No.

mmutis

Republic of the Philippines

DOTC*MMDA*DPWH*NEDA*PNP-NCR*HUDCC*UP-NCTS*EMB
Japan International Cooperation Agency (JICA)

METRO MANILA URBAN TRANSPORTATION INTEGRATION STUDY

TECHNICAL REPORT NO. 1

MMUTIS TRANSPORTATION SURVEY

March 1999

MMUTIS STUDY TEAM

SSF
JR
99-036 (4/16)

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1. INTRODUCTION

1.1 Study Background

Metro Manila, like any other large urban area in Asia, has been suffering from serious transportation problems. Inasmuch as there have been a number of comprehensive studies and feasibility studies undertaken and various transportation infrastructure projects implemented, many problems still need to be addressed and a lot of areas need to be improved. The Metro Manila Urban Transportation Planning Study Phases I and II (otherwise known as JUMSUT), conducted over a period of 31 months from October 1982 to September 1985, have created and established massive transportation data through the many surveys conducted. This information base contributed much to the research and planning activities of the Transportation Training Center of the University of the Philippines (now known as the National Center for Transportation Studies or NCTS) as well as to other projects in Metro Manila. Other transportation studies that followed updated some of the JUMSUT database but not at the same grand scale.

With the transportation situation worsening and becoming a serious socio-economic concern of society, the Government of the Philippines (GOP) decided to urgently undertake a coordinated and integrated development of transportation infrastructure. The request of the GOP to conduct a comprehensive transportation study, including a feasibility study on selected priority projects, was responded by the Japanese Government with a technical assistance grant under the Japanese International Cooperation Agency (JICA). The Implementing Arrangement for the Metro Manila Urban Transportation Integration Study (MMUTIS) was signed by both governments in December 1995 and the study commenced in March 1996.

1.2 Study Objectives

The overall objectives of the MMUTIS are as follows:

(1) To establish an updated transportation database system similar to the one built in JUMSUT which is intended to contribute to transportation planning, research and education in the Philippines;

(2) To formulate a Master Plan for a comprehensive urban transportation system of Metro Manila for the target year 2015; and

(3) To formulate a Medium-term Plan (1999-2004) based on the Master Plan.

1.3 Study Area

The study area is composed of Metro Manila and the adjacent municipalities, which form part of the actual metropolitan area in terms of traffic interaction as well as present and future integrity of the urban areas. Figure 1.1 shows the entire study area encompassing 6 municipalities of Laguna Province, 12 municipalities of Rizal Province, 16 municipalities of Bulacan Province, and 12 municipalities and 2 cities of Cavite Province.

FIGURE 1.1
MMUTIS STUDY AREA

In terms of population, the study area holds 14.4 million as of 1995, inclusive of the 4.9 million people in the adjacent municipalities (refer to Table 1.1).

TABLE 1.1
POPULATION IN THE MMUTIS STUDY AREA

Area	Population: 000 (%)			Growth Rate: %/yr.		
	1980	1990	1995	80-90	90-95	80-95
Metro Manila	5,926 (70.9)	7,929 (67.7)	9,454 (65.8)	2.9	3.6	3.1
Adjoining Area	2,434 (29.1)	3,773 (32.3)	4,914 (34.2)	4.5	5.4	4.8
Study Area	8,360 (100.0)	11,703 (100.0)	14,368 (100.0)	3.4	4.2	3.7
Philippines	48,098	60,703	68,614	2.4	2.5	2.4
% of Study Area to RP	17.4	19.3	20.9	-	-	-

Source: NSO

2. SURVEY FRAMEWORK

At the onset of the Metro Manila Urban Transportation Integration Study in 1996, the main surveys planned and conducted by the study team were basically of four types; (a) landuse survey, (b) twelve transportation surveys, (c) road inventory, and (d) road environmental survey. These surveys are individually described in succeeding chapters of this report

Later, however, upon the request of the Government of the Philippines (in a Steering Committee and Technical Advisory Committee meeting in January 1997), six supplemental surveys were additionally approved by JICA. These surveys consist of five transportation surveys and a subdivision road inventory. These surveys are, likewise, described in succeeding chapters of this report.

The overall framework of the surveys conducted is presented in Table 2.1.

TABLE 2.1
OUTLINE OF THE SURVEYS CONDUCTED IN MMUTIS

NO.	SURVEY	OBJECTIVE	COVERAGE	METHOD
1	Person Trip Survey	• Socio-economic profile of residents • Trip information of residents	• 235,000 samples for Metro Manila (2.5%) • 39,000 samples for adjoining areas (0.8%)	• Direct interview with household head/members
2	Cordonline Survey	• Traffic volume on cordonlines • Socio-economic profile and trip information of residents outside the Study Area	• 19 stations on Metro Manila boundary • 14 stations on the Study Area boundary	• 16 or 24-hour traffic count and vehicle occupancy survey with 16-hour roadside direct interview survey
3	Screenline Survey	• Traffic volume of screenlines	• 37 stations on the Pasig River, San Juan River and PNR	• 16 or 24-hour traffic count and vehicle occupancy survey
4	Public Transport Operation/ Utilization Characteristics Survey	• Operation and utilization characteristics of bus and jeepney	• Representative routes: jeepney (102), bus (45) time periods: morning/evening peak, interpeak	• On-board observation to obtain no. of passengers boarding/ alighting and time arrived and departed by stop
5	Public Transport Passenger Interview Survey	• Transfer characteristics • Time value and "willingness to pay" attitude	• Selected major terminals: jeepney (12), bus (8), LRT (5)	• 16-hour direct interview with passengers
6	Bus/Jeepney/ Tricycle Terminal Survey	• Route identification • Service frequencies	• All routes operating • All terminal location/ characteristics • Service frequencies at major terminals: jeepney (83), bus (30)	• Route reconnaissance • Terminal location/ characteristics survey • 8 or 16-hour service frequency count survey
7	Parking Survey	• Parking capacity • Service frequency	• On-road parking in selected sites of 6 urban centers in Metro Manila • Off-street parking in 5 different land uses of the 6 urban centers	• Parking inventory survey • 16-hour number plate survey • 16-hour direct interview with off-road parking users
8	Travel Speed Survey	• Travel speed on major road sections	• 15 major routes time periods: morning/ afternoon peak and interpeak	• Floating car method • 3 round trip by time period by route

Con. Table 2.1

NO.	SURVEY	OBJECTIVE	COVERAGE	METHOD
9	Truck Survey	• Approximate goods flow characteristics	• 7 cordonline stations on Metro Manila boundary • 8 gates of Manila Port	• 16-hour traffic count and roadside interview with truck driver
10	Bus/Jeepney/ Tricycle/Taxi Driver Interview Survey	• Working condition of drivers and operational characteristics	• 10 terminals for each mode	• Direct interview with jeepney/bus/ tricycle/taxi drivers
11	Airport Survey	• Characteristics of NAIA related traffic	• NAIA (Ninoy Aquino International Airport) • Domestic terminal • Cargo terminal	• Airport employee survey • 24-hour traffic count and vehicle occupancy survey at all gates • 24-hour direct interview with passengers, well-wishers /visitors
12	Bus/Jeepney Operator Survey	• Characteristics of bus/jeepney industry	• Public transport operators: bus (51), jeepney (49+18)	• Direct interview with operators
13	Road Inventory Survey	• Basic planning information by road section	• All major roads in the study area	• Observation and measurement if necessary
14	Land Use Survey	• Updating present land use map	• Metro Manila (detailed) • Study Area (general classification)	• Observation
15	Road Environmental Survey	• Environmental quality of MMUTIS Study Area	• 6 selected sites for the first survey duration and 8 selected sites for the second survey in the Study Area • Air pollution (NOx, CO, SO_2, SPM and Pb) and noise level coupled with meteorological and traffic data	• Direct measurement and analysis in laboratory
16	Garbage Truck Movement Survey	• Traffic volume, vehicle type, loading volume and service area of garbage trucks	• 5 major dump sites of Metro Manila	• one-week continuous observation
17	Willingness-to-Pay Survey	• Willingness-to-pay attitude and value of time	• 6 public transport mode and private car • Major terminal areas for public transport, and EDSA, SLE and NLE for private car • 1,000 samples per mode (total of 7,000)	• Direct interview with passenger/ driver
18	Water Transport Demand Survey	• Socio-economic characteristics of river ferry passengers • Opinions/Preferences on river ferry	• 600 river ferries, 400 bancas, 1800 jeepneys and 600 bus passengers	• Direct interview with passengers at selected terminals/ routes
19	Traffic Accident Survey	• Collect traffic accident records • Prepare procedure of accident data	• 18 police districts • 3,200 accident files in 1997	• Collection of records • Interview with investigators
20	Subdivision Road Inventory Survey	• Basic planning information of selected roads in selected subdivisions	• 24 subdivisions/ areas	• Observation and measurement of roads
21	Perception on the Unified Vehicular Volume Reduction Program	• Perception of public transport users affected by UVVRP	• 7 major public transport modes at 4 survey sites in Metro Manila	• Direct interview of public transport passengers

3. PERSON TRIP SURVEY

3.1 Objectives

The primary objective of the person trip survey (popularly referred to as the Household Interview Survey or HIS) is to acquire information on the travel characteristics of the residents of the study area. Additionally, other surveys were integrated with the HIS to acquire information for the better understanding of the actual conditions and characteristics of trip makers. These surveys covered items on the socio-economic characteristics of the households and individual household members.

Likewise, residents' opinion on transport related issues were included in the survey to capture current situation such as:

- travel activity on Saturdays, Sundays and Holidays;
- awareness on living environment;
- use of parking;
- effect of the current traffic restraint (i.e., Unified Vehicular Volume Reduction Program) for private mode users; and
- travel activity of the disabled and elderly people.

3.2 Methodology

Sampling

At the onset of the Person Trip Survey, the 1990 NSO Population Census was used in calculating the number of samples per barangay. This was later updated with the 1995 Population Census which was made available only end of September 1996. For Metro Manila, the sampling rate of 2.5% per barangay was calculated. For the 51 municipalities at the periphery of the metropolis, the sampling rate was at 0.8% per barangay.

