.0
	211	1,199	11.0	514	4.7	1.0	856	7.8	1.0
	212	1,660	20.2	1,850	14.0	1.2	346	2.6	1.0
	213	1,800	9.7	1,029	5.5	1.4	771	4.1	1.0
Sub-total	10,177	14.0	6,716	9.2	1.1	3,010	4.1	1.3	
Laguna	214	4,397	32.7	2,885	21.4	1.1	1,649	12.2	1.1
	215	3,799	11.2	2,227	6.5	1.7	1,572	4.6	1.0
	Sub-total	8,196	17.2	5,112	10.7	1.4	3,221	6.8	1.1
Cavite	216	3,082	19.2	2,010	12.5	5.5	1,206	7.5	1.3
	217	3,776	11.6	3,357	10.3	1.1	699	2.1	1.0
	218	2,402	21.8	1,413	12.8	1.2	1,130	10.2	1.4
	219	523	5.9	0	0.0	0.0	523	5.9	1.0
	220	266	2.3	133	1.2	1.0	133	1.2	1.0
Sub-total	10,049	12.6	6,913	8.6	1.8	3,691	4.6	1.1	
Grand Total		38,211	14.0	26,616	8.3	1.4	11,708	4.3	1.1

Source: 1984 Supplemental HIS

- 1/ No. of households owning 4 wheeled vehicles; a household may own more than one type of 4-wheeled vehicle
- 2/ No. of households owning passenger car
- 3/ No. of households owning jeepney

However, in terms of vehicle ownership ratio, it is indicated that the typical 4-wheeled vehicle-owning household in Cavite owned more passenger cars (1.8) than its counterparts in the other provinces. This is followed by Laguna, with an average of 1.4 passenger cars owned per household. In the case of jeepney ownership, households in Rizal tend to own more jeepneys (1.3 per household) than those in the rest of the study area.

For the study area as a whole, households with passenger cars and jeepneys owned, on the average, 1.4 cars per household and 1.1 jeepneys per household, respectively. When related with the BLT data on registration, it appears that car ownership from the HIS is overstated and for jeepney ownership understated. Alternatively, it may be that not all cars are registered in the area.

Distribution of households with vehicles by income level is shown on Table 3.15. Of the total 38,211 households owning 4-wheeled vehicles, 14.3% (highest share) of these households earn ₱2,501 to ₱3,000 per month followed by 14.0% belonging to the ₱1,501 to ₱2,000 income bracket. The same pattern of distribution is seen for the jeep and car owning households, although a greater percentage (83.8%) of the car owners reported income of ₱1,500 or more against 64.9% for jeepney owners.

The biggest group of car-owning households (15.7%) fall on the income bracket of ₱2,501 to ₱3,000; for the jeepney owning households (18.8%), the corresponding bracket is ₱1,001 to ₱1,500. Median income for car-owning households is ₱2,838 against ₱1,990 for jeepney owners.

Table 3.15
Distribution of Households with Vehicles
by Income Level

Household Income Level (₱/month)	Households Owning 4-Wheeled Vehicles		Households Owning Jeep/Car		Households Owning Jeepney	
	No. of Households	%	No. of Households	%	No. of Households	%
0 - 500	529	1.4	388	1.5	141	1.2
501 - 1,000	2,952	7.7	938	3.5	1,771	15.1
1,001 - 1,500	5,008	13.1	2,988	11.2	2,196	18.8
1,501 - 2,000	5,342	14.0	3,452	13.0	1,778	15.2
2,001 - 2,500	3,807	10.0	2,716	10.2	953	8.1
2,501 - 3,000	5,452	14.3	4,166	15.7	1,044	8.9
3,001 - 3,500	3,121	8.2	2,696	10.1	425	3.6
3,501 - 4,000	3,413	8.9	2,448	9.2	1,096	9.4
4,001 - 5,000	3,209	8.4	2,406	9.0	676	5.8
5,001 - 7,000	2,799	7.3	2,387	9.0	527	4.5
7,001 - above	2,579	6.7	2,031	7.6	1,101	9.4
TOTAL	38,211	100.0	26,616	100.0	11,708	100.0

Source: 1984 Supplemental HIS

Vehicle ownership in relation to income of the household population is shown in Table 3.16. Expressed in percentages, the table supports the general hypothesis that the higher the income bracket, the more households in that bracket own vehicles (jeep/car and jeepney).

Table 3.16
Vehicle Ownership by Income Level (%)^{1/}
(All Provinces)

Household Income Level (₱/month)	Households Owning 4-Wheeled Vehicles	Households Owning Jeep/Car	Households Owning Jeepney
0 - 500	2.8	2.1	0.8
501 - 1,000	4.0	1.3	2.4
1,001 - 1,500	11.1	6.6	4.9
1,501 - 2,000	13.5	8.7	4.5
2,001 - 2,500	15.4	11.0	3.9
2,501 - 3,000	28.2	21.6	5.4
3,001 - 3,500	21.2	18.3	2.9
3,501 - 4,000	25.8	18.5	8.3
4,001 - 5,000	30.9	23.2	6.5
5,001 - 7,000	30.3	25.8	5.7
7,000 - above	52.0	41.0	22.2

Source: 1984 Supplemental HIS

^{1/} Computed against total number of households per income level

3.3.3 Trip Characteristics

From the standpoint of transportation planning, determinants of the trip characteristics of the study area are the most important outputs of the 1984 Supplemental HIS. The results are presented under five categories, namely: Trip Composition, Trip Generation/Attraction, Trip Rate, Travel Time, and OD Trip Pattern.

A. Trip Composition

The total number of trips determined by the Supplemental HIS for the 4 provinces is 1,222,231 trips. These motorized trips are broken down further by purpose and mode - as shown in Table 3.17. Most of the trips (88.8% of the total) are made via the public transport mode, while the balance of 11.2% or 137 thousand trips occur on private transport. According to purpose, the highest number of trips as expected falls under "To Home" category (586 thousand or 47.9% of all types), followed by "To School" trips (234 thousand or 19.1%) and "To Work" journeys (17.4%).

Detailed analysis of the modal shares according to trip purpose are captured in Table 3.18. For the public mode, jeepneys account for 48.6% of total trips, with tricycle at

23.3% and buses a good third at 15.8%. For the private mode, the car/jeep is preferred among other modes but accounts for only 8.3% of total trips. This is followed by the van/pick up with 2.8% and taxi with 0.1% share.

Table 3.17
Number of Trips by Purpose and Mode 1/
(4 Provinces)

Trip Purpose	M o d e		Total
	Public	Private	
To work	183,776	29,167	212,943
To school	214,649	19,292	233,941
Private	144,872	21,125	165,997
Business	17,577	6,049	23,626
To home	524,344	61,380	585,724
Total	1,085,218	137,013	1,222,231

Source: 1984 Supplemental HIS

1/ Motorized trips only

Table 3.18
Modal Shares per Trip Purpose

Mode	Purpose					Total
	To Work	To School	Pri- vate	Busi- ness	To Home	
Train	2.1	0.1	0.6	4.7	1.2	1.1
Bus	22.7	13.8	10.7	13.7	15.6	15.8
Jeepney	46.6	49.5	49.3	40.9	49.1	48.6
Tricycle	14.9	28.3	26.6	15.5	23.7	23.3
Public Total	86.3	91.8	87.3	74.4	89.5	88.8
Car/Jeep	9.8	5.9	10.4	14.6	7.8	8.3
Taxi	0.1	0.0	0.2	0.8	0.0	0.1
Van/Pick-up	3.8	2.3	2.1	10.2	2.6	2.8
Private Total	13.7	8.2	12.7	25.6	10.5	11.2
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: 1984 Supplemental HIS

The public transport mode maintained a stable share in almost all of the trip categories - showing from 86.3% to 91.8% in 4 to 5 trip purposes. It suffers only a slight reduction in the business trip category as against private mode, although still substantial at 74.4% of the total business trips amounting to 24 thousand. Cars/jeeps and vans/pick-ups mainly account for the balance of the 25.6% under the private mode.

Of the total trips on the public transport mode, almost one-half (48.3%) are home-based. This is followed by school-based trips (19.8%) and by trips to work (16.9%). This distribution is slightly different for the private mode which shows 44.8% for trips-to-home, 21.3% for trips-to-work, and 15.4% for private trips (see Table 3.19).

While the role of taxis and trains are minimal, in the aggregate, their contributions are significant for specific trips related to work, business, and private purpose.

Table 3.19
Trip Composition by Mode

Mode	Purpose					Total
	To Work	To School	Pri- vate	Busi- ness	To Home	
Train	32.6	1.8	7.6	8.1	49.9	100.0
Bus	25.1	16.7	9.2	1.6	47.4	100.0
Jeepney	16.7	19.5	13.8	1.6	48.4	100.0
Tricycle	11.1	23.3	15.5	1.3	48.8	100.0
Public Total	16.9	19.8	13.3	1.6	48.3	100.0
Car/Jeep	20.6	13.7	17.0	3.4	45.3	100.0
Taxi	29.8	0.0	44.5	25.7	0.0	100.0
Van/Pick-up	23.1	15.5	10.1	6.9	44.3	100.0
Private Total	21.3	14.1	15.4	4.4	44.8	100.0
Total	17.4	19.1	13.6	1.9	47.9	100.0

Source: 1984 Supplemental HIS

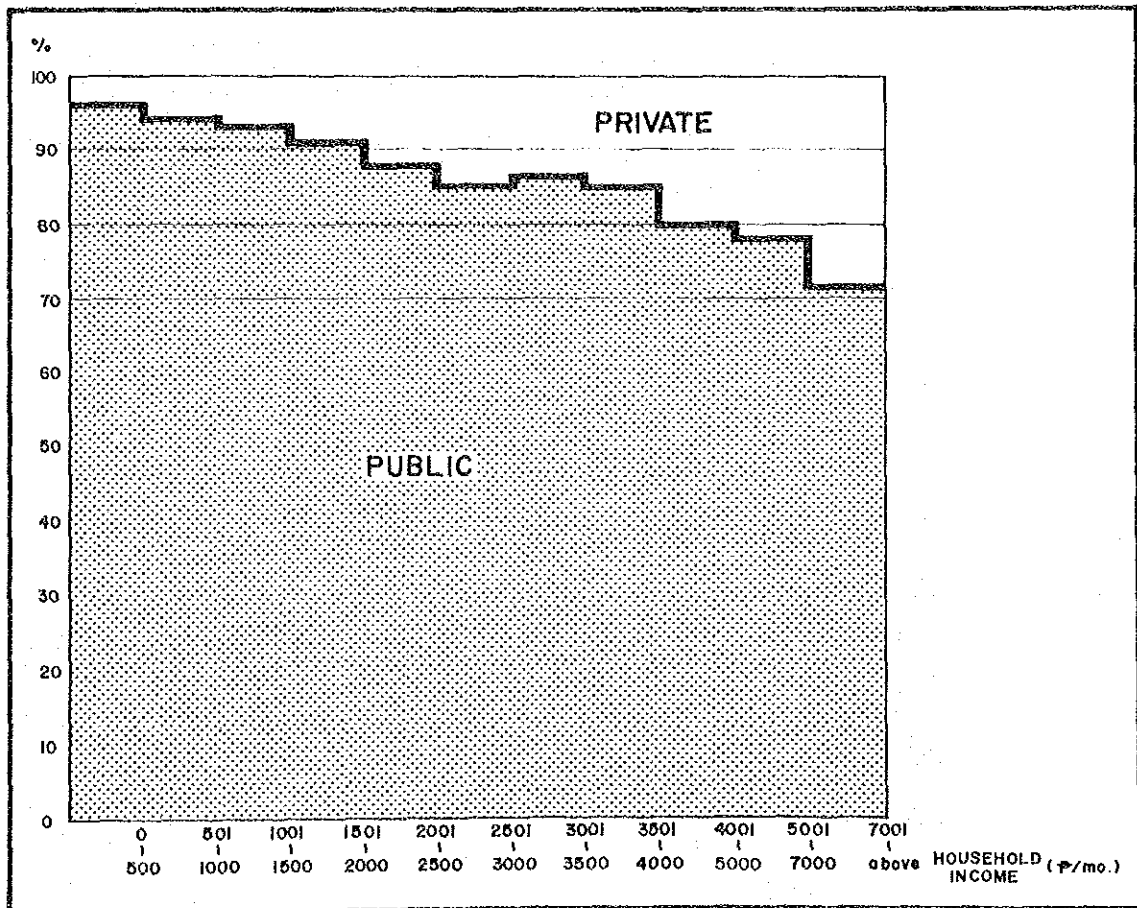
Based on composition of trips by income level, it is generally seen that the public mode occupies a larger share of trips made per income as against the private mode (see Table 3.20). However, a distinct shift or erosion of trips from public to private is noted as the income bracket gets higher. This represents the modal share of both public and private mode per income bracket and is better illustrated by Figure 3.4.

Table 3.20
Trip Composition by Income Level (%)

Income	Train	Bus	Jeep- ney	Tri- cycle	Pub- lic	Car/ Jeep	Taxi	Van/ Truck	Pri- vate	Total
0 - 500	3.5	14.4	47.8	30.4	96.1	3.2	0.0	0.7	3.9	100.0
501 - 1,000	1.5	11.9	52.1	28.7	94.3	3.7	0.1	1.9	5.7	100.0
1,001 - 1,500	0.5	12.8	55.2	24.5	93.0	4.0	0.0	2.9	7.0	100.0
1,501 - 2,000	1.8	18.7	45.0	25.8	91.3	5.1	0.1	3.6	8.7	100.0
2,001 - 2,500	0.7	14.9	57.6	15.4	88.7	8.2	0.0	3.2	11.3	100.0
2,501 - 3,000	0.4	17.8	42.3	24.2	85.3	10.9	0.0	3.9	14.7	100.0
3,001 - 3,500	0.0	15.5	46.7	24.0	86.1	11.4	0.2	2.3	13.7	100.0
3,501 - 4,000	1.7	21.0	43.9	18.8	85.5	12.7	0.0	1.9	14.5	100.0
4,001 - 5,000	0.8	16.4	44.2	19.1	80.5	18.2	0.2	1.0	19.5	100.0
5,001 - 7,000	0.9	20.5	39.3	17.9	78.6	15.6	0.3	5.4	21.4	100.0
7,001 - above	2.9	17.5	37.8	14.5	72.6	22.3	0.0	5.0	27.4	100.0
Total	1.1	15.8	48.6	23.3	88.8	8.3	0.1	2.8	11.2	100.0

Source: 1984 Supplemental HIS

Figure 3.4
Modal Split by Household Income Level
(Public vs. Private)



Across all income brackets, the jeepneys emerge as the largest trip providers. Even its lowest share of 37.8% (among households in the ₱7,000 and above category) is larger than cars/jeeps (22.3%). The next preferred mode is the tricycle with percentage shares ranging from 14.5% to 30.4% and the bus with shares ranging from 11.9% to 21.0%. On the whole, distribution of trips for the public modes follow a tapering pattern as the income scale increases.

On the other hand, the distribution of trips for the private modes, particularly the car/jeep, generally follow an expanding pattern as the income scale increases.

The distribution of trips via the public transport mode is clustered around (60.9% of total) the income groups ₱500 and ₱2,500 (see Table 3.21). On the other hand, trips on the private mode tend to converge around the income range ₱1,500 to ₱3,500 - accounting for 44.1% of all households using this mode.

Table 3.21
Distribution of Trips by
Public and Private Modes (%)

Household Income (₱/month)	Mode		Total
	Public	Private	
0 - 500	3.6	1.2	3.4
501 - 1,000	18.8	9.0	17.7
1,001 - 1,500	16.8	9.9	16.0
1,501 - 2,000	15.1	11.4	14.7
2,001 - 2,500	10.2	10.3	10.2
2,501 - 3,000	8.6	11.8	9.0
3,001 - 3,500	8.3	10.6	8.6
3,501 - 4,000	6.5	8.7	6.7
4,001 - 5,000	5.0	9.5	5.5
5,001 - 7,000	4.4	9.5	5.0
7,001 - above unknown	2.7	7.9	3.2
Total	100.0	100.0	100.0

Source: 1984 Supplemental HIS

B. Trip Generation and Attraction

The trip generation and attraction of the 18 zones of the study area are shown in Table 3.22. Cavite has the most number of trips generated and attracted, with a share of 32.8% of total trips in all four provinces. Laguna has the least share at 18.5%, although this can be attributed to the smaller number of zones covered by the HIS in this particular province. Examining the trips generated and attracted on a per zone basis, it is indicated that zone 217 has the highest

number of trips (both in generation and attraction), with 15.4% of total trips while zone 215 has the second highest, accounting for 13% of total trips. This may be partly due to the fact that these zones cover several municipalities/areas - Kawit, Noveleta, Rosario and Cavite City in the case of zone 217 and Biñan, Sta. Rosa and Cabuyao for zone 215 - unlike most other zones which only cover one municipality/area each.

Table 3.22
Trip Generation/Attraction of the Surveyed Areas (000)

Province/Zone		Generation	Attraction	Total	%
Bulacan	203	25,695	25,161	50,856	2.6
	204	22,185	21,227	43,412	2.2
	205	103,139	104,016	207,155	10.6
	206	67,349	65,922	133,271	6.8
	207	41,903	40,835	82,738	4.2
	Sub-total	260,271	257,161	517,432	26.4
Rizal	208	22,913	22,091	45,004	2.3
	209	28,361	29,322	57,683	2.9
	210	33,139	32,924	66,063	3.4
	211	30,073	29,570	59,643	3.0
	212	47,059	46,586	93,645	4.8
	213	57,940	57,733	115,673	5.9
Sub-total	219,485	218,226	437,711	22.3	
Laguna	214	54,542	53,850	108,392	5.5
	215	127,378	127,698	255,076	13.0
	Sub-total	181,920	181,548	363,468	18.5
Cavite	216	49,541	49,044	98,585	5.0
	217	151,621	151,062	302,683	15.4
	218	58,629	57,604	116,233	5.9
	219	35,396	35,829	71,225	3.6
	220	27,997	27,793	55,790	2.8
	Sub-total	323,184	321,322	644,516	32.8
Grand Total		984,860	978,267	1,963,127	100.0

Source: 1984 Supplemental HIS

The composition of the generated trips in the surveyed areas follow the previously observed pattern of high numbers of home-based trips where percentage shares range from 23.3% to 45% for all zones, while the rest of the trips appear to be well-distributed across the zones. There are, however, notable exceptions. School-bound trips are dominant among all purposes in Obando and Montalban. In Bacoor, the highest trip purpose is work-related at 33% of total.

The general pattern of trip attractions by purpose is almost similar to distribution of trip generations in the different zones. The notable deviation is the bigger share of home-bound trips which is roughly more than 50% (see Table 3.23).

Table 3.23
Trip Generation/Attraction Composition
by Trip Purpose

Province/Zone		Generation (%)					Attraction (%)				
		To Work	To School	Pri-vate	Busi-ness	To Home	To Work	To School	Pri-vate	Busi-ness	To Home
Bulacan	203	26.1	28.7	15.8	5.5	23.9	4.6	14.1	3.2	1.2	76.9
	204	28.7	15.3	14.2	3.2	38.4	17.5	12.0	14.2	2.7	53.6
	205	18.3	17.5	18.2	4.8	41.1	12.1	14.7	14.9	3.2	55.3
	206	20.7	27.4	11.8	0.8	39.3	11.1	20.1	9.8	0.6	58.4
	207	25.6	32.5	9.1	0.3	32.5	10.4	19.2	4.3	0.3	65.7
	Sub-total		21.8	23.4	14.5	3.0	37.3	11.3	16.5	10.7	1.8
Rizal	208	26.1	29.4	17.5	3.7	23.3	4.8	12.5	9.0	0.0	73.8
	209	27.4	20.3	21.4	2.2	28.7	7.9	9.1	11.2	1.5	70.4
	210	26.0	26.3	15.6	1.7	30.4	10.3	11.4	12.1	1.0	65.2
	211	24.0	19.2	21.2	4.5	31.0	14.8	8.2	7.9	4.0	65.2
	212	13.9	19.3	20.9	4.1	41.8	10.5	13.0	20.0	1.9	54.7
	213	25.3	23.6	15.0	1.9	34.2	12.5	12.4	11.9	1.3	61.8
Sub-total		23.1	22.7	18.3	2.9	33.0	10.7	11.4	12.7	1.6	63.6
Laguna	214	26.0	26.3	9.9	2.6	35.2	14.4	14.5	7.6	2.2	61.3
	215	20.7	22.5	11.2	0.5	45.0	12.4	23.7	10.8	0.8	52.2
	Sub-total		22.3	23.6	10.8	1.1	42.1	13.0	21.0	9.9	1.3
Cavite	216	33.0	30.7	10.7	0.6	25.1	6.8	11.1	7.6	0.2	74.3
	217	14.3	20.9	20.4	1.7	42.6	9.0	16.0	18.0	1.3	55.8
	218	14.0	23.5	17.9	0.2	44.4	5.9	27.2	13.9	0.4	52.6
	219	20.7	26.5	9.1	0.5	43.2	12.0	23.1	7.6	0.8	56.5
	220	26.5	27.2	12.4	3.9	29.9	8.4	17.7	4.9	0.4	68.7
	Sub-total		18.9	24.0	16.5	1.3	39.2	8.4	18.2	13.4	0.8
Grand Total		17.4	19.1	13.6	1.9	47.9	17.4	19.1	13.6	1.9	47.9

Source: 1984 Supplemental HIS

C. Trip Rate

Trip rate measures the relationship of trips and particular segments of the population - categorized by income, age group, zone or trips by purpose. Distribution of trips is arranged by age groups further broken down by purpose (see Table 3.24). The survey shows that "To Work" trips are relatively highest in the employable age groups from 20 to 59 years and "To School" trips for the age groups 7 to 24 years old. The trip

rates for "Private" purpose is widely-distributed across all ages above 15 years but skewed more to the older age brackets. The "Business" trips rates are low ranging from 0.01 to 0.06 and evident only from 20 to 69 age class. "To Home" trip rates are the highest in all age brackets. This conforms with previous findings that there is a preponderance of trips made for this purpose.

Net trip rate indicates the trips made by those who actually travelled, i.e., trip makers. Except for persons above 80 years where net trip rate is 3.73, the net trip for all age groups exceeds 2. On the average, a person who travels is likely to make 2.19 trips per day.