The interviewers sampled the target number of households as much as possible in barangays of Metro Manila. Those in the adjoining areas underwent some modifications as follows:

1) Barangays within the same area with less than 10 samples were merged to total at least 10 households. These barangays showed similar area characteristics in terms of density, type of dwelling places and economic activity (farming village or fishing village, etc.).

2) Barangays determined as risky to visit for security reasons were skipped and their sample numbers added to the samples of a nearby barangay.

3) Barangays which were not accessible by public transportation (crossing of several rivers or up in the mountains) were not visited and their sample allocation merged with samples of a nearby barangay of similar area characteristics.

Sample selection within the barangays were taken from at least 3 different streets as much as possible in most areas except in the City of Manila where a barangay could be composed of only 2 streets. All the names of the streets are listed by the Area Coordinators based on available maps per barangay. The streets to be sampled are then randomly selected. The number of households to be sampled on a street ranges from 1 to 6. The list of streets to be sampled are predetermined at the survey office and verified by an Area Coordinator on field. The final list was then given to the field supervisors for survey coverage.

The first house to be sampled was randomly selected. Succeeding samples were selected based on the density of the area. That is, the low-density areas (with lot areas of more than 500 sq.m.) were sampled at an interval of 3 houses while the high-density areas (with lot areas of less than 500 sq.m.) were at an interval of 6 houses.

For refusals, the next interval house was sampled.

Field Survey Proper

The following procedures were adopted for the field survey proper:

1) An office was established as the headquarters for the HIS activities.

2) Recruitment and selection of the interviewers were done with the following requirements:

   - residents of the area (i.e., from Metro Manila and adjoining municipalities) assigned;
   - preferably college graduate; and
   - equal number hiring of males and females for a tandem team composition of one male and one female.

3) The interviewers were group by ten persons under one supervisor.

4) There were eight Area Coordinators for the entire study area. Four were assigned to cover areas outside Metro Manila handling four supervisor each and four were assigned within the metropolis with eight supervisor each.

5) Deployment of the interviewers was done in two batches. The first batch or 50% of the field survey force was deployed on August 10, 1996 for Metro Manila. The full surveyor force was deployed for the adjoining municipalities of Bulacan, Rizal, Laguna and Cavite on the same day. The second batch of interviewers for Areas 1 and 4 in Metro Manila was deployed on August 31, 1996. The second batch for Areas 2 and 3 was deployed on September 7, 1996.

6) Two dry runs were done to establish better understanding of the forms and conditions of the survey areas. The first dry-run entailed the sampling of friends and neighbors of each interviewer. The second dry-run was conducted at an actual survey area coverage.

7) Interviewers were paired as a male and a female team while on field. They were provided with survey uniform (white shirt with blue collar/cuffs and the words DOTC-JICA MMUTIS HIS Surveyor printed on the shirt). They were required to wear identification cards (also provided) while on field.

8) Supervisors and interviewers were provided with manuals containing all instructions related to the field survey. This included information on how to proceed with the interview and how to coordinate with their team and the HIS office.

9) Coordinative letters were provided to the supervisors for the barangay captains and some homeowner associations of private subdivisions.

10) A field progress reporting flow was established as shown in Figure 3.1.

Survey Forms

The survey forms used are as follows (actual forms are shown in Annex 1):

1) Form 1: Household Information
The questionnaire covers the socio-economic characteristics of households members, household structure, car-ownership, income level, location of residence and number of years in said residence, etc.

2) Form 2: Household Member Information
The questionnaire covers the socio-economic characteristics of household members, 4 years old and above. These include age, sex, occupation, work and/or school address, income and so on.

3) Form 3: Trip Information
The questionnaire covers the characteristics of trips made by residents of the area which includes origin and destination, trip purpose, travel mode, transfer, departure and arrival time, and so on.

4) Form 4: Information on Vehicle Users
The questionnaire consists of two types of questions; one regarding vehicle use patterns during the implementation of the Unified Vehicular Volume Reduction Program (UVVRP) and the other regarding practices. This form was accomplished by all private mode users in a household whether owned vehicle, rented vehicle or company vehicle.

5) Form 5: Information on the Specially Abled and Elderly People
The questionnaire covers trip patterns of the specially abled and elderly people.

6) Form 6: Environmental and Leisure Information
The questionnaire covers characteristics of leisure trips of the residents of the area as well as the environmental positions of said residents which include awareness, views for improvement and willingness to contribute to environmental conservation. Each household member of one-out-of-every-ten households sampled were requested to complete the form.

Items Surveyed

The survey items in the Person Trip Survey Forms 1 to 3 are exactly the same as the ones used in JUMSUT except with some minor modifications to reflect current situations. These include current transport situation with other modes like the FX or community taxi and LRT; current socio-economic situation such as higher income scales and other classification of profession, etc.

Survey items by questionnaire form used in the additional residents' opinion survey are listed below.

(1) Questionnaire for vehicle users (Form 4)

(regarding control of vehicle use)

- Interviewee's knowledge for traffic management scheme
- effect of the Unified Vehicular Volume Reduction Program (UVVRP) scheme
- travel pattern change due to the UVVRP scheme
- mode of travel taken
- whether or not buy another vehicle due to the UVVRP scheme
- whether or not support the current UVVRP scheme
- implementation conditions of the suggested or preferred scheme

(regarding parking)

- type of parking by place of parking
- parking charge by place of parking
- payer of charge by place of parking
- difficulties in parking by place of parking

(2) Questions for the specially abled and elderly people (Form 5)

- specially abled or elderly person
- type of disability
- whether or not own a wheelchair
- whether or not need a wheelchair
- whether or not made trips the last week
- reason of no trip
- the number of times of making trips during the past week
- place of visit
- purpose of travel
- mode of travel
- helper
- use of wheelchair
- difficulties in travel
- improvement measures

(3) Questions for 1/10 households (Form 6)

(weekend/holiday traffic)

- place visited
- purpose of travel
- mode of travel
- starting time of travel
- arrival time of travel

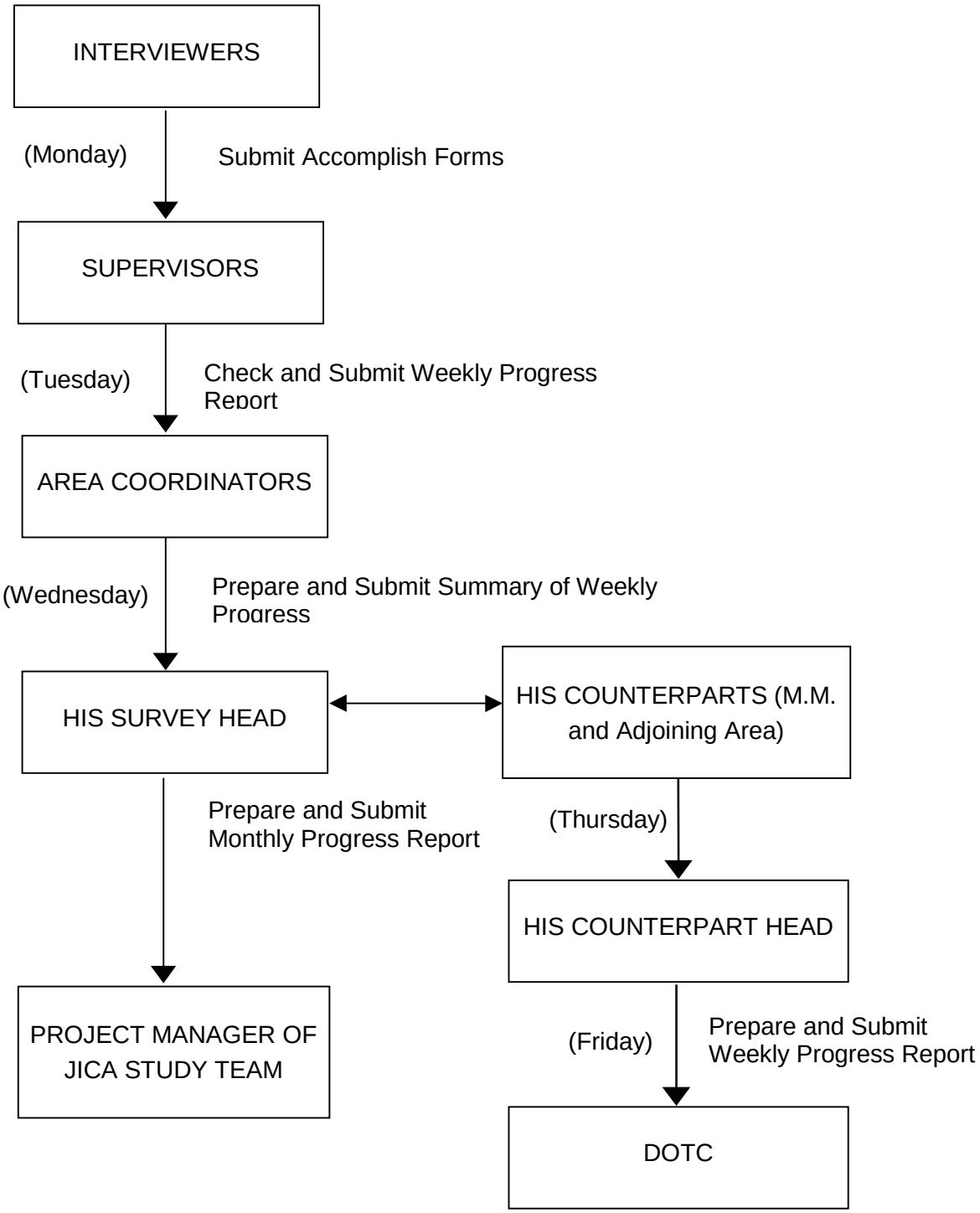
(living environment)

- assessment of living environment (air pollution, traffic congestion, traffic safety, noise, smell, water quality, garbage/solid waste, vibration, crime/violence, flood and others)
- effective measures to improve traffic congestion (construction of roads, expansion of bus/jeepney services, expansion of rail service, installation of more traffic signals, improvement of driving manner, enforcement of traffic control, restriction of car use, opening of village roads, control of on-road parking, improvement of loading/unloading facilities and others)
- necessary measures to improve road environment (widening of roads, pavement of roads, improvement of drainage, street lighting, street trees, improvement of sidewalks, safety facilities for pedestrian, control vehicle traffic, control of parking and others)
- necessary measures to improve other infrastructure and services (playground, garbage collection, flood control, security control, air pollution control and others)
- willingness to pay additional tax or fee to improve the environment

(public transportation service)

- assessment of the existing bus service (coverage of network, access to bus stop, waiting condition/time, loading/unloading, riding comfort, travel speed, driving attitude, fare level)
- assessment of the existing jeepney service (coverage of network, access to jeepney stop, waiting condition/time, loading/unloading, riding comfort, travel speed, driving attitude, fare level)
- assessment of the existing PNR service (coverage of network, access to PNR station, waiting condition/time, loading/unloading, riding comfort, travel speed, driving attitude, fare level)
- assessment of the existing LRT service (coverage of network, access to LRT station, waiting condition/time, loading/unloading, riding comfort, travel speed, driving attitude, fare level)
- assessment of the existing taxi service (availability, riding comfort, fare level, drivers' attitude)
- the most effective/needed public transportation for the metropolitan area (pedicabs, tricycle, jeepney, air-conditioned jeepney, mini-bus, air-conditioned mini-bus, bus, air-conditioned bus, LRT, PNR, taxi, school bus, company bus and others)

FIGURE 3.1
PROCEDURE OF HIS FIELD PROGRESS REPORTING



Zoning System

In MMUTIP and JUMSUT, Metro Manila was divided into 202 zones and the external zones into 15 zones. This 217 zone system was the finest zoning then and various aggregated zoning systems (e.g., 30-80 zones) were used for planning purposes due to the limitation in computing capabilities. For MMUTIS, this zoning system was changed due to the following reasons:

1) Information technology and support hardware had advanced with no actual limitation in the computing power of computers (even with the PCs).

2) The study area was expanded to the adjoining areas of Metro Manila.

3) For inside Metro Manila, the zoning of areas such as Quezon City, Valenzuela, Las Pinas, and Muntinlupa was considered too coarse judging from the recent urbanization.

Considering these reasons, the following changes were adopted for the MMUTIS zoning system:

1) For zones within Metro Manila, the previous 202 zones were further made finer with the subdivision of zones into 265 zones (refer to Table 3.1).

2) For areas outside of Metro Manila but within the study area, 51 new zones were established (refer to Table 3.2). Each zone has been made to correspond to one municipality/city.

3) Outside the study area, about 78 zones were established. The area surrounding the study area and some strategically important areas such as Angeles, Infanta Real and Batangas were considered as a zone per area.

On the whole, the number of zones is 394 (refer to Figures 3.2 and 3.3). This is the finest/smallest zoning for MMUTIS, which was aggregated into medium or large zoning systems depending on the planning purposes.

3.3 Survey Coverage

The survey coverage is Metro Manila and the 17 adjoining municipalities of Bulacan, 14 of Cavite, 6 of Laguna and 14 of the Rizal provinces. All barangays in the study area were sampled (except for some where problems of peace/order and accessibility exist).

About 235,000 persons representing about 50,000 households were sampled in Metro Manila while 39,000 representing 7,900 households were sampled in the adjoining areas.

TABLE 3.1
MMUTIS ZONING SYSTEM

Municipality	No. of Zones	
	JUMSUT	MMUTIS
City of Manila	52	57
Pasay City	13	15
Makati City	15	23
City of Mandaluyong	8	9
San Juan	5	5
Quezon City	42	59
Kaloocan City	11	17
Valenzuela	8	9
Malabon	7	7
Navotas	4	6
Marikina City	8	8
Pasig City	8	11
Pateros	1	1
Taguig	5	6
Paranaque City	8	14
Muntinlupa	3	7
City of Las Pinas	4	8
Total	**202**	**265**

TABLE 3.2
ZONING OF AREAS OUTSIDE OF METRO MANILA

Area	Total No. of External Zones	Zones within Study Area
Adjoining Municipalities		
Bulacan	24	17
Cavite	23	14
Laguna	30	6
Rizal	14	14
Other External Areas	38	-
Total	**129**	**51**

Table 3.3 lists the samples based on the sampling rate targeted and the actual number of samples accomplished by the survey.