Table 3.24
Trip Rate by Age Group by Purpose

Age Group	Trip Rate ^{1/}						Net ^{2/} Trip Rate	Ratio of Person who Travelled
	To Work	To School	Pri- vate	Busi- ness	To Home	Total		
7- 9	0.00	0.01	0.01	0.00	1.01	2.03	2.26	0.90
10-14	0.01	0.96	0.02	0.00	0.95	1.95	2.27	0.86
15-19	0.07	0.62	0.11	0.00	0.76	1.57	2.15	0.73
20-24	0.31	0.25	0.15	0.01	0.68	1.39	2.11	0.66
25-29	0.47	0.02	0.25	0.05	0.70	1.49	2.16	0.69
30-34	0.44	0.01	0.31	0.05	0.72	1.53	2.15	0.71
35-39	0.46	0.01	0.30	0.06	0.74	1.58	2.23	0.71
40-49	0.39	0.00	0.34	0.05	0.69	1.47	2.19	0.67
50-59	0.27	0.01	0.35	0.06	0.61	1.29	2.15	0.60
60-69	0.09	0.00	0.32	0.04	0.40	0.86	2.15	0.40
70-79	0.02	0.00	0.21	0.00	0.23	0.45	2.05	0.22
80-over	0.02	0.00	0.18	0.00	0.21	0.41	3.73	0.11
Total	0.26	0.29	0.20	0.03	0.72	1.51	2.19	0.69

Source: 1984 Supplemental HIS

1/ Trip rate is calculated against total population per age group

2/ Net trip rate is calculated against total number of persons who actually made trips

The last column of Table 3.24 gives the ratio of those who travelled to the number of persons in that age group. The lower ratios are found in the above 60 years age brackets which indicate that there is less trip activities in the older age class.

D. Hourly Distribution of Trips

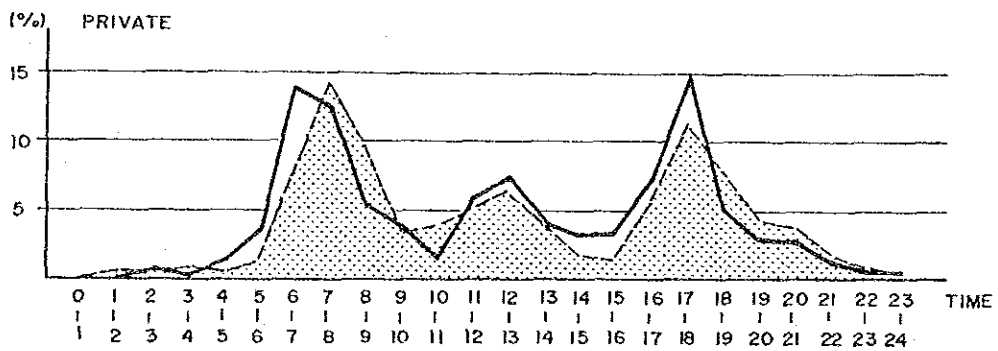
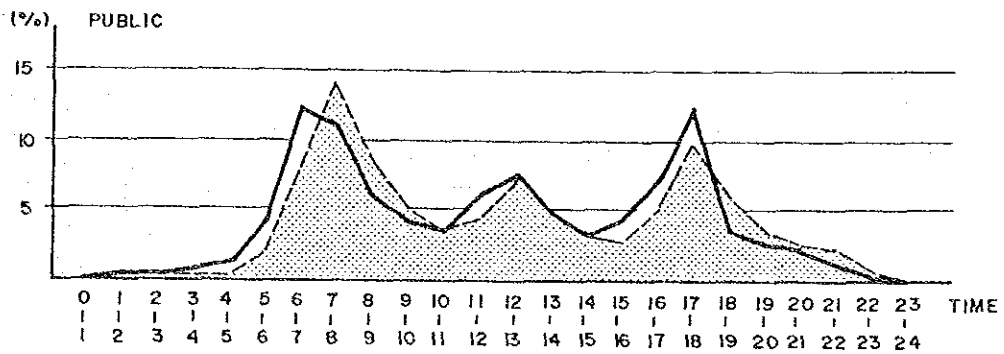
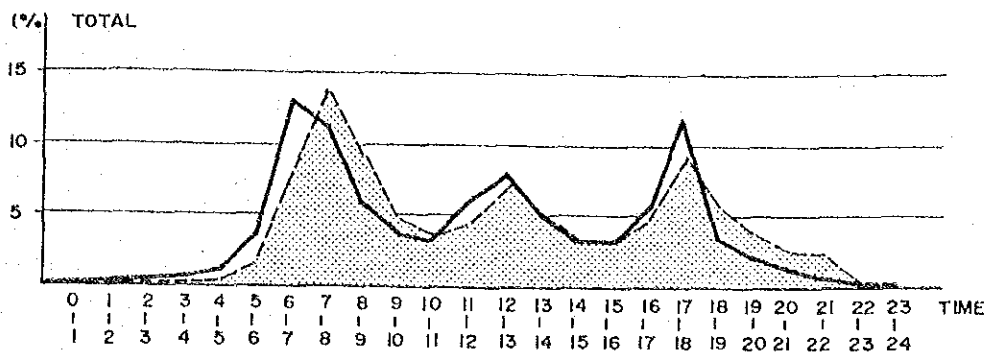
The number of trips in the study area has been examined also in terms of the hourly variation over a 24-hour duration. Generally, the same pattern of hourly fluctuation is observed in both trip generation and attraction. Three peak hours are shown in Figure 3.5, namely: 6:00 - 8:00 a.m., 12:00 - 1:00 p.m., and 5:00 - 6:00 p.m. However, a slight time delay is seen in the morning peak hour of the generated (at 6:00 - 7:00 a.m.) against attracted (at 7:00 - 8:00 a.m.) trips. Furthermore, the peak volume of the former is lower than the latter in the morning, but reverses in the evening.

Further differentiation of hourly fluctuation has been made for both the public and private modes. The former reflects similarity to the overall trip distribution. Trips by private modes are slightly different in that the peak of generated trips in the evening is a little higher than the morning peak. The trips attracted using private modes have similar hourly flow as that of the public modes for the three peak periods.

The hourly distribution of trips according to purpose are shown in Figure 3.6. It is evident from the graphs that the "peaks" of the various trip purposes are unique - they differ from each other. Work trips tend to peak around 8:00 a.m., while school trips are an hour early at 7:00 a.m. A second peak recurs for school trips at around 1:00 to 2:00 p.m. with only one-third (1/3) of the morning peak volume. "To Home" trips rise steeply at 6:00 p.m. with a minor jump at 1:00 p.m. Private and business trips exhibit greater variability during the day with multiple peaks but their largest concentration is between 8:00 to 10:00 p.m. The public and private modes also differed substantially in their peaks for these two trip purposes.

E. OD Trip Pattern

To capture the direction of trip movements for the surveyed areas, they were further aggregated. The volume of trips by direction is summarized in Table 3.25 and shown in Figure 3.7. Four major types of trip flow emerge, namely: Trips between Metro Manila and each adjoining area, trips between two adjoining areas, trips made within each adjoining area, and trips between the external areas and the adjoining areas. The trip volumes under these 4 categories suggest that Cavite and Laguna are not as dependent to Metro Manila as they would appear. Internal trips (71% of total) are significantly more than those linked to Metro Manila (29%). To a considerable extent, the same can be said for Bulacan and Rizal.

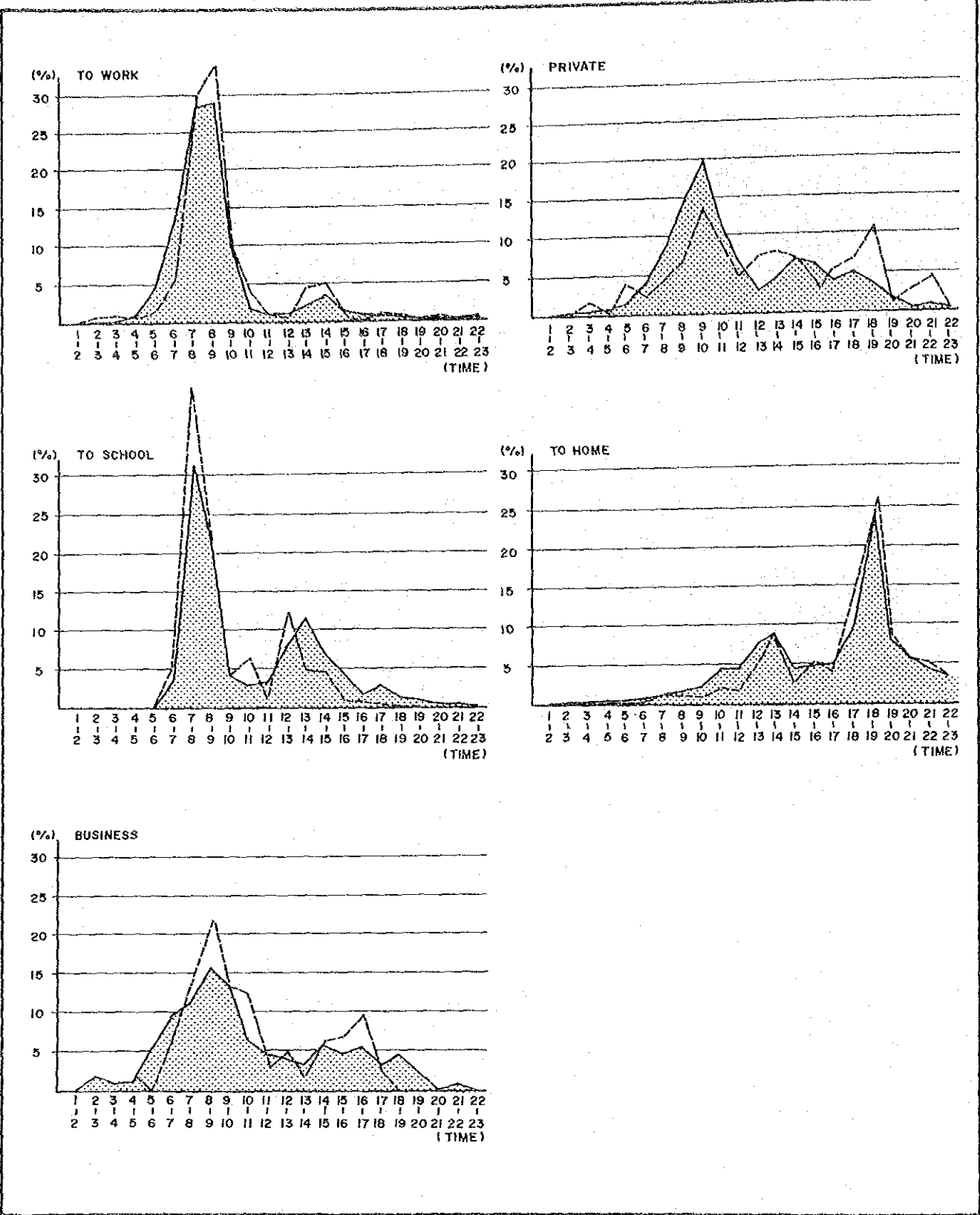


LEGEND :

- GENERATION
- ▨ ATTRACTION

SOURCE : 1984 SUPPLEMENTAL HIS

Figure 3.5
Hourly Distribution of
Trip Generation/Attraction



LEGEND:

- PUBLIC
- PRIVATE

SOURCE: 1984 SUPPLEMENTAL HIS

Figure 3.6
Hourly Distribution of
Trips by Trip Purpose

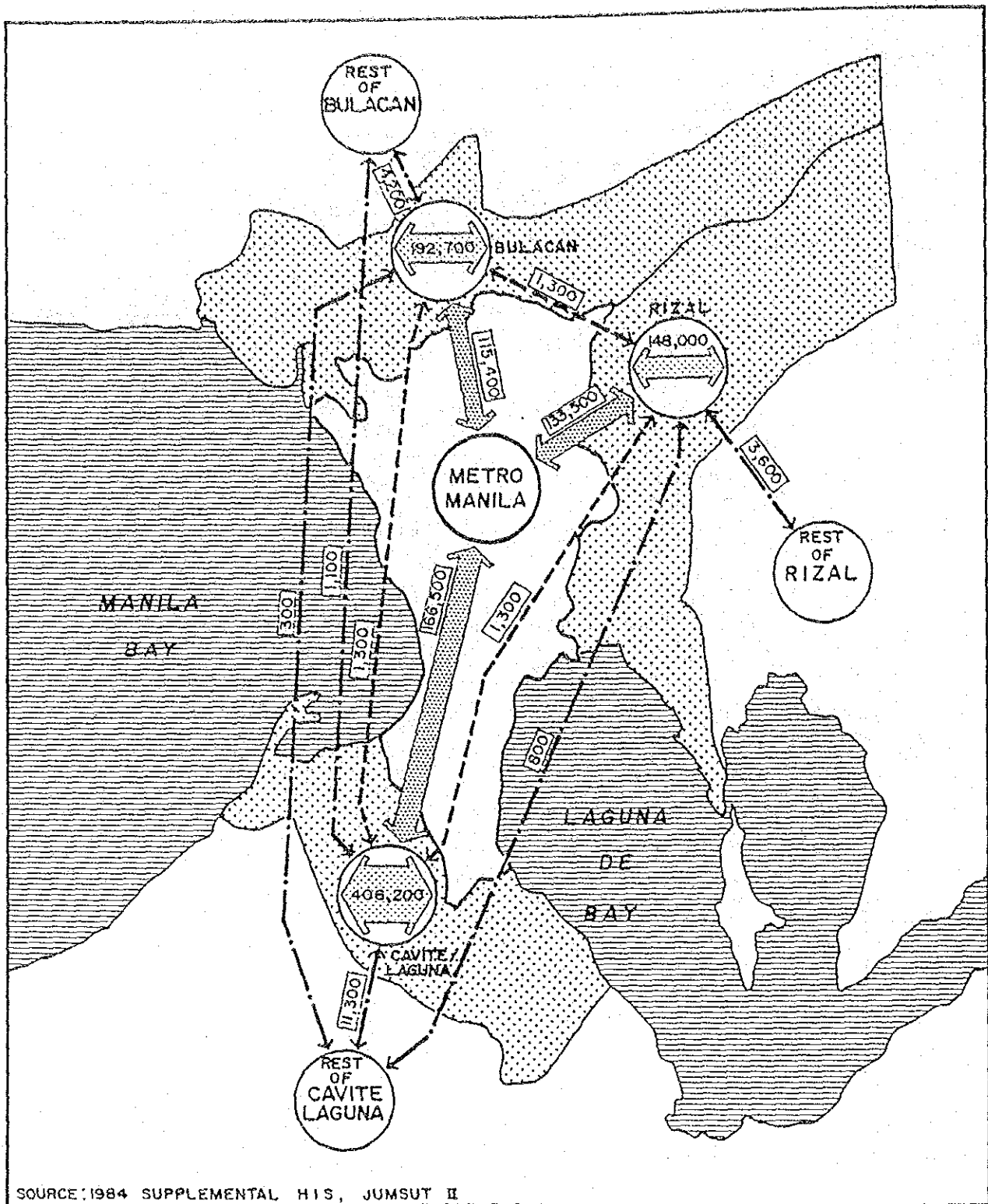
A sizeable volume, however, is noticeable between Metro Manila and the southern areas. This is partly due to the extensive land developments toward the southern portion of Metro Manila which attract and generate more trips. For another, the population of these areas (Laguna and Cavite combined) is larger than the northern and eastern areas. The 1984 Cordonline Survey also found the same trip pattern between Metro Manila and its adjoining areas.

The total number of trips recorded in the OD table (Table 3.25) is 1,208,161 which is less than the 1,222,231 actual trips made. This is due to the exclusion of trips made on the railways (train) since the primary focus of analysis is the trips made on roads by both public and private modes. For completeness, an additional 3 external zones were included to the gross zoning system of 7 for a total of 10. Thus, zone 8 is the external areas further up north (of the surveyed areas) of Metro Manila, zone 9 is the eastern areas and zone 10 is the external areas at the southernmost tip.

Table 3.25
OD Traffic Volume of Resident of the
Adjoining Areas, Public and Private

O \ D	No. of Trips/Day							Total
	Metro Manila	Adjoining Areas			Rest of Bulacan Province	Rest of Rizal Province	Rest of Cavite/Laguna Province	
		Bulacan	Rizal	Cavite/Laguna				
M. Manila	20,350	56,202	66,157	82,409	0	0	83	225,201
5	59,169	192,716	739	433	2,359	0	0	255,416
6	67,345	564	147,962	685	0	1,815	448	218,819
7	84,120	826	570	406,208	568	0	5,662	497,954
8	0	1,819	0	568	0	0	0	2,387
9	0	0	1,792	0	0	0	0	1,792
10	210	331	340	5,603	0	0	108	6,592
Total	231,194	252,458	217,560	495,906	2,927	1,815	6,301	1,208,161

Source: 1984 Supplemental HIS



SOURCE: 1984 SUPPLEMENTAL HIS, JUMSUT II

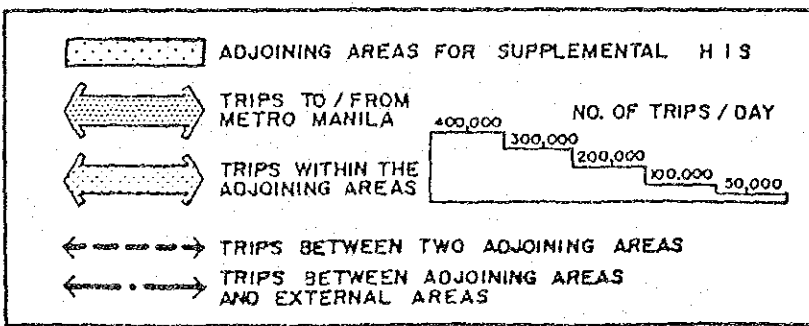


Figure 3.7
Person Trip Flow by
Residents of the Adjoining
Areas of Metro Manila
(1984 HIS)

4.0 CHANGES IN THE TRAFFIC SITUATION

4.1 GENERAL

The volume of vehicles and passengers primarily dictates road traffic conditions. Hence, the need for constant gathering and analysis of pertinent data. JUMSUT II conducted the 1984 screenline and cordonline surveys with this objective in mind and to supplement other previous transportation surveys, such as the 1980 screenline and cordonline surveys and the 1983 public transportation surveys.

This chapter presents the overall traffic situation with emphasis on the public utility vehicles since short and mid-term rerouting plans evolve around them.

4.2 OVERALL ROAD TRAFFIC

4.2.1 Traffic Volume

Overall road traffic was determined based on a comparison of 1980 and 1984 traffic volumes.

A. Vehicular Volume

In general, vehicular volume showed a slight decrease on screenlines and cordonlines as shown in Table 4.1. However, if we look at each section closely, slight increases were recorded in some sections.

Based on the 1984/1980 ratio of screenline traffic volume, EW East registered a slight increase (4%) in private vehicles only. However, in cordonlines, each section recorded increases either in public or private modes as follows: North and south had increases in private vehicles (8% and 53%, respectively) and each, in public vehicles (2%). It should be noted that the general increase in private vehicles in cordonlines is due to increased development activities in the south.

The breakdown of 1980 and 1984 screenline/cordonline traffic volume by station is shown in Appendix 4.1.

Table 4.2 shows the changes in bus and jeepney traffic volume. The volume of jeepneys decreased on all sections by 3 -26%. The volume of buses, on the other hand, decreased as a whole. It is, however, noted that it increased on cordonline south by 16%.

Table 4.1
Changes in Traffic Demand Between 1980 and 1984
(Number of Vehicles/24 Hours)

Section	1984 JUMSUT 2 (000)			1980 MMUTIP (000)			1984/1980 RATIO			
	Public ^{2/}	Private	Total	Public ^{2/}	Private	Total	Public ^{3/}	Private	Total	
SCREENLINE ^{1/}	EW.WEST	79	206	285	88	211	299	0.90	0.98	0.95
	EW.EAST	32	147	179	33	142	175	0.97	1.04	1.02
	Sub-total	111	353	464	121	353	474	0.92	1.00	0.98
	NS.NORTH	83	198	281	86	210	296	0.97	0.94	0.95
	NS.SOUTH	45	221	266	50	224	274	0.90	0.99	0.97
	Sub-total	128	419	547	136	434	570	0.94	0.97	0.96
TOTAL	239	772	1,011	257	787	1,044	0.93	0.98	0.97	
CORDONLINE	NORTH	26	40	66	31	37	68	0.84	1.08	0.97
	EAST	19	23	42	18	25	43	1.06	0.92	0.98
	SOUTH	25	45	70	25	30	55	1.00	1.50	1.27
	TOTAL	70	108	178	74	92	166	0.95	1.17	1.07

1/ Exclusive of the eight (8) new stations surveyed in 1984

2/ Includes jeepneys, buses and tricycles

Table 4.2
Changes in Traffic Demand Between 1980 and 1984
of Buses and Jeepneys
(Number of Vehicles/24 Hours)

Section	1984 JUMSUT 2 (000)			1980 MMUTIP (000)			1984/1980 Ratio			
	Bus	Jpy.	Total	Bus	Jpy.	Total	Bus	Jpy.	Total	
SCREENLINE ^{1/}	EW.WEST	7	73	80	8	80	88	0.88	0.91	0.91
	EW.EAST	9	13	22	9	17	26	1.00	0.76	0.85
	Sub-total	16	86	102	17	97	114	0.94	0.89	0.89
	NS.NORTH	13	69	82	13	72	85	1.00	0.96	0.96
	NS.SOUTH	10	35	45	14	36	50	0.71	0.97	0.90
	Sub-total	23	104	127	27	108	135	0.85	0.96	0.94
TOTAL	39	190	229	44	205	249	0.89	0.93	0.92	
CORDONLINE	NORTH	4	17	21	5	23	28	0.80	0.74	0.75
	EAST	2	14	16	2	15	17	1.00	0.93	0.94
	SOUTH	6	18	24	5	20	25	1.20	0.90	0.96
	TOTAL	12	49	61	12	58	70	1.00	0.84	0.87

1/ Exclusive of the eight (8) new stations surveyed in 1984

B. Passenger Volume

Table 4.3 shows the comparison between 1980 and 1984 passenger traffic volume. In contrast to vehicles, public and private passenger volume generally increased, both on screenlines and cordonlines.

In screenlines, the passenger traffic volume of PUVs increased by 14%, while that of private cars increased by 18%. As a result, the number of passengers using private vehicles increased slightly from 30.0% to 30.6%.

In cordonlines, the passenger volume of PUVs increased only by 4%, while that of private vehicles increased by 10% (with cordonline south showing a 32% increase). The number of passengers using private vehicles, therefore, increased slightly by 1% (from 22.6% to 23.6%).

The increase in passenger traffic volume may be attributed to population growth, considering the recent annual population growth rate of Metro Manila which is 3.0-4.0%.

Table 4.4 shows the changes in bus/jEEPney passenger traffic demand. The highlights of these changes are as follows:

- The total number of bus/jEEPney passengers increased (4 - 19%) on all sections, with the exception of NS screenline south and cordonline east.
- The number of bus passengers increased significantly (5 - 48%) on all sections, with the exception anew of NS screenline south and cordonline east.
- On the other hand, the number of jEEPney passengers decreased both on screenlines and cordonlines.
- In 1984, the number of jEEPney passengers accounted for 54% on screenlines and 51% on cordonlines, although the difference between bus and jEEPney decreased compared with that of 1980.

4.2.2 Hourly Fluctuation of Traffic Volume

A. Vehicular Traffic Volume

Figure 4.1 graphically illustrates the hourly fluctuation of the 1980 and 1984 vehicular traffic volumes on screenlines west, east, north, south.