FIGURE 3.2
MMUTIS ZONING SYSTEM FOR METRO MANILA

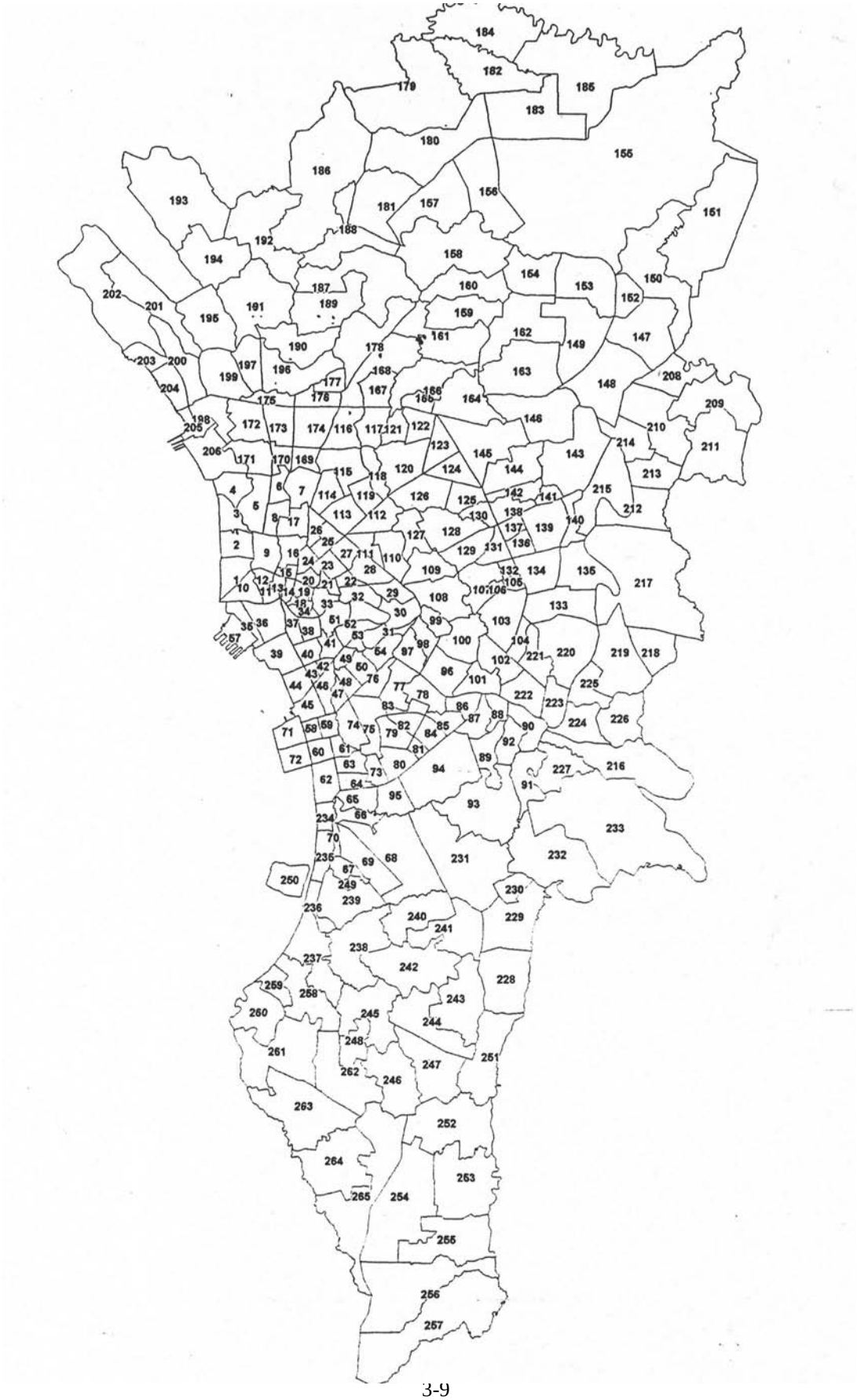


FIGURE 3.3
MMUTIS ZONING SYSTEM FOR ADJOINING AREAS

TABLE 3.3
HIS ACCOMPLISHED SAMPLING VIS-À-VIS TARGET SAMPLING BY ZONE

Municipality	Zone Number	Name	Population	Household	2.5 % Sampling	Accomplishment	
						Sample	Rate
Manila	1	Divisoria /Zaragosa	104,108	21,312	531	691	130.1%
	2	Tondo/Moriones	116948	23,638	588	572	97.3%
	3	Tondo/Herbosa	79,348	15,962	400	394	98.5%
	4	Tondo/H.Lopez	44,281	9,334	234	234	100.0%
	5	Tondo/J. Luna	80,090	17,041	425	426	100.2%
	6	Tondo/Corregidor	44,054	9,272	233	379	162.7%
	7	La Loma/Chinese Cemt.	17,419	3,538	89	90	101.1%
	8	Tondo/J.A. Santos	57,762	12,013	297	267	89.9%
	9	Sta. Cruz/J.A Santos	63,053	12,866	324	337	104.0%
	10	Divisoria/Del Pan	39,594	8,817	222	72	32.4%
	11	Binondo/J. Luna	6,212	1,310	32	32	100.0%
	12	Binondo/Reina Regente	8,891	1,903	48	48	100.0%
	13	Binondo/Mesericorida	5,670	1,250	31	29	93.5%
	14	Quiapo/Carriedo	4,670	1,048	26	26	100.0%
	15	Sta. Cruz/D. Jose	17,279	3,412	85	86	101.2%
	16	Sta. Cruz/Bambang	39,581	8,570	216	217	100.5%
	17	Sta.Cruz/San Lazaro	38,954	8,405	210	220	104.8%
	18	Quiapo/Globo de Oro	11,575	2,508	63	64	101.6%
	19	Quiapo/Bilibid Viejo	8,392	2,164	55	55	100.0%
	20	Sampaloc/FEU/UE	17,650	3,823	96	54	56.3%
	21	Sta.Mesa/Lardizabal Ext.	21,157	4,556	116	80	69.0%
	22	Sta. Mesa/Pureza Ext.	25,789	5,429	136	125	91.9%
	23	Sampaloc/NU	47,749	10,420	262	213	81.3%
	24	Sampaloc/UST	10,283	2,308	58	19	32.8%
	25	Sampaloc/Florentino	41,093	9,012	226	242	107.1%
	26	Sampaloc/Calamba	30,091	6,187	157	165	105.1%
	27	Sampaloc/S.H. Loyola	44,273	9,237	230	203	88.3%
	28	Sta. Mesa/P. Sanchez	58,204	11,962	300	277	92.3%
	29	Old Sta.Mesa/V. Mapa	46,339	9,717	243	268	110.3%
	30	Sta. Mesa/P. Sanchez	27m704	5,499	139	152	109.4%
	31	Punta	37,052	7,657	193	193	100.0%
	32	Sta. Mesa/R. Magsaysay	24,779	5,415	135	149	110.4%
	33	San Miguel/J.P. Laurel	9,297	1,931	47	38	80.9%
	34	Quiapo/C. Palanca	11,970	2,593	65	70	107.7%
	35	South Port Area	15,883	3,539	88	88	100.0%
	36	Intramuros/Murallla	10,384	2,356	58	60	103.4%
	37	Intramuros/Arroceros	2,934	698	17	16	94.1%
	38	Intramuros/Tanque	4,650	986	25	2	8.0%
	39	Ermita	2,099	506	13	9	69.2%
	40	Paco/Apacible	9,377	1,969	50	50	100.0%
	41	Paco/Canociga	23,291	4,805	119	119	100.0%
	42	Paco/Linao (Dart)	11,596	2,487	62	61	98.4%
	43	Malate/PCU	6,244	1,548	39	40	102.6%
	44	Malate/J.C. Bocobo	14,858	3,047	76	76	100.0%
	45	Malate/Harrison Plaza	14,768	3,146	80	45	56.3%
	46	San Andres/L. Guinto	43,462	9,149	228	220	96.5%
	47	San Andres/SSH	18,607	4,057	103	91	88.3%
	48	San Andres/Diamante	31,738	6,707	168	187	111.3%
	49	Paco/Fabie	21,609	4,473	114	117	102.6%
	50	Sta. Ana/Estrada	68,584	14,166	356	356	100.0%
	51	San Miguel/Malacañang	6,271	1,325	33	40	121.2%
	52	Pandacan/Beta	57,165	11,606	289	291	100.7%
	53	Pandacan/T. Claudio	24,441	5,076	127	114	89.8%
	54	Sta. Ana/Panaderos	24,949	5,418	135	141	104.4%
	55	Manila North Harbor					
	56	MIJCT					
	57	Manila South Harbor					

Cont. Table 3.3

Municipality	Zone Number	Name	Population	Household	2.5 % Sampling	Accomplishment	
						Sample	Rate
Pasay	58	San Jose	24,924				
	59	San Isidro	20,317	5,615	140	141	100.7%
	60	Sta. Clara/Leviriza	22,450	4,033	100	80	80.0%
	61	Sta. Clara/Tramo	30,217	4,902	123	98	79.7%
	62	San Rafael	33,000	6,291	157	161	102.5%
	63	San Roque	44,451	7,359	184	167	90.8%
	64	Tabon	31,474	9,539	239	250	104.6%
	65	Malibay	68,212	6,873	172	175	101.7%
	66	Maricaban	33,925	14,157	356	339	95.2%
	67	Sto. Niño	31,24	6,898	172	142	82.6%
	68	Villamore Air Base	57,630	6,481	163	106	65.0%
	69	Air Cargo	5,927	11,792	295	390	132.2%
	70	Domestic Airport	4,838	1,250	31	37	119.4%
	71	PICC (Reclamation Area)		1,063	27	20	74.1%
	72	CITE (Reclamation Area)					
Makati	73	Bangkal	27,652	6,367	159	160	100.6%
	74	Pio del Pilar	29,266	6,037	151	58	38.4%
	75	Palanan	35,510	7,982	200	210	105.0%
	76	Tejeros	44,905	9,421	236	190	80.5%
	77	Olympia	35,560	7,374	184	199	108.2%
	78	Poblacion (Makati)	25,403	5,373	135	181	134.1%
	79	Legaspi Vill.	2,632	607	15	15	100.0%
	80	San Lorenzo	2,632	606	15	15	100.0%
	81	Ayala Center					
	82	Salcedo Vill.	2,018	440	11	11	100.0%
	83	Bel Air II	2,018	440	11	11	100.0%
	84	Urdaneta Vill.	3,575	787	20	-	0.0%
	85	Bel Air I	2,018	439	11	11	100.0%
	86	Guadalupe Viejo	13,250	2,625	66	66	100.0%
	87	Guadalupe Nuevo	46,040	9,904	247	176	71.3%
	88	Cembo	40,223	8,397	210	230	109.5%
	89	Post Proper North	6,816	1,363	34	40	117.6%
	90	Rembo	53,011	10,707	268	249	92.9%
	91	Pembo	77,652	15,429	386	310	80.3%
	92	For Bonifacio					
	93	Post Proper South	16,458	3,508	88	65	73.9%
	94	Dasmariñas/Forbes	10,574	1,714	43	-	0.0%
	95	Magallanes	6,963	1,402	35	-	0.0%
Mandaluyong	96	Plainview					
	97	Old Zaniga	64,653	14,098	353	402	113.9%
	98	Poblacion (Mandaluyong)	22,732	4,883	122	128	104.9%
	99	Hagdang Bato	33,788	7,168	178	185	103.9%
	100	Additon Hills	29,856	6,206	154	159	103.2%
	101	Barangka	66,664	14,191	354	433	122.3%
	102	Highway Hills	35,712	7,633	191	223	116.8%
	103	Wack Wack/Greenhills	30,487	6,511	163	175	107.4%
	104	Ortigas Center	2,978	406	10	-	0.0%
San Juan	105	East Greenhills	7,743	1,360	34	16	47.1%
	106	Greenhills Com'l Center					
	107	North Greenhills	15.676	3,300	83	80	96.4%
	108	Batis	50.797	10,461	263	264	100.4%
	109	Corazon de Jesus	49.971	10,573	266	287	107.9%

Cont. Table 3.3

Municipality	Zone Number	Name	Population	Household	2.5 % Sampling	Accomplishment	
						Sample	Rate
Quezon City	110	Doña Imelda	20,884	4,443	112	112	100.0%
	111	Santo Niño	26,042	5,414	136	136	100.0%
	112	Tatalon	57,597	12,592	315	318	101.0%
	113	Sta. Mesa Heights	21,248	4,486	112	112	100.0%
	114	La Loma	28,134	6,362	159	159	100.0%
	115	Ba. Manresa	30,729	6,365	159	159	100.0%
	116	Balintawak	24,134	5,220	131	133	101.5%
	117	South Apolinio Samson	12,305	2,681	67	134	200.0%
	118	Masambong	15,216	3,439	86	86	100.0%
	119	Ba. Matalahib	11,075	2,445	61	61	100.0%
	120	San Francisco del Monte	53,567	11,508	288	288	100.0%
	121	San Antonio	23,789	4,862	122	122	100.0%
	122	Project 7	21,328	4,477	112	112	100.0%
	123	Phil-am	8,092	1,438	36	36	100.0%
	124	South Triangle	8,622	2,015	50	50	100.0%
	125	Kamuning	23,265	4,689	118	124	105.1%
	126	Roxas District	31,510	6,746	170	175	102.9%
	127	New Manila	29,148	6,261	156	157	100.6%
	128	Mariana (Gilmore)	14,648	2,875	72	76	105.6%
	129	Kaunlaran	18,220	3,645	91	91	100.0%
	130	Immaculate Concepcion	16,400	3,446	86	86	100.0%
	131	Bagong Lipunan Crame	22,376	4,738	119	119	100.0%
	132	Crame					
	133	Corinthian Garden	5,620	852	21	21	100.0%
	134	Camp Aguinaldo	4,648	744	19	19	100.0%
	135	Green Meadows	15,585	3,030	76	61	80.3%
	136	Murphy District	23,353	5,657	141	141	100.0%
	137	Cubao (Araneta Center)					
	138	E. Rodriguez	23,813	5,059	127	128	100.8%
	139	Project 4	52,761	12,104	302	306	101.3%
	140	Escopa	16,386	3,077	77	82	106.5%
	141	Project 2 & 3	12,968	2,685	68	69	101.5%
	142	Quirino District	24,425	4,955	124	124	100.0%
	143	Loyola Heights	32,496	6,092	152	152	100.0%
	144	Piñahan	76,309	16,079	402	403	100.2%
	145	QMC	26,857	5,519	138	138	100.0%
	146	UP Diliman	25,732	4,746	119	119	100.0%
	147	Matandang Balara	55,513	11,736	293	298	101.7%
	148	Holy Spirit	73,414	14,952	374	374	100.0%
	149	Payatas	102,761	21,164	529	529	100.0%
	150	Constitution Hills	81,161	17,081	427	427	100.0%
	151	Commonwealth	108,396	22,247	556	556	100.0%
	152	Fairview	18,430	3,514	88	91	103.4%
	153	Pasong Putik	43,761	8,650	216	220	101.9%
	154	Kaligayahan	46,400	9,602	240	240	100.0%
	155	San Agustin	75,441	15,606	390	390	100.0%
	156	Gulod	85,366	17,236	430	433	100.7%
	157	Bagbag	54,192	10,920	273	276	101.1%
	158	Tandang Sora	67,783	14,257	356	356	100.0%
	159	Pasong Tamo	49,615	10,142	254	254	100.0%
	160	Culiat	39,438	8,647	216	215	99.5%
	161	Project 6	60,790	13,999	350	350	100.0%
	162	R. Magsaysay	30,097	6,042	150	150	100.0%
	163	Bahay Toro	53,968	11,642	291	296	101.7%
	164	North Apolonio Samson	12,306	2,681	67		0.0%
	165	Baesa	71,305	14,924	373	373	100.0%