The hourly fluctuation of EW screenline west (Figure 4.1A) shows that the morning peak hour of 1984 public vehicles is from 7:00 - 8:00 a.m.; while that of 1980 is from 9:00 - 10:00 a.m. Both reflect the same share of traffic volume (8%). The evening peak hour of public vehicles greatly varies between 1980 and 1984: 5:00 - 6:00 p.m. and 8:00 - 9:00 p.m., respectively.

Table 4.3
Changes in Traffic Demand Between 1980 and 1984
(Number of Passengers/24 Hours)

	Section	1984 JUMSUT 2 (000)			1980 MMUTIP (000)			1984/1980 RATIO		
		Public ^{1/}	Private	Total	Public ^{1/}	Private	Total	Public ^{1/}	Private	Total
SCREENLINE ^{2/}	EW.WEST	1,054	441	1,495	1,016	361	1,377	1.04	1.22	1.09
	EW.EAST	664	326	990	559	262	821	1.19	1.24	1.21
	Sub-total	1,718	767	2,485	1,575	623	2,198	1.09	1.23	1.13
	NS.NORTH	1,260	429	1,689	1,241	453	1,694	1.02	0.95	1.00
	NS.SOUTH	752	434	1,186	783	463	1,246	0.96	0.94	0.95
	Sub-total	2,012	863	2,875	2,025	916	2,940	0.99	0.94	0.98
	TOTAL	3,730	1,630	5,360	3,599	1,539	5,138	1.04	1.06	1.04
CORDONLINE	NORTH	343	98	441	320	97	417	1.07	1.01	1.06
	EAST	196	59	255	208	66	274	0.94	0.89	0.93
	SOUTH	373	114	487	345	90	435	1.08	1.27	1.12
	TOTAL	912	271	1,183	873	253	1,126	1.04	1.07	1.05

1/ Do not include passengers of tricycles and others

2/ Exclusive of eight (8) new stations

Table 4.4
Changes in Traffic Demand Between 1980 and 1984
of Buses and Jeepneys
(Number of Passengers/24 Hours)

	Section	1984 JUMSUT 2 (000)			1980 MMUTIP (000)			1984/1980 RATIO		
		Bus	Jpy.	Total	Bus	Jpy.	Total	Bus	Jpy.	Total
SCREENLINE ^{1/}	EW.WEST	254	803	1,054	238	778	1,016	1.07	1.03	1.04
	EW.EAST	541	123	664	365	194	559	1.48	0.63	1.19
	Sub-total	795	926	1,718	603	972	1,575	1.32	0.95	1.09
	NS.NORTH	497	763	1,260	438	803	1,241	1.13	0.95	1.02
	NS.SOUTH	441	311	752	457	326	783	0.96	0.95	0.96
	Sub-total	938	1,074	2,012	895	1,129	2,024	1.05	0.95	0.99
	TOTAL	1,733	2,000	3,730	1,498	2,101	3,599	1.16	0.95	1.04
CORDONLINE	NORTH	183	160	343	140	180	320	1.31	0.89	1.07
	EAST	50	145	196	56	152	208	0.89	0.95	0.94
	SOUTH	209	164	373	186	160	346	1.12	1.03	1.08
	TOTAL	442	469	912	382	492	874	1.16	0.95	1.04

1/ Exclusive of the eight (8) new stations surveyed in 1984

In EW screenline east (Figure 4.1B), the 1984 daily peak hour of public vehicles (7.7%) is at 5:00 - 6:00 p.m. in contrast to that of 1980 (8.0%) which is at 8:00 - 9:00 a.m. From 9:00 - 12:00 noon and from 3:00 - 6:00 p.m., there is quite a notable difference between 1984 and 1980 volumes of private vehicles.

The most significant period in NS screenline north is from 5:00 - 6:00 p.m. (Figure 4.1C). At this hour, 1984 public vehicle volume is at its lowest (4.6%) compared with 1980 which is fairly high (5.8%). In the same manner, private vehicle volume also varies greatly at this hour between 1980 and 1984.

The 1984 hourly fluctuation in NS screenline south generally shows a fairly steady level of vehicular volume. An exception to this is the period from 8:00 a.m. till 10:00 a.m., where the volume of public and private vehicles fluctuates widely. Meanwhile, the 1980 hourly fluctuation of public and private vehicles fluctuates sharply at most periods. Unlike 1984, the volume of public and private vehicles fluctuates widely during evening peak hours.

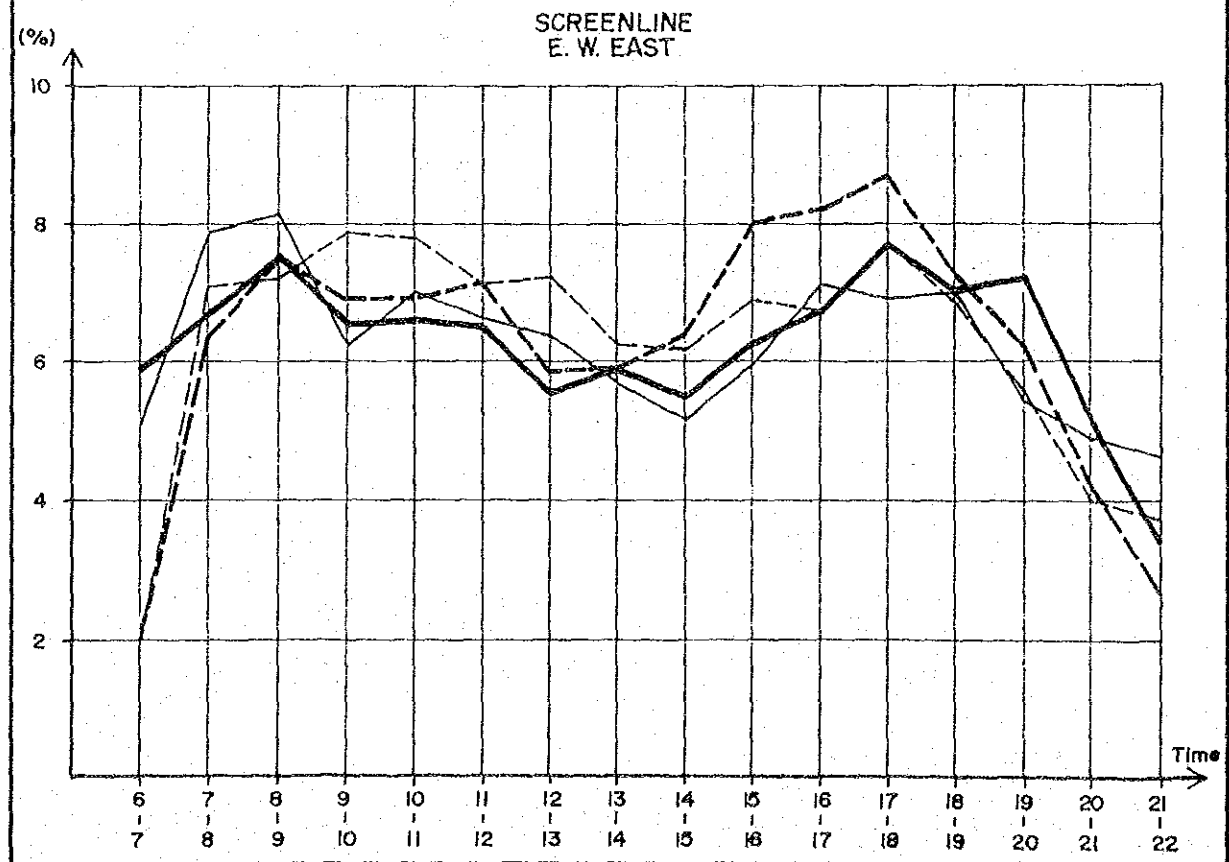
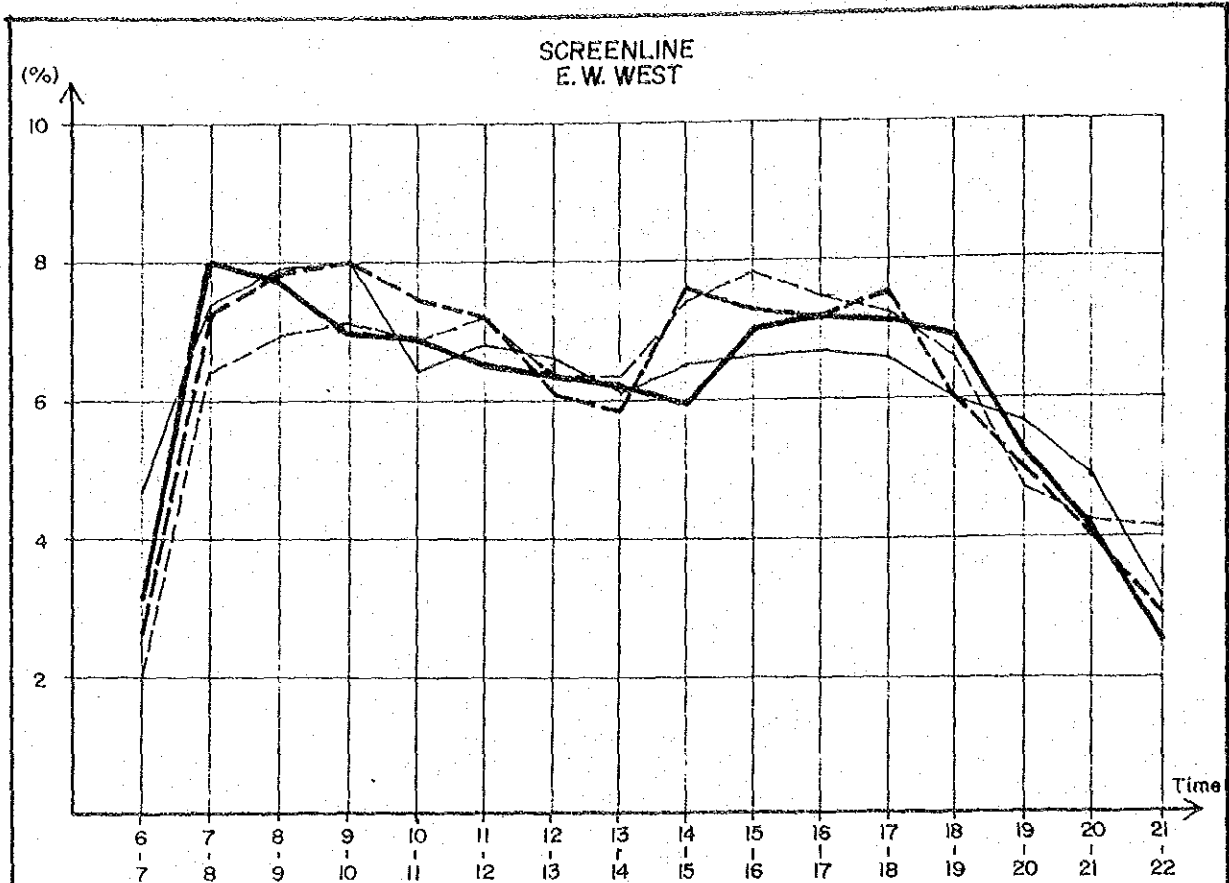
B. Passenger Traffic Volume

The 1980 and 1984 morning peak hours for public passengers range from 7:00 - 9:00 a.m. However, after 9:00 a.m., the 1980 volume of public passengers sharply declines, continuing until the afternoon off-peak hours (12:00 - 3:00 p.m.) and then gradually increases and reaches its evening peak at 6:00 - 7:00 p.m. The 1984 public vehicle volume, on the other hand, shows only a slight decrease after 9:00 a.m. and then slightly increased anew during the afternoon off-peak hours. Private vehicle volume of 1984 during the morning is higher than 1980's at most periods and is about the same level during the afternoon and evening hours. An exception is the period from 5:00 - 6:00 p.m., at which time it fluctuates widely than that of 1980's. This is graphically shown in Figure 4.2A.

The hourly passenger fluctuation of NS screenline is shown in Figure 4.2B. The 1980 and 1984 public passenger volume show a significant share during the morning peak hour (7:00 - 8:00 a.m.). However, the decrease in public passengers is quite noticeable - from 9.8% in 1980 down to 8.0% in 1984. The private vehicle volume, both of 1980 and 1984, starts off with a steady degree of increase and then widely fluctuates at varying degrees, most especially from 4:00 till 6:00 p.m.

4.2.3 Vehicle Composition

The comparison between the 1980 and 1984 vehicle composition is shown in Table 4.5.

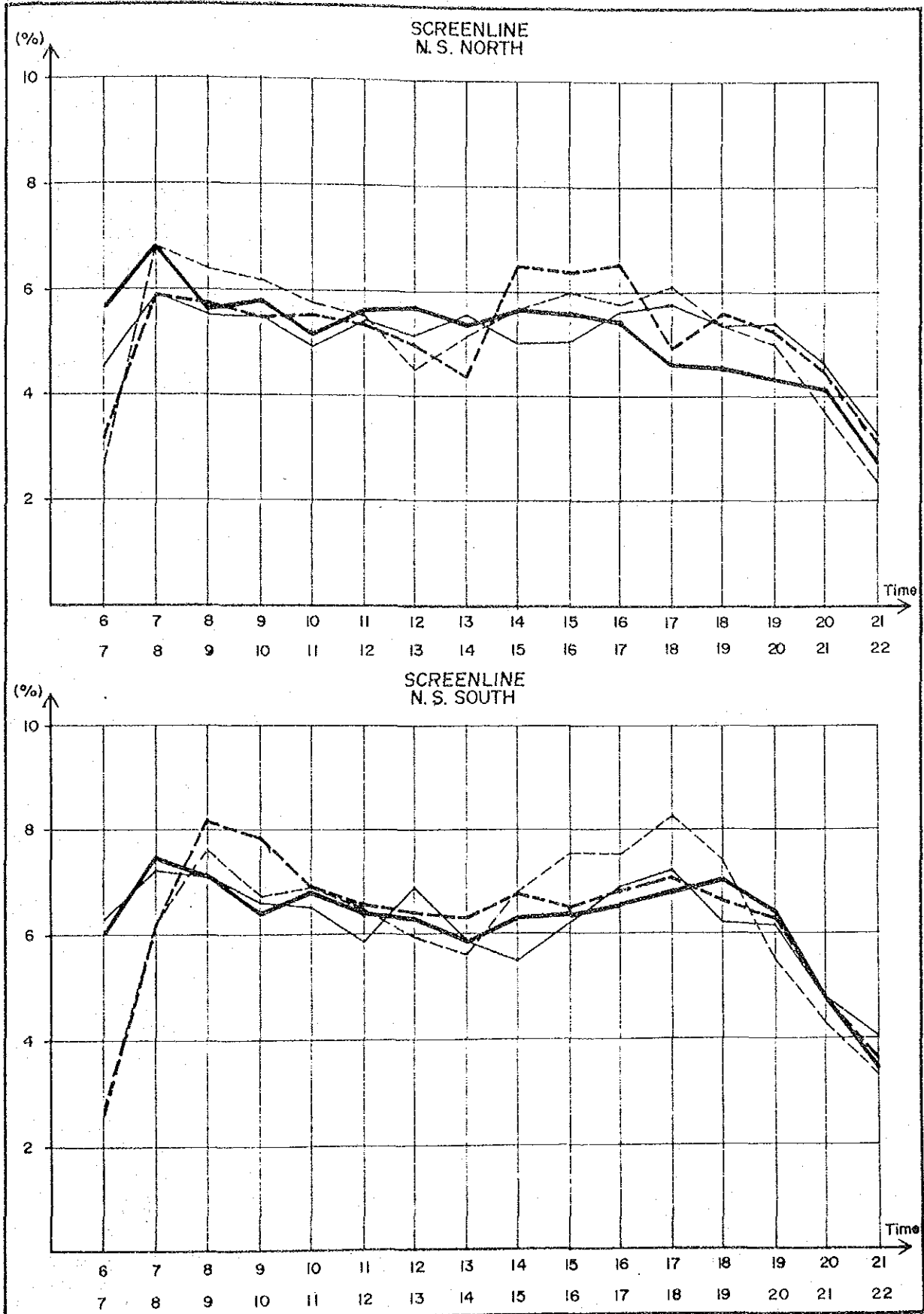


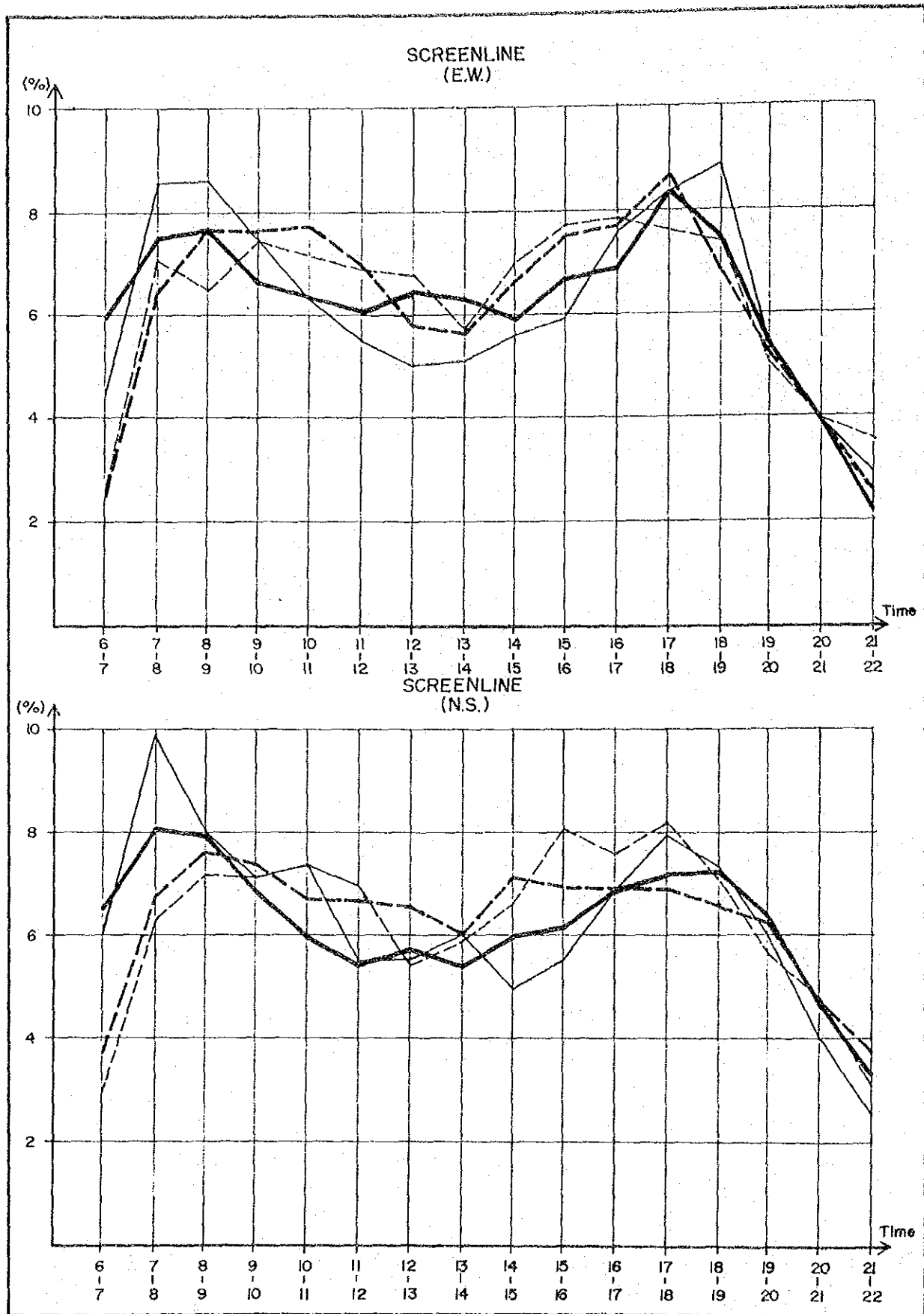
LEGEND:

- | | |
|----------------------|----------------------|
| ——— 1984 PUBLIC | ——— 1980 PUBLIC |
| - - - - 1984 PRIVATE | - - - - 1980 PRIVATE |
- 1/ Exclusive of tricycles, motorcycles, and others.

Figure 4.1
1980 and 1984 Hourly
Fluctuation of Vehicular
Traffic Volume by Model/

(Cont. Figure 4.1)





LEGEND:

- 1984 PUBLIC
 - 1980 PUBLIC
 - - - 1984 PRIVATE
 - - - 1980 PRIVATE
- 1/ Exclusive of passengers of tricycles, motorcycles, and others.

Figure 4.2
1980 and 1984 Hourly
Fluctuation of Passenger
Traffic Volume by Mode 1/

In general, there is a decrease in the number of jeepney units in all sections. This may be attributed to the banning of jeepneys in some stations and to the fact that some operators cannot cope with the high maintenance costs.

As for buses, there is both a decrease and an increase in some sections. In screenline east and north and cordonline south, the volume of buses increased because of increased population and development activities, both public and private. Besides, buses have longer routes which make them popular for long distance travel.

There is a significant increase in the number of tricycles in all sections, emphasizing the role of tricycles as feeders to other modes.

Car/taxi traffic volume decreased on screenlines. However, on cordonline south and north, there was a significant increase in car volume. Trucks and other private modes, in general, increased on most sections.

Table 4.5
Changes in Vehicle Composition Between 1980 and 1984 (%)

Section	1984 JUMSUT 2 (%)					1980 MMUTIP (%)					1984/1980 Ratio					
	Jpy.	Bus	Tri- cycle	Car/ Taxi	Truck/ Others	Jpy.	Bus	Tri- cycle	Car/ Taxi	Truck/ Others	Jpy.	Bus	Tri- cycle	Car/ Taxi	Truck/ Others	
SCREENLINE	EW. WEST	25.5	2.3	0.0	54.1	18.1	26.7	2.7	0.0	55.9	14.6	0.90	0.80	1.25	0.92	1.18
	EW. EAST	7.4	5.3	5.3	64.4	17.6	9.8	5.3	3.8	65.0	16.1	0.78	1.01	1.43	1.02	1.13
	Subtotal	18.5	3.4	2.1	58.1	17.9	20.5	3.7	1.4	59.1	15.1	0.89	0.92	1.43	0.96	1.16
	NS. SOUTH	24.6	4.6	0.4	51.8	18.6	24.5	4.4	0.1	54.5	16.5	0.96	1.00	2.66	0.91	1.07
	NS. SOUTH	13.2	3.6	0.1	67.3	15.8	13.1	5.0	0.1	66.7	15.1	0.97	0.71	1.91	0.98	1.01
	Subtotal	19.0	4.1	0.3	59.3	17.2	19.0	4.7	0.1	60.3	15.9	0.96	0.85	2.45	0.95	1.05
TOTAL	18.8	3.8	1.1	58.8	17.5	19.7	4.2	0.7	59.8	15.5	0.93	0.88	1.51	0.95	1.10	
CORDONLINE	NORTH	26.4	6.7	6.4	35.0	25.5	34.6	6.7	4.0	31.3	23.3	0.74	0.97	1.55	1.09	1.06
	EAST	34.5	3.5	6.8	29.2	26.0	35.7	4.8	2.1	32.6	24.8	0.93	0.71	3.18	0.86	1.01
	SOUTH	25.8	8.6	1.2	41.6	22.7	36.0	9.5	0.5	34.2	19.8	0.92	1.16	3.13	1.56	1.47
	TOTAL	28.0	6.7	4.4	36.3	24.5	35.4	7.1	2.3	32.6	22.5	0.85	1.01	2.03	1.19	1.17

1/ Exclusive of the eight (8) new stations surveyed in 1984

4.2.4 Average Occupancy

The average occupancy of jeepneys, buses and cars is shown in Table 4.6. Generally, the 1984/1980 ratios of average occupancy of jeepneys and buses registered an increase along the screenlines: 3-7% for jeepneys and 8% to as much as 44% for buses. However, decreases were noted in the east for jeepneys and big buses and in the south for minibuses.