Cont. Table 3.3

Municipality	Zone Number	Name	Population	Household	2.5 % Sampling	Accomplishment	
						Sample	Rate
Caloocan	166	Bo. San Jose	27,208	5,761	143	162	113.3%
	167	West ¾ Ave.	39,515	8,282	207	242	116.9%
	168	A. Mabini	88,921	18,649	468	496	106.0%
	169	Dagat Dagatan	94,794	20,069	501	515	102.8%
	170	West 8/10 Av.	63,161	13,410	337	356	105.6%
	171	Grace Park	55,856	12,574	317	354	111.7%
	172	Sangandaan	20,324	4,682	115	119	103.5%
	173	Bagong Barrio EDSA	16,460	3,507	87	96	110.3%
	174	Bagong Barrio Center	72,401	14,990	375	412	109.9%
	175	Bagong Barrio East	62,168	13,336	334	357	106.9%
	176	Bagumbong (K. North)	109,187	23,431	586	600	102.4%
	177	Camarin (K. North)	126,351	26,459	662	686	103.6%
	178	North (K. North)	157,578	31,523	788	816	103.6%
	179	West (K. North)	89,235	18,449	461	496	107.6%
Valenzuela	180	Canumay	39,567	9,173	230	227	98.7%
	181	Mapulang Lupa/Ugong	69,324	15,313	382	384	100.5%
	182	Hen. T. de Leon	71,855	14,359	359	400	111.4%
	183	Marulas	55,953	11,916	298	305	102.3%
	184	Caruhatan	69,555	15,055	376	185	49.2%
	185	Maysan	43,657	9,572	240	241	100.4%
	186	Malanday (Valenzuela)	38,165	8,418	211	22	10.4%
	187	Dalandan	49,089	10,571	265	265	100.0%
Malabon	188	Maysilo/Panghulo	27,898	6,096	153	170	111.1%
	189	Potrero	51,433	11,181	280	290	103.6%
	190	Tugatog	53,346	11,313	283	270	95.4%
	191	Longos	65,202	13,605	340	345	101.5%
	192	Tonsuya	62,328	13,538	339	344	101.5%
	193	Britan/Concepcion	69,319	14,989	375	376	100.3%
	194	Dampalit	17,958	3,935	99	110	111.1%
Navotas	195	Tanza	19,054	4,263	107	108	100.9%
	196	Tangos	50,614	10,877	272	280	102.9%
	197	San Jose/Naval	40,474	8,250	206	232	112.6%
	198	Navotas East/West	23,297	4,948	124	152	122.6%
	199	North Bay Blvd.	95,600	21,133	528	564	106.8&
	200	Fisheries Port					
Marikina	201	Nangka	26,169	5,273	132	94	71.2%
	202	Parang	60,750	12,831	321	358	111.5%
	203	Concepcion (Marikina)	62,888	13,105	328	432	131.7%
	204	Marikina Heights	48,130	9,235	231	245	106.1%
	205	Calumpang/San Roqaue	38,208	7,950	199	201	101.0%
Marikina	206	Sto. Niño	27,474	5,883	147	124	84.4%
	207	Malanday (Marikina)	23,297	8,089	202	211	104.5%
	208	Barangka (Marikina)	95,600	11,251	282	269	95.4%
Pasig	209	Kalawaan	39,751	8,876	223	228	102.2%
	210	Santolan/Manggahan	102,400	23,160	579	612	105.7%
	211	Sta. Lucia	30,965	6,620	166	166	100.0%
	212	Rosario	70,256	16,067	401	335	83.5%
	213	Ugong (Pasig)	20,220	4,123	103	107	103.9%
	214	San Antonio	5,777	1,187	298	4	13.8%
	215	Kapitolyo	26,115	5,741	143	11	7.7%
	216	Bagong Ilog	17,580	4,150	104	105	101.0%
	217	Bambang	60,014	13,366	335	198	59.1%
	218	Caniogan	44,167	9,582	239	126	52.7%
	219	Pinagbuhatan	53,830	11,370	285	288	101.1%
Pateros	220	Sta. Ana (Pateros)	55,286	11,377	284	254	89.4%
Taguig	221	Bagumbayan	55,271	11,868	297	171	57.6%
	222	Bicutan	107,508	21,733	543	543	100.0%
	223	Signal Village	70,296	14,957	374	391	104.5%
	224	Western Bicutan	61,689	13,382	335	345	103.0%
	225	Hagonoy	23,869	4,631	116	113	97.4%
	226	Ususan	62,717	12,648	317	328	103.5%

Cont. Table 3.3

Municipality	Zone Number	Name	Population	Household	2.5 % Sampling	Accomplishment	
						Sample	Rate
Parañaque	227	Baclaran	21,773	4,552	114	130	114.0%
	228	Tambo	21,144	4,544	114	114	100.0%
	229	La Huerta	15,934	3,313	82	85	103.7%
	230	San Dionisio	45,750	9,925	248	250	100.8%
	231	Moonwalk	27,739	5,748	144	144	100.0%
	232	Santo Niño (Parañaque)	22,454	4,969	124	124	100.0%
	233	Merville	14,719	3,085	77	80	103.9%
	234	Sun Valley	38,338	8,360	209	210	100.5%
	235	Don Bosco	27,609	5,864	147	188	127.9%
	236	Marcelo Green Village	19,250	3,958	99	20	20.2%
	237	San Antonio	28,331	6,163	154	153	99.4%
	238	San Isidro	46,169	10,524	263	271	103.0%
	239	BF Homes	59,086	11,687	292	294	100.7%
	240	NAIA					
Muntinlupa	241	Sucat	60,891	13,165	329	333	101.2%
	242	Cupang	59,996	12,684	317	301	95.0%
	243	Alabang	88,495	18,744	468	503	107.5%
	244	New Alabang Village	21,056	3,105	78	80	102.6%
	245	Putatan	82,223	17,347	434	434	100.0%
	246	Poblacion (Muntinlupa)	37,979	8,274	207	232	112.1%
	247	Tunasan	49,206	10,022	251	277	110.4%
Las Piñas	248	Manuyo	16,614	3,458	86	84	97.7%
	249	Aldana/Daniel Fajardo	23,761	4,841	121	104	86.0%
	250	Pulang Lupa	50,732	10,192	255	180	70.6%
	251	Pamplona/Zapote	70,822	13,969	349	354	101.4%
	252	BF International	77,397	15,205	380	380	100.0%
	253	Talon	78,215	15,883	396	397	100.3%
	254	Pilar	50,624	9,598	240	244	101.7%
	255	Almanza	44,921	9,472	237	240	101.3%
Total			9,454,040	1,987,659	49,722	49,144	98.8%
				Sample Rate =	2.50%		