Table 4.6
Comparison Between 1980 and 1984 Average Occupancy
by Section on Screenlines

Section	1984 JUMSUT II				1980 MMUTIP				1984/1980 RATIO			
	Jeep- ney	Mini- bus	Big Bus	Car	Jeep- ney	Mini- bus	Big Bus	Car	Jeep- ney	Mini- bus	Big Bus	Car
<u>SCREENLINE</u>												
EW.WEST	11.0	22.8	40.6	2.3	10.0	18.4	28.2	2.2	1.10	1.29	1.44	1.05
EW.EAST	8.6	35.2	37.9	2.3	12.9	32.7	48.2	2.4	0.67	1.08	0.79	0.96
NS.NORTH	10.7	30.8	38.6	2.2	10.4	21.8	35.8	2.3	1.03	1.41	1.08	0.96
NS.SOUTH	9.1	16.3	42.4	2.1	8.5	17.8	37.3	2.1	1.07	0.92	1.14	1.00

4.3 PUV TRAFFIC

4.3.1 Comparison of 1984 Public Traffic Volume with 1980 and 1983

The comparison of vehicular traffic volume by section is shown in Table 4.7. In general, PUVs exhibited a marked tendency to decrease between years 1980 and 1983 and 1980 and 1984. This may be attributed to changes in travel patterns and other major developments in Metro Manila (LRT construction) and in its peripheral areas.

Compared with 1980, jeepneys showed a significant decrease (50%) in screenline east and increase (18%) in screenline north in 1983. However, the volume of jeepneys took the opposite trend in said sections the following year.

The overall volume of buses on screenlines increased in 1983 (12%) and then decreased by the same percentage ratio in 1984 when compared with 1980.

On cordonlines, the PUVs followed the 1983 screenline trend registering a 15% decrease in jeepneys and a very slight increase of 3% in buses. As a result, the overall total recorded a 12% decrease for both modes.

Appendix 4.2 shows a more detailed comparison by station.

4.3.2 Traffic Flow/Distribution

Also from Table 4.7, we can deduce that vehicle traffic flow concentrated in EW screenline west and NS screenline north for both 1980 and 1984. The north-western block undoubtedly generates/attracts the largest traffic volume for both jeepneys and buses. Needless to say, jeepneys account for 83% of the total number in 1980 and 1984, and 79% in 1983.

On cordonlines, the total number of PUVs in 1980 was almost equally distributed in the north and south with 25 thousand and 28 thousand respectively. Vehicles in the east were fairly low at 17 thousand. The same pattern is observed in 1984, but the figures are slightly lower.

Table 4.7
Comparison of Public Utility Vehicle Traffic Volume
on Screenline and Cordonline (ADT)

Section		1980 MUTIP (000)			1983 JUMSUT I(000)			1984 JUMSUT II(000)			1983/1984 Ratio			1984/1980 Ratio		
		Jpy.	Bus	Total	Jpy.	Bus	Total	Jpy.	Bus	Total	Jpy.	Bus	Total	Jpy.	Bus	Total
SCREENLINE	EW. WEST	79.9	8.2	88.1	73.5	6.7	80.2	72.6	6.6	79.1	0.92	0.82	0.91	0.91	0.80	0.90
	EW. EAST	17.1	9.3	26.4	8.7	13.4	22.0	13.3	9.5	22.8	0.51	1.44	0.94	0.78	1.01	0.86
	Sub-total	97.0	17.5	114.5	82.2	20.1	102.3	85.9	16.0	101.9	0.85	1.15	0.89	0.89	0.92	0.89
	NS. NORTH	72.2	13.0	85.2	85.3	14.3	99.6	69.3	13.0	82.3	1.18	1.10	1.17	0.96	1.00	0.97
	NS. SOUTH	36.0	13.6	49.6	28.9	15.1	44.1	35.1	9.7	44.7	0.80	1.11	0.89	0.97	0.71	0.90
	Sub-total	108.2	26.6	134.8	114.2	29.4	143.7	104.4	22.7	127.1	1.06	1.11	1.07	0.96	0.85	0.94
TOTAL		205.2	44.1	249.3	196.4	49.6	246.0	190.3	38.7	229.0	0.96	1.12	0.99	0.93	0.88	0.92
CORDONLINE	NORTH	23.3	4.5	27.9	-	-	-	17.3	4.4	21.7	-	-	-	0.74	0.97	0.78
	EAST	15.4	1.9	17.3	-	-	-	14.4	1.5	15.8	-	-	-	0.93	0.78	0.92
	SOUTH	15.9	5.3	25.1	-	-	-	18.2	6.1	24.3	-	-	-	0.92	1.16	0.97
	TOTAL	58.6	11.7	70.3	-	-	-	49.9	12.0	61.8	-	-	-	0.85	1.03	0.88

5.0 COMPARATIVE ANALYSES OF METRO MANILA AND ITS ADJOINING AREAS

5.1 GENERAL

This chapter presents comparative analyses of demographic and transport characteristics of Metro Manila and its adjoining provinces, namely: Bulacan, Laguna, Rizal and Cavite. Comparison was mainly based on the data derived from the 1980 and 1983 HIS for Metro Manila and the 1984 Supplemental HIS for adjoining areas. However, other supplementary socio-economic data from the NCSO and BLT were also used.

5.2 DEMOGRAPHY

A. Population

Opposite trends can be detected in the population growth of Metro Manila as against its adjoining provinces (see Table 5.1). From 1970 to 1975, the compounded annual population growth rate of Metro Manila was higher compared to those of its adjoining areas, except Rizal province. These rates, however, decreased from 1975-1980 while those of the peripheral provinces, except Rizal, either remained the same or increased and exceeded the growth rate of Metro Manila. Despite the slight decrease from 1975 to 1980, Rizal still exhibited the highest population growth rate among the areas.

Table 5.1
Changes in Trends in Population Growth
of Metro Manila and its Adjoining Areas
(1970, 1975, 1980)

Area	1970	1975	1980	Annual Growth (%)	
				1970-75	1975-80
Metro Manila	3,964	4,970	5,927	4.6	3.6
Adjoining Areas:	2,265	2,746	3,396	3.9	4.3
- Bulacan	738	900	1,096	4.0	4.0
- Laguna	700	804	973	2.8	3.9
- Rizal	307	414	556	6.2	6.0
- Cavite	520	628	771	3.8	4.2

Source: NCSO

1/ Population figures for 1970, 1975 and 1980 are given in thousands (000)

The composition of the population by age group indicates slightly differing characteristics between Metro Manila and its adjoining areas (see Table 5.2). Although the greatest majority of the people in both areas belong to the working age group (15-59 years old), there is a higher concentration of working age population in Metro Manila (60.4%) than in the adjoining provinces (54.5%). Furthermore, the median age is higher in Metro Manila (20.6 years) than in the peripheral areas (18.7).

Except for the age brackets under 14, the male/female ratios in the adjoining areas are higher than that of Metro Manila. This means that a greater proportion of people in the adjoining provinces are male.

Table 5.2
Comparison of Population by Age Group
Between Metro Manila and its Adjoining Areas

Age Group	Population (both sexes) ^{1/}				Male/Female Ratio	
	Metro Manila (%)		Adjoining Areas (%)		Metro Manila	Adjoining Areas
under 1	211	3.6	123	3.6	1.19	1.00
1 - 4	645	10.9	404	11.9	1.20	1.10
5 - 9	653	11.0	435	12.8	1.16	1.00
10 - 14	614	10.4	405	11.9	1.08	1.00
15 - 19	720	12.1	364	10.7	0.81	0.96
20 - 24	762	12.9	343	10.1	0.81	0.96
25 - 29	627	10.6	298	8.8	0.85	0.98
30 - 34	458	7.7	240	7.1	0.90	1.00
35 - 39	300	5.1	173	5.1	0.88	1.00
40 - 44	255	4.3	146	4.3	0.84	0.99
45 - 49	191	3.2	114	3.4	0.82	0.97
50 - 54	154	2.6	94	2.8	0.80	0.94
55 - 59	111	1.9	75	2.2	0.74	0.87
60 - 64	84	1.4	62	1.8	0.70	0.88
65 - 69	63	1.1	54	1.6	0.67	0.86
70 - 74	39	0.7	31	0.9	0.73	0.87
75 over	38	0.6	35	1.0	0.66	0.90
TOTAL	5,925	100.0	3,396	100.0	0.93	0.99

Source: 1980 NCSO Census

1/ Population is given in thousands (000)

Inasmuch as the four provinces have bigger percentage shares of the primary and secondary sector as compared to Metro Manila, the former still reflects an urban character with 55.0% of its working population employed in the tertiary sector (see Table 5.3). (For a more detailed comparative analysis on employment between 1984 Supplemental HIS and NCSO data, see Appendix 5.1)

Table 5.3
Comparison of Employment by Industry Sector
Between Metro Manila and its Adjoining Areas (%)

Industry Sector	Supplemental HIS Survey Areas					Metro Manila ^{1/}
	Bulacan	Rizal	Laguna	Cavite	Total	
Primary	6.9%	4.2%	6.9%	8.0%	6.5%	0.5%
Secondary	39.1	44.7	41.3	30.1	38.5	29.1
Tertiary	54.0	51.2	51.8	61.9	55.0	70.4
TOTAL (%)	100.0	100.0	100.0	100.0	100.0	100.0
(Net in 000)	118	117	84	122	443	1,786

Source: HIS analysis

^{1/} Derived from 1980 HIS

The comparison of Metro Manila and its adjoining areas in terms of day and night population of their residents alone show that both study areas have more people recorded during the night than in day time. The former has a higher ratio of 0.99 as compared to the latter with only 0.82 ratio of day-to-night population. This could be interpreted to mean that the activities of the residents of Metro Manila are centered more within its area; activities of residents in adjoining areas occur outside to a greater degree. However, based on the total population day and night count, regardless of residence, shows that Metro Manila has more attraction during the day with a day-to-night ratio of 1.04 as against the adjoining areas' 0.85 ratio.

Table 5.4
Comparison of Daytime and Nighttime Population
Between Metro Manila and its Adjoining Areas

Area	Population		Ratio of Day to Night Population
	Nighttime	Daytime	
Metro Manila ^{1/}	4,796,401	4,764,346	0.99
Adjoining Areas ^{2/} :	1,197,930	984,255	0.82
- Bulacan	314,101	258,065	0.82
- Rizal	317,499	249,193	0.78
- Laguna	210,371	182,619	0.87
- Cavite	355,959	294,378	0.83

^{1/} Derived from 1980 HIS

^{2/} Derived from 1984 HIS

B. Household Characteristics

Households in both study areas exhibit similar characteristics - such as household size which is between 5.4 to 5.6 persons and household distribution by income level which has the same tapering pattern as income increases. Households earning above ₱2,000/month are more prevalent in the adjoining areas (35.5% of households) than in Metro Manila (22.3%).

However, direct comparison of household population by income levels for Metro Manila and the adjoining areas may not be accurate since the data for the former was derived in 1983 and the latter in 1984.

Table 5.5
Comparison of Household Population
Between Metro Manila and its Adjoining Areas

Area	No. of Households	Ave. No. of Persons/Households
Metro Manila	1,103,563	5.4
Adjoining Areas:	3,396,003	5.6
- Bulacan	1,096,046	5.6
- Rizal	555,533	5.6
- Laguna	973,104	5.5
- Cavite	771,320	5.6

Source: 1980 NCSO Census

Table 5.6
Comparison on the Distribution of Households
by Income Level Between Metro Manila and its Adjoining Areas (%)

Income Level (₱/mo.)	Adjoining Areas ^{1/}					Metro ^{2/} Manila
	Bulacan	Rizal	Laguna	Cavite	Total	
0 - 500	6.4	6.4	7.2	7.4	6.8	7.1
501 - 1,000	26.1	26.8	24.1	28.9	26.7	36.5
1,001 - 1,500	19.2	18.0	13.9	14.1	16.5	21.1
1,501 - 2,000	15.4	16.0	14.3	12.4	14.5	13.2
2,001 - 2,500	9.0	8.9	9.0	9.3	9.1	7.4
2,501 - 3,000	5.8	8.4	7.0	7.0	7.1	5.1
3,001 - 3,500	6.1	5.0	4.5	5.6	5.4	1.9
3,501 - 4,000	3.9	3.2	6.0	6.6	4.9	1.7
4,001 - 5,000	3.2	3.2	4.6	4.5	3.8	1.8
5,001 - 7,000	3.2	2.8	4.5	3.4	3.4	2.0
7,001 - above	1.3	1.2	5.1	0.9	1.8	2.3
Total Households	72,770	72,924	47,518	79,836	273,048	1,103,502

1/ Derived from 1984 Supplemental HIS

2/ Derived from 1983 Supplemental HIS

To get a fair comparison, the HIS results on average household income for the adjoining areas were deflated to 1980 and 1983 conditions (see Table 5.7). Under similar conditions, the households of Metro Manila exhibited higher average income of ₱1,152 for 1980 and ₱1,601 for 1983, about 30-31% more than the adjoining areas. Among the surveyed areas, Laguna appears to be wealthier with an average household income of ₱1,486/month in 1983.

Table 5.7
Comparison of Average Household Income
Between Metro Manila and its Adjoining Areas

Area	1980 Money Values ^{1/}	1983 Money Values ^{2/}	1984 HIS Results
Metro Manila	₱ 1,152	₱ 1,601	-
Adjoining Areas	₱ 885	₱ 1,225	₱1,954
- Bulacan	826	1,129	1,875
- Rizal	861	1,208	1,846
- Laguna	1,058	1,486	2,270
- Cavite	902	1,266	1,934

Source: JUMSUT II Surveys

- 1/ Money value for Metro Manila was derived from 1980 HIS and those for adjoining areas were deflated using NEDA Consumer Price Index (1980 = 100)
- 2/ Value for Metro Manila was derived from 1983 HIS and those for adjoining areas were deflated using NEDA Consumer Price Index (1983 = 100)

5.3 VEHICLE OWNERSHIP

BLT statistics on registered vehicles provide the extent of vehicle concentration in Metro Manila. It has approximately four times the combined number of registered vehicles of Bulacan, Rizal, Laguna, and Cavite (see Table 5.8). By type, the greatest number of vehicles are cars (46.5%), followed by utility vehicles (35.1%). Rizal exhibits a similar distribution pattern as Metro Manila, while in the other 3 provinces, more utility vehicles than any other type are registered. On a per capita basis, Metro Manila has 77.5 vehicles per thousand population (estimate for 1983) as against 29.0 in the adjoining areas. The rate of motorization is highest in Bulacan among the 4 provinces, with a ratio of 34.6 and least in Cavite with only 20.8 registered vehicles per 1,000 persons.

Table 5.8
Comparison on the Number of Registered Vehicles
Between Metro Manila and its Adjoining Areas (%)

Type of Vehicles	Adjoining Areas					Metro Manila
	Bulacan	Rizal	Laguna	Cavite	Total	
Cars	20.1	51.8	18.3	24.6	24.3	46.5
Utility Vehicles	41.0	33.9	51.4	47.6	44.5	35.1
Buses	1.1	0.3	1.8	3.1	1.5	1.0
Trucks	11.3	3.0	7.7	4.1	7.9	6.8
Motorcycle/ Tricycle	20.4	10.4	19.2	19.0	18.5	9.3
Trailers	6.2	0.6	1.7	1.5	3.2	1.2
Total ^{1/}	46,672	14,413	36,346	18,100	111,531	510,504

Source: 1983 BLT Statistical Report

^{1/} Total number of vehicles registered

Likewise, there are more households (13.2% of total) owning cars in Metro Manila than in the four adjoining provinces, where only 8.3% of the households own cars (see Table 5.9). In all income categories, Metro Manila households showed greater rate of car ownership.

Table 5.9
Comparison of Car Ownership by Income Level
Between Metro Manila and its Adjoining Areas (%)

Average Household Income (P/mo.)	Car-Owning Household ^{1/}	
	Adjoining Areas (1984)	MManila (1983)
Less than 500	2.1	2.5
501 - 1,000	1.3	5.5
1,001 - 1,500	6.6	9.1
1,501 - 2,000	8.7	14.4
2,001 - 2,500	11.0	18.2
2,501 - 3,000	21.6	25.4
3,001 - 3,500	18.3	36.8
3,501 - 4,000	18.5	39.4
4,001 - 5,000	23.2	45.9
5,001 - 7,000	25.8	60.7
7,001 - above	41.0	89.3
Total	8.3	13.2

Source: HIS

^{1/} Percentage of car/jeep-owning households to total households in each income bracket

5.4 TRAFFIC DEMAND AND ITS CHARACTERISTICS

The total volume of trips recorded for Metro Manila, as captured in the 1980 HIS and further calibrated by the screenline/cordonline results, is 10,633,019. That for the adjoining areas is 1,222,231 trips which is principally taken from the 1984 Supplemental HIS only.

The public mode of transportation is more popular among people in the adjoining provinces accounting for 88.8% of the total number of trips as against Metro Manila's 74.4% (see Table 5.10). This may be partly attributed to the lower levels of car ownership in the adjoining areas relative to that in Metro Manila.

Table 5.10
Comparison on the Number of Daily Trips
by Purpose and by Mode Between
Metro Manila and its Adjoining Areas

Trip Purpose	Adjoining Areas			Metro Manila ^{1/}		
	Public Mode	Private Mode	Total	Public Mode	Private Mode	Total
To Work	183,776	29,167	212,943	1,441,144	488,382	1,929,526
To School	214,649	19,292	233,941	1,397,262	331,178	1,728,440
Private	144,872	21,125	165,997	1,040,311	391,966	1,432,277
Business	17,577	6,049	23,626	211,673	234,210	445,883
To Home	524,344	61,380	585,724	3,820,392	1,276,501	5,096,893
TOTAL	1,085,218	137,013	1,222,231	7,910,782	2,722,327	10,633,019

Source: 1984 Supplemental HIS

^{1/} The trips in 1980 HIS for Metro Manila had been calibrated with the 1980 Screenline/Cordonline results

In both Metro Manila and the adjoining provinces, almost half of total trips made by each mode of the public and private transport, except the taxi, are for "To Home" purpose. While the taxi is also commonly used in Metro Manila for going home, the frequency of its use in the adjoining areas is almost nil.

Aside for "To Home" trip purpose, most of the trips done by public transportation, in both study areas, are for the purposes of "To Work" and "To School". It can be noted, however, that a substantial amount of trips by tricycle are for "Private" purpose.

In terms of trip purpose, "To Home" trips account for nearly half (47.9%) of total trips in both Metro Manila and the adjoining areas. In the latter, however, trips to school rank second highest and work trips, the third. In the case of Metro Manila, work trips rank second, while trips to school are third highest (see Table 11).

On the other hand, trips by private modes are usually for "To Work" and "Private" purposes. Nonetheless, a great number of trips by van/pick-up are notably done for going to school.

Table 5.11
Comparison of Trip Composition by Purpose
Between Metro Manila and its Adjoining Areas (%)

Mode	1984 HIS						1980					
	To Work	To School	Private	Business	To Home	Total	To Work	To School	Private	Business	To Home	Total
Train	32.6	1.8	7.6	8.1	49.9	100.0	18.9	15.3	8.7	2.3	54.8	100.0
Bus	25.1	16.7	9.2	1.6	47.4	100.0	26.5	11.4	10.0	3.0	48.1	100.0
Jeepney	16.7	19.5	13.8	1.6	48.4	100.0	16.5	19.3	13.4	2.6	48.3	100.0
Tricycle	11.1	23.3	15.5	1.3	48.8	100.0	9.6	20.6	18.1	2.8	48.9	100.0
Public Total	16.9	19.8	13.3	1.6	48.3	100.0	18.2	17.6	13.2	2.7	48.3	100.0
Car/Jeep	20.6	13.7	17.0	3.4	45.3	100.0	20.6	8.7	15.4	10.5	44.8	100.0
Taxi	29.8	0.0	44.5	25.7	0.0	100.0	14.8	4.7	26.3	9.9	44.3	100.0
Van/Pick-up	23.1	15.5	10.1	6.9	44.3	100.0	13.3	20.4	10.1	4.7	51.3	100.0
Private Total	21.3	14.1	15.4	4.4	44.8	100.0	17.9	12.2	14.4	8.6	46.9	100.0
Total	17.4	19.1	13.6	1.9	47.9	100.0	18.2	16.3	13.5	4.2	47.9	100.0

Source: 1984 Supplemental HIS

Overall, the jeepney is the most popular mode of public transportation, accounting for 48.6% of total trips in the adjoining areas and 54.5% in Metro Manila (see Table 5.12). The tricycle, however, ranks second in popularity in the provinces while the bus is the second most commonly preferred in the metropolitan area.

In the case of private modes of transportation, car/jeep is the most popularly used for any trip purpose in both the adjoining areas and in Metro Manila, although the frequency of its use is higher in the latter. The van/pick-up rank second in popularity among the private modes.

Table 5.12
Comparison of Trip Composition by Mode
Between Metro Manila and its Adjoining Areas (%)

Mode	1984 HIS						1980 HIS					
	To Work	To School	Pri- vate	Busi- ness	To Home	Total	To Work	To School	Pri- vate	Busi- ness	To Home	Total
Train	2.1	0.1	0.6	4.7	1.2	1.1	0.1	0.1	0.1	0.0	0.1	0.1
Bus	22.7	13.8	10.7	13.7	15.6	15.8	23.0	11.0	12.9	11.3	15.8	15.8
Jeepney	46.6	49.5	49.3	40.9	49.1	48.6	49.5	64.6	54.2	33.4	54.9	54.5
Tricycle	14.9	28.3	26.6	15.5	23.7	23.3	2.1	5.1	5.4	2.8	4.1	4.0
Public Total	86.3	91.8	87.3	74.4	89.5	88.8	74.1	80.8	72.6	47.5	75.0	74.4
Car/Jeep	9.8	5.9	10.4	14.6	7.8	8.3	18.1	8.6	18.2	39.7	14.9	15.9
Taxi	0.1	0.0	0.2	0.8	0.0	0.1	1.3	0.5	3.1	3.7	1.4	1.6
Van/Pick-up	3.8	2.3	2.1	10.2	2.6	2.8	5.9	10.1	6.1	9.1	8.7	8.1
Private Total	13.7	8.2	12.7	25.6	10.5	11.2	25.3	19.2	27.4	52.5	25.0	25.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: 1984 Supplemental HIS