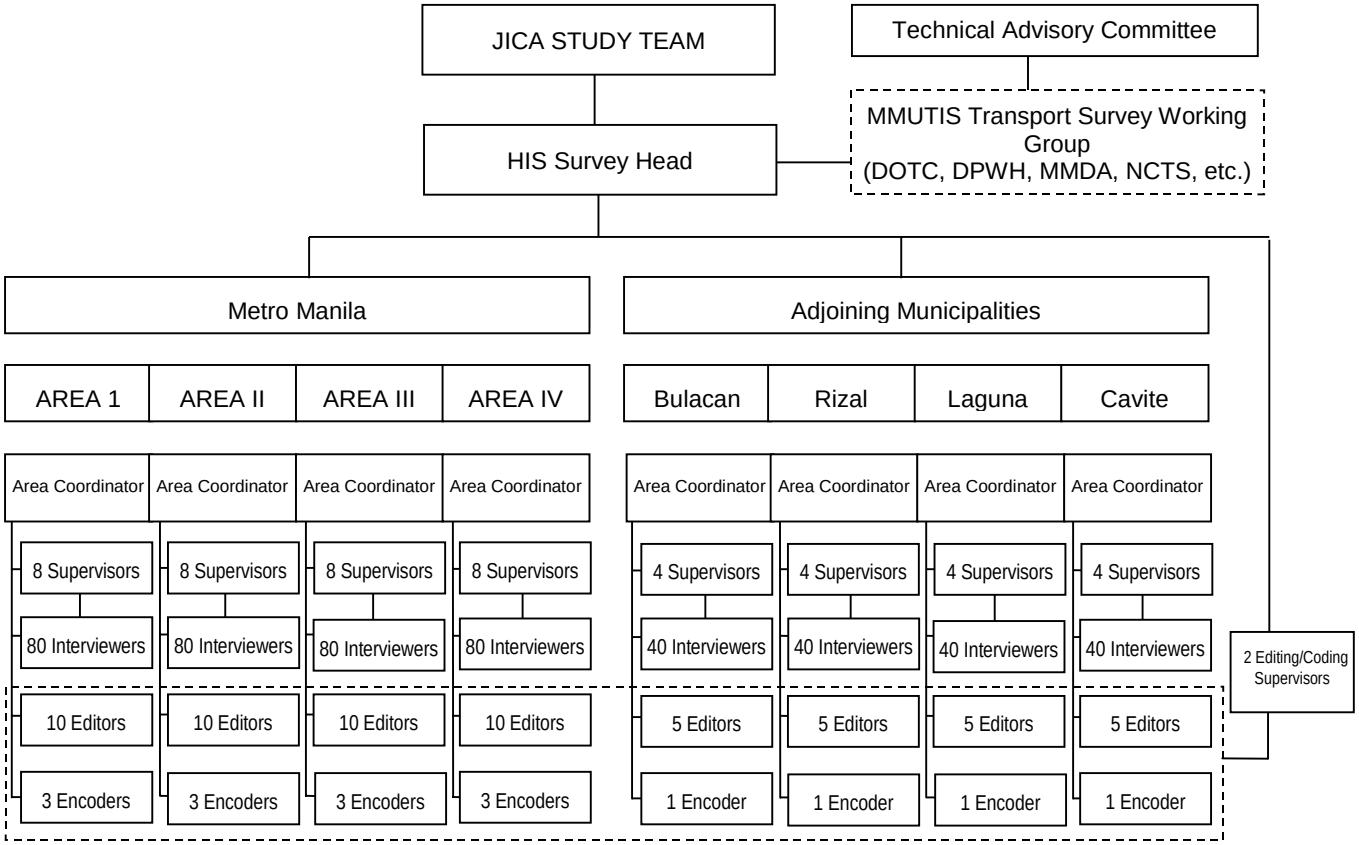
Cont. Table 3.3

Province	Zone Number	Name	Population	Household	2.5 % Sampling	Accomplishment	
						Sample	Rate
Bulacan	256	Obando	51,488	10,793	86	86	100.0%
	257	Marilao	68,752	14,545	117	117	100.0%
	258	Metcauayan	137,081	29,072	230	238	103.5%
	259	San Jose del Monte	201,690	39,609	317	268	94.0%
	260	Norzagaray	51,015	10,215	83	160	192.8%
	261	Sta. Maria	101,071	20,741	166	434	261.4%
	262	Bocaue	69,718	14,780	117	122	104.3%
	263	Bulacan	54,236	11,455	90	93	103.3%
	264	Balagtas	49,210	10,055	79	188	238.0%
	265	Pandi	40,520	7,964	61	158	259.0%
	266	Guiguinto	52,575	10,577	84	218	256.5%
	267	Plaridel	66,355	13,136	106	252	237.7%
	268	Pulilan	59,682	11,923	94	228	242.6%
	269	Malolos	147,414	30,056	240	239	99.6%
	270	Paombong	33,149	6,621	54	54	100.0%
	271	Hagonoy	99,423	19,700	159	159	100.0%
	272	Calumpit	70,839	13,923	112	272	242.9%
Cavite	273	Gen. Alvarez	86,824	16,494	133	110	82.7%
	274	Dasmarinas/ Forbes	262,406	51,189	412	448	108.7%
	275	Bacoor	250,911	53,063	419	658	157.0%
	276	Imus	177,408	36,846	294	295	100.3%
	277	Kawit	56,993	11,701	95	256	269.5%
	278	Cavite City	92,641	20,059	158	179	113.3%
	279	Niveleta	27,306	5,725	48	48	100.0%
	280	Rosario	54,086	11,463	92	91	98.9%
	281	General Trias	66,837	13,743	108	283	262.0%
	282	Tanza	77,839	15,494	125	125	100.0%
	283	Trece Martires City	20,451	3,982	31	34	109.7%
	284	Naic	58,046	11,414	91	87	95.6%
	285	Silang	124,062	23,342	188	486	258.5%
	286	Carmona (divided 1990)	35,686	7,204	59	59	100.0%
Laguna	287	San Pedro	189,333	38,932	213	464	148.7%
	288	Binan	160,206	33,168	265	265	100.0%
	289	Santa Rosa	138,257	28,771	230	340	147.8%
	290	Cabuyao	77,302	15,606	124	123	99.2%
	291	Calamba	218,951	45,261	360	552	153.3%
	292	Los Banos	71,683	14,676	118	112	94.9%
Rizal	293	Taytay	144,748	30,419	243	243	100.0%
	294	Cainta	201,550	40,671	325	325	100.0%
	295	Antipolo	345,512	71,475	572	570	99.7%
	296	San Mateo	99,217	19,652	157	388	247.1%
	297	Rodriguez	79,668	16,759	134	306	228.4%
	298	Angono	59,444	12,561	100	111	111.0%
	299	Binangonan	140,700	28,129	224	529	236.2%
	300	Cardona	35,501	7,206	57	71	124.6%
	301	Morong	36,048	7,322	58	158	272.4%
	302	Teresa	23,906	4,925	37	38	102.7%
	303	Baras	20,060	3,998	33	79	239.4%
	304	Tanay	69,181	14,042	113	103	91.2%
	305	Pililla	37,081	7,555	62	144	232.3%
	306	Jala-jala	19,873	3,871	32	78	243.8%
Total			4,913,935	1,001,883	8,004	11,474	143.4%
				Sample Rate =	0.80%		

3.4 Survey Organization

Figure 3.4 depicts the total survey organization for the HIS. It shows the organization for the administration of the field survey and the organization for carrying out the data processing activities.

FIGURE 3.4
HIS SURVEY ORGANIZATION



3.5 Survey Schedule

Table 3.4 below shows the general flow of activities of the person trip survey.

TABLE 3.4
PERSON TRIP SURVEY SCHEDULE OF ACTIVITIES

Activity	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.
1. Preparations								
a) survey approval								
b) forms design/printing								
c) recruitment								
d) training of survey								
e) zoning maps								
2. Field Survey								
a) first batch interviewers								
b) second batch interviewers								
c) call backs								
3. Editing /Coding								
a) training of editors/coders								
b) editing/coding of HIS forms								
4. Encoding								
a) data entry program design								
b) error checking program								
c) encoding of HIS forms								
5. Data Checking /Error Handing								
6. Table Outputs								

4. CORDONLINE SURVEY

4.1 Objectives

Metro Manila has strong connection with other regions economically and personally. Therefore, significant transport movements of passengers/goods among them are becoming visible.

The cordonline survey aims to determine the trips to/from the study area made by external residents and to calibrate the origin-destination matrices obtained from the person-trip survey on the study area boundary. In order to obtain such data/information, roadside OD interview survey, traffic count survey and vehicle occupancy survey were conducted on the boundary of the study area.

4.2 Survey Coverage

(1) Survey Stations

The survey stations were located on the boundary of the study area. There were 19 survey stations for the Metro Manila boundary (referred to as the inner cordon) and 14 stations for the study area boundary (referred to as the outer cordon). The survey stations were basically located on roads, and some stations were located on expressways and passenger ferry terminals for the Metro Manila boundary.

All the survey stations are listed in Table 4.1, while their locations are shown in Figures 4.1 and 4.2.

The locations and code numbers of the survey stations were principally the same with those of the following previous studies:

1) MMUTIP (Metro Manila Urban Transport Improvement Project, 1980);
2) JUMSUT (Metro Manila Transportation Planning Study, 1984); and
3) MMUES (Metro Manila Urban Expressway System Study, 1993).

(2) Survey Duration

A 24-hour traffic count and vehicle occupancy survey coupled with 16-hour roadside interview survey were conducted at 4 stations (CH04, CH09, CH12 and EX02) on Metro Manila boundary, while 16-hour traffic count and vehicle occupancy survey coupled with 16-hour roadside interview survey were conducted at rest 15 stations on Metro Manila boundary and 14 stations on the study area boundary.

The surveys were conducted on one-day of weekday except singular day, but only the traffic count survey was conducted continuously for one-week (7 days) at above 4 stations, from Monday to Sunday. The coverage by survey type is summarized in Table 4.2.

TABLE 4.1
LIST OF CORDONLINE SURVEY STATIONS

Code	Survey Station	Location
Inner Cordon (Metro Manila Boundary)		
CH01	Malabon-Obando	Boundary of Malabon & Obando (Bulacan)
CH02	Panghulo Road	Boundary of Valenzuela & Obando (Bulacan)
CH03	Gen. Vililla	Boundary of Valenzuela & Obando (Bulacan)
CH04	McArthur Highway	Boundary of Valenzuela & Meycauayan (Bulacan)
CH05	Quirino Highway	Boundary of Quezon City & San Jose D.M.(Bulacan)
CH06	Marikina-Sn. Mateo Road	boundary of Marikina & San Mateo (Rizal)
CH07	Marikina-Cargo Road	outside of intersection of Marcos & Sumulong Highway
CH08	Antipolo Road	outside of intersection of Marcos & Sumulong Highway
CH09	Ortigas Avenue	boundary of Pasig & Cainta (Rizal)
CH10	San Pedro	boundary of Muntinlupa & Laguna
CH11	Bacoor	boundary of Las Pinas & Bacoor (Cavite)
CH12	Manila-Cavite Coastal Road	boundary of Las Pinas & Bacoor (Cavite)
CH13	Imelda Avenue	Boundary of Pasig & Cainta (Rizal)
EX01	Malinta-Meycauayan	through & going into/out traffic outside of diamond
EX02	Alabang-Carmona	Through & going into/out traffic outside of intersection
EX03	Susana Heights	4 direction-traffic at Susana Heights junction
FT01	Ferry Terminal (Pier 4) *	North Pier No. 4
FT02	Ferry Terminal (Pier 14) *	North Pier No. 14
FT03	Ferry Terminal (PICC) *	Near Philippine International Convention Center
Outer Cordon (Study Area Boundary)		
CL01	Calumpit-Apalit 1 *	Boundary of Calumpit (Bulacan) & Apalit (Pampanga)
CL02	Calumpit-Apalit 2 *	Boundary of Calumpit (Bulacan) & Apalit (Pampanga)
CL03	Pililan-Baliuag *	Boundary of Pulilan & Baliuag (Bulacan)
CL04	Plaridel-Bustos *	Boundary of Plaridel & Bustos (Bulacan)
CL05	Plaridel-Angat *	Boundary of Norzagaray & Angat (Bulacan)
CL06	Pilillia-Mabitac *	Boundary of Pilillia & Mabitac (Rizal)
CL07	Los Banos-Bay *	Boundary of Los Banos & Bay (Laguna)
CL08	Calamba-Santo Tomas *	Boundary of Calamba (Laguna) & Santo Tomas (Batangas)
CL09	Silang-Tagaytay 1 *	Boundary of Silang & Tagaytay City (Cavite)
CL10	Silang-Tagaytay 2 *	Boundary of Silang & Tagaytay City (Cavite)
CL11	Gen. Trias-Amadeo *	Boundary of Gen. Trias & Amadeo (Cavite)
CL12	Trece Martires-Indang *	Boundary of Trece Martires City & Indang (Cavite)
CL13	Naic-Indang *	Boundary of Naic & Indang (Cavite)
CL14	Naic-Maragondon *	Boundary of Naic & Maragondon (Cavite)

* denotes new stations in this study

FIGURE 4.1
LOCATION OF MANILA BOUNDARY CORDONLINE SURVEY STATIONS
(INNER CORDON)

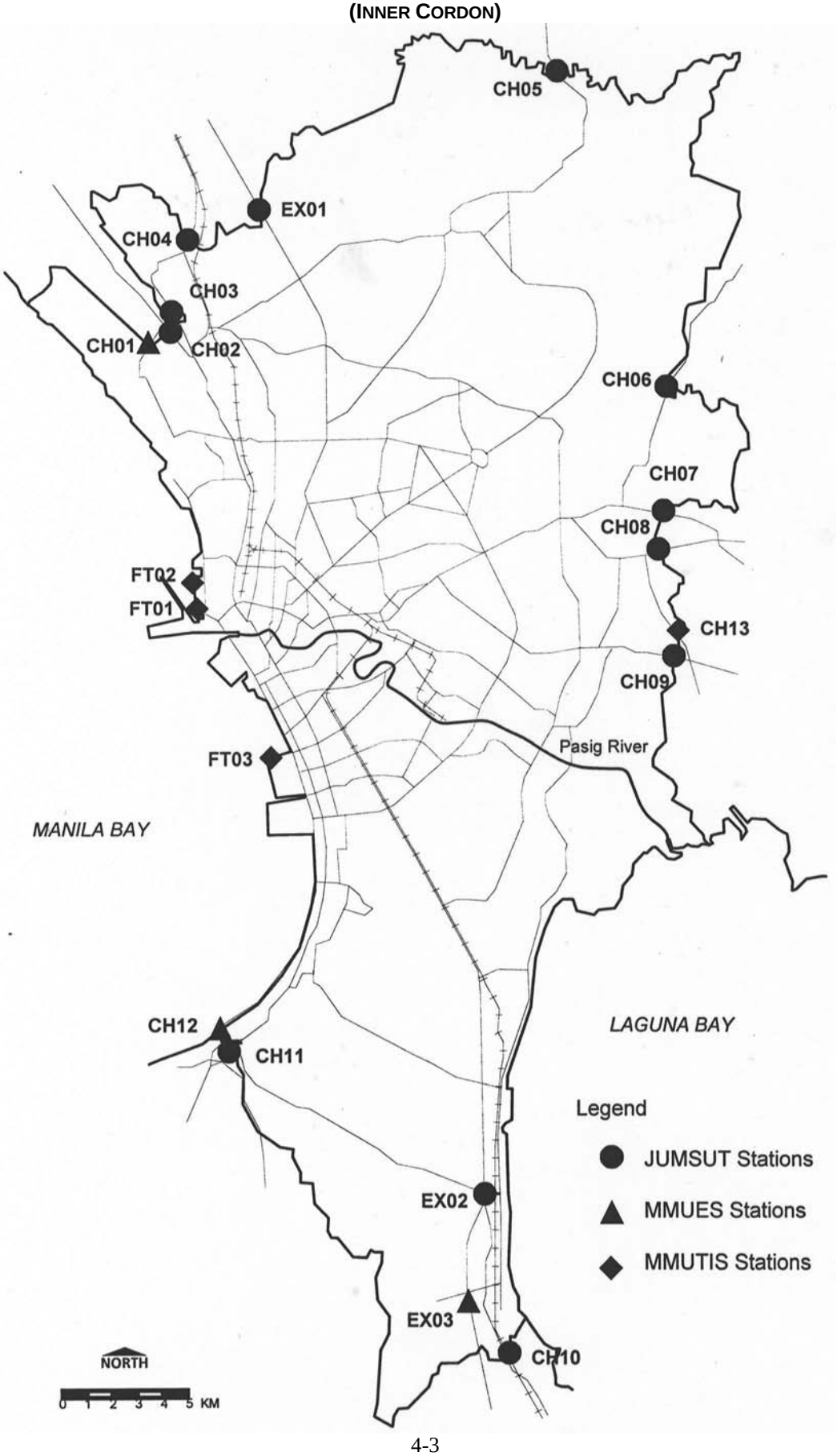


FIGURE 4.2
LOCATION OF STUDY AREA BOUNDARY CORDONLINE SURVEY STATIONS
(OUTER CORDON)

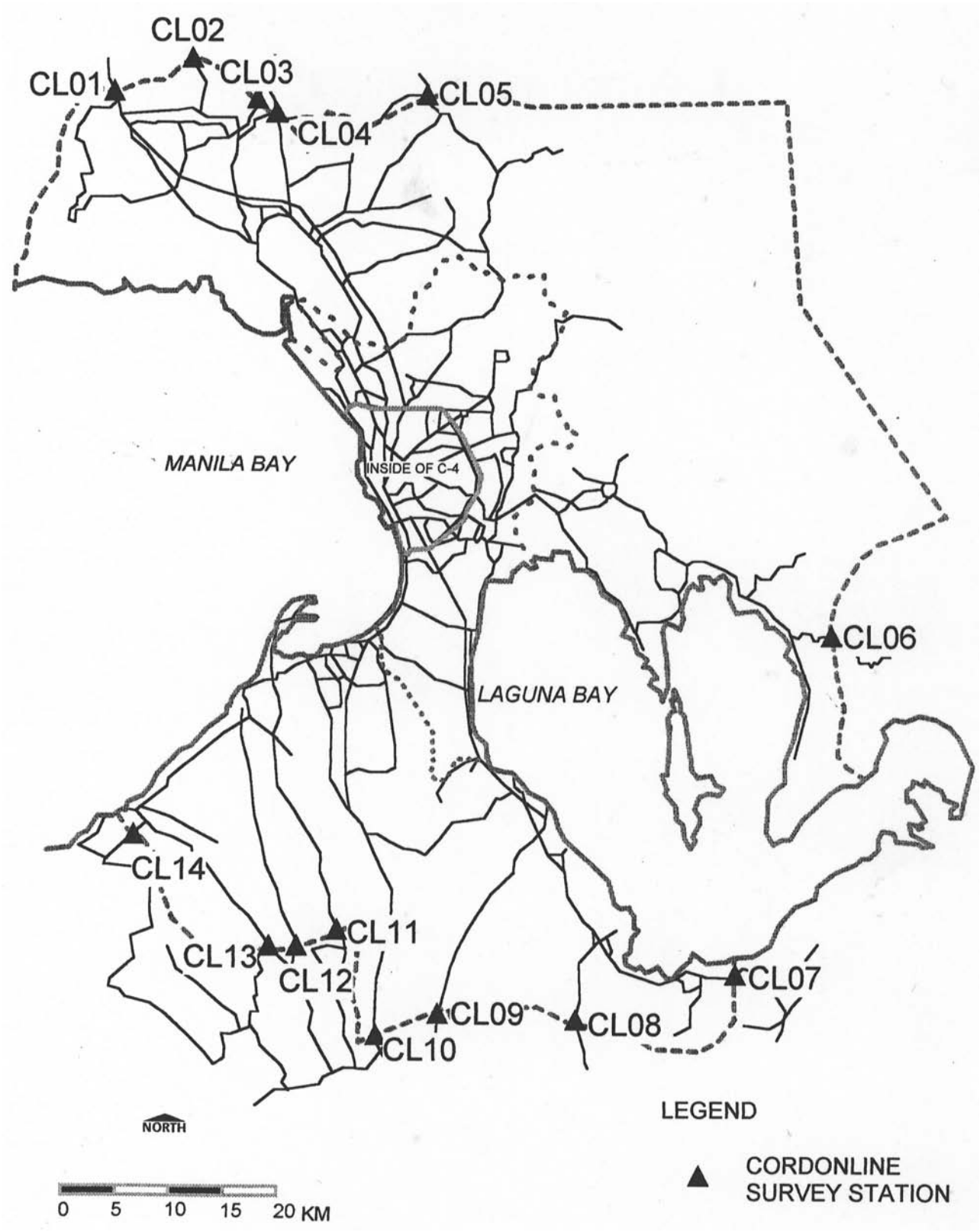


TABLE 4.2
SURVEY PERIOD AND DURATION BY SURVEY STATIONS

Code	Survey Station	Survey Period (hours)		
		Traffic Count	Vehicle Occupancy	Roadside Interview
Inner Cordon (Metro Manila Boundary)				
CH01	Malabon-Obando	16	16	16
CH02	Panghulo Road	16	16	16
CH03	Gen. Vililla	16	16	16
CH04	McArthur Highway	24 *	24	16
CH05	Quirino Highway	16	16	16
CH06	Marikina-Sn. Mateo Road	16	16	16
CH07	Marikina-Cargo Road	16	16	16
CH08	Antipolo Road	16	16	16
CH09	Ortigas Avenue	24 *	24	16
CH10	San Pedro	16	16	16
CH11	Bacoor	16	16	16
CH12	Manila-Cavite Coastal Road	24 *	24	16
CH13	Imelda Avenue	16	16	16
EX01	Malinta-Meycauayan	16	16	16
EX02	Alabang-Carmona	24 *	24	16
EX03	Susana Heights	16	16	16
FT01	Ferry Terminal (Pier 4)	16	16	16
FT02	Ferry Terminal (Pier 14)	16	16	16
FT03	Ferry Terminal (PICC)	16	16	16
Outer Cordon (Study Area Boundary)				
CL01	Calumpit-Apalit 1	16	16	16
CL02	Calumpit-Apalit 2	16	16	16
CL03	Pililan-Baliuag	16	16	16
CL04	Plaridel-Bustos	16	16	16
CL05	Plaridel-Angat	16	16	16
CL06	Pilillia-Mabitac	16	16	16
CL07	Los Banos-Bay	16	16	16
CL08	Calamba-Santo Tomas	16	16	16
CL09	Silang-Tagaytay 1	16	16	16
CL10	Silang-Tagaytay 2	16	16	16
CL11	Gen. Trias-Amadeo	16	16	16
CL12	Trece Martires-Indang	16r	16	16
CL13	Naic-Indang	16	16	16
CL14	Naic-Maragondon	16	16	16

* traffic count survey is conducted continuously for one-week (7 days)

4.3 Methodology

(1) Traffic Count Survey

The hourly vehicular traffic volume by vehicle type and by direction was counted using the survey form (Annex 2). With the exception of 4 stations (CH04, CH09, CH12 and EX02), the survey was conducted for 16 hours, starting from 6:00 a.m. While, at the 4 stations, the survey was conducted for 24 hours starting from 6:00 a.m. and continuously for one-week period (7 days). The vehicle type was classified as follow:

1) Pedicab
2) Bicycle
3) Motorcycle
4) Tricycle
5) Jeepney
6) Mini-Bus
7) Standard Bus
8) Taxi
9) HOV Taxi
10) Car/Jeep
11) School/Company/Tourist Bus
12) Utility Vehicle
13) Truck
14) Trailer
15) Others

(2) Vehicle Occupancy Survey

The number of passengers on board and the seating capacity of the sampled vehicles chosen at random was observed and recorded by hour and by vehicle type using the survey form (Annex 2).

The survey was conducted for 16 hours for all stations except the above mentioned 4 stations same as traffic count survey, starting from 6:00 a.m. At those 4 stations, the survey was conducted for 24 hours, also starting from 6:00 a.m.

The sample rate has to be determined based on the traffic volume by vehicle type. The number of vehicle to be observed was tentatively determined at least 1 per minute for buses and 2 per minute for other vehicles or all vehicles when traffic volume is small.

(3) Roadside OD Interview Survey

The roadside OD interview survey was conducted for 16 hours using the survey forms (Annex 2 for private vehicle drivers, public vehicle drivers and public vehicle passengers), starting from 6:00 a.m.

The private mode drivers and public transport passengers/drivers were interviewed. The information such as origin-destination, trip purpose, number of passengers, seating capacities etc. were obtained.

It was desirable that vehicles as many as possible are interviewed. However, the sample rate of this survey was carefully determined by the supervisor at site that the survey itself does not create the queue at the survey station.

4.4 Survey Schedule

The field survey was mostly conducted in September and October 1996. However, on stations of EX01, EX03, CH02 and CL02, it was conducted in November and December 1996 due to delays in the coordination with the toll road management office.

5. SCREENLINE SURVEY

5.1 Objectives

In the Metro Manila Urban Transportation Integration Study, the current and future origin-destination matrices were prepared as one of the important data for transportation planning. The screenline survey's objective is to provide information to calibrate the current origin-destination matrices obtained from the person-trip survey in terms of vehicular and passenger traffic. In order to obtain the required data, the following two surveys were conducted at the road section crossing the screenlines set of Metro Manila; the Traffic Count Survey and the Vehicle Occupancy Survey.

5.2 Survey Coverage

The survey stations were located on the road sections crossing on the screenlines. The screenlines were set along the Pasig River, San Juan River and Philippine National Railway (PNR) in the previous transport studies (MMUTIP in 1980, JUMSUT in 1984 and MMUES in 1993).

The number of stations was increased due to new road constructions after the previous studies. There were a total of 37 screenline stations and these stations were basically located at bridges and railway crossings of PNR.

The survey stations are listed in Table 5.1, while their locations are indicated Figure 5.1. The locations and code numbers of the survey stations are principally the same with those of the previous studies.

The traffic count and vehicle occupancy survey were conducted for 24 hours at 6 stations (SL04, SL08, SL12, SL14, SL19 and SL21), and for 16 hours at 31 stations. These surveys shall be conducted on one-day of weekdays except singular day. The coverage of the screenline survey is summarized in Table 5.2.

5.3 Methodology

(1) Traffic Count Survey

The hourly vehicular traffic volume by vehicle type and by direction was counted using the form (Annex 3). With the exception of 6 stations (SL04, SL08, SL12, SL14, SL19 and SL21), the survey was conducted for 16 hours, starting from 6:00 a.m. While, at the 6 stations, the survey was conducted for 24 hours, starting from 6:00 a.m. and continuously for one-week period (7 days).

The classification of vehicle types followed the one used for the cordonline survey (i.e., bicycle, pedicab, motorcycle, tricycle, jeepney, mini-bus, standard bus, taxi, HOV taxi, car/jeep, school/company/tourist bus, utility, truck, trailer, and others).

TABLE 5.1
LIST OF SCREENLINE SURVEY STATIONS

Screen Line	Code No.	Survey Station	Location
East-West Screen	SL01	Roxas Bridge (Del Pan Bridge)	Pasig River - Bonifacio Drive
(Pasig River)	SL02	Jones Bridge	Pasig River - Taft Avenue
	SL03	McArthur Bridge	Pasig River - Rizal Avenue
	SL04	Quezon Blvd.	Pasig River - Quezon Blvd.
	SL05	Ayala Bridge	Pasig River - Ayala Blvd.
	SL06	Nagtahan Bridge	Pasig River - Nagtahan
	SL07	Lambingan Bridge	Pasig River - New Panaderos
	SL08	Guadalupe Bridge	Pasig River - EDSA
	SL09	Bambang	Pasig River - A.Luna
	SL30	Makati-Mandaluyong Bridge *	Pasig River - Makati Avenue
	SL33	C5 *	Pasig River - C5
North-South Screen	SL10	EDSA near Roosevelt	San Juan River - EDSA
(San Juan River)	SL11	Del Monte Avenue	San Juan River - Del Monte Avenue
	SL12	Quezon Avenue	San Juan River - Queson Avenue
	SL13	E.Rodriguez Avenue	San Juan River - E.Rodrigues
	SL14	Aurora Avenue	San Juan River - Aurora Avenue
	SL15	N.Domingo	San Juan River - N.Domingo
	SL22	Shaw Blvd.	San Juan River - Shaw Blvd.
	SL23	Bagbaguin	Boundary of Valenzuela & Kalookan
	SL24	Quirino Highway	Quezon City
	SL25	Quirino Highway -Tandang Sora	Auezon City
	SL31	Araneta Avenue *	San Juan River - Araneta Avenue
	SL34	Caroline *	San Juan River - Caroline
	SL35	Road 20 *	Dario Creak - Road 20
North-South Screen	SL16	Pedro Gil	crossing of PNR & Pedro Gil
(PNR)	SL17	San Andres	crossing of PNR & San Andres
	SL18	Vito Cruz	crossing of PNR & Vito Cruz
	SL19	Buendia Avenue	crossing of PNR & Buendia Avenue
	SL20	Pasay Road	crossing of PNR & Passay Road
	SL21	EDSA	crossing of PNR & EDSA
	SL26	Nichols McKinely Road	crossing of PNR & Nichols Mckinely
	SL27	Dona Soledad Avenue	crossing of PNR & Dona Soledad
	SL28	Dr.M.L. Carreon	crossing of PNR & Dr.M.L. Carreon
	SL29	M.L. Quezon	M.L. Auezon - Bagumbayan River
	SL32	Don Basco *	crossing of PNR & Don Basco
	SL36	C5 *	crossing of PNR & C5
	SL37	Manalac Avenue *	crossing of PNR & Manalac Avenue

* denotes additional stations in this survey

FIGURE 5.1
LOCATION OF SCREENLINE SURVEY STATIONS

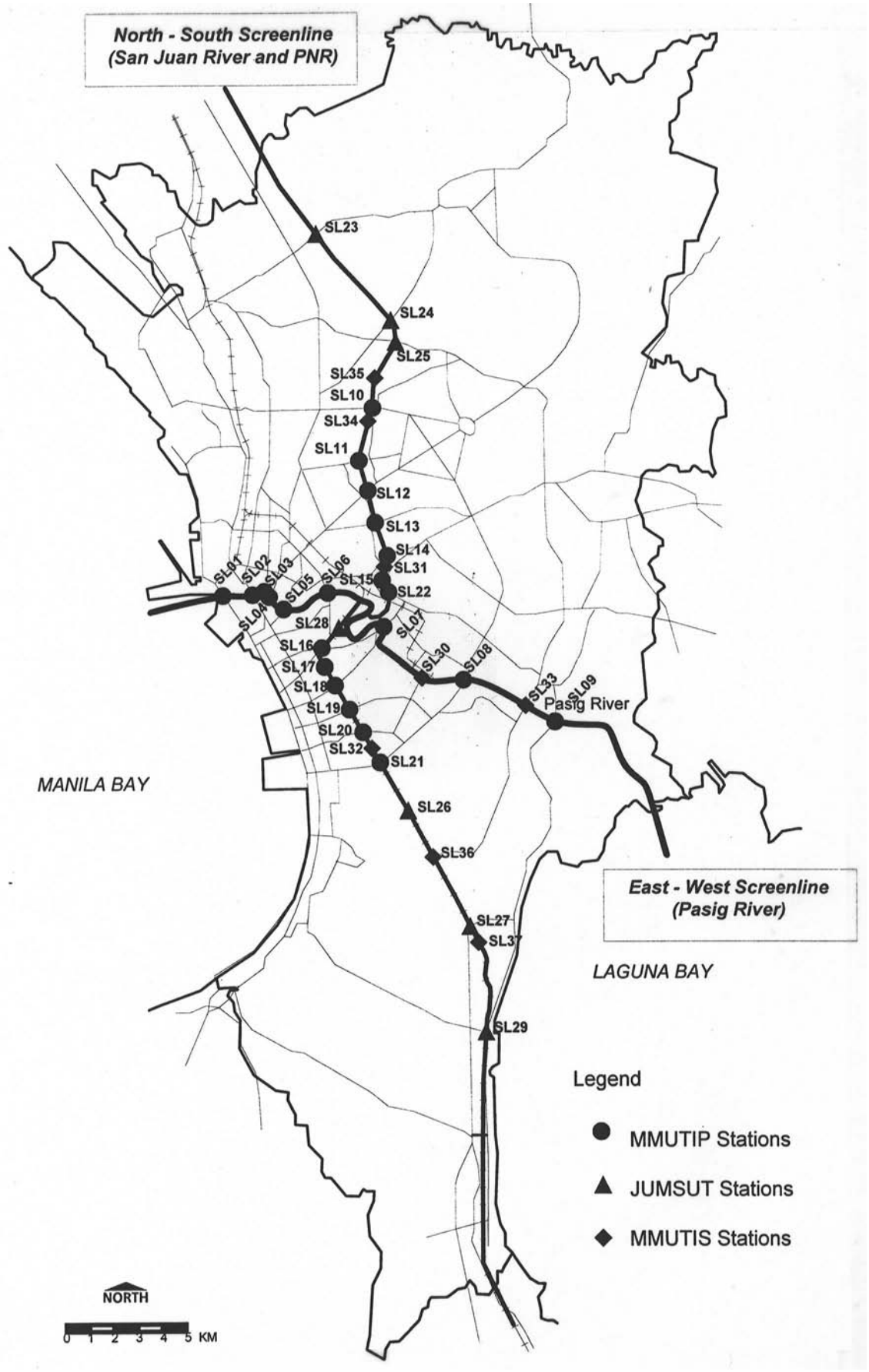


TABLE 5.2
SURVEY PERIOD AND DURATION BY SURVEY STATIONS

Screen Line	Code No.	Survey Station	Survey Period (hours)	
			Traffic Count	Vehicle Occupancy
East-West Screen (Pasig River)	SL01	Roxas Bridge (Del Pan Bridge)	16	16
	SL02	Jones Bridge	16	16
	SL03	McArthur Bridge	16	16
	SL04	Quezon Blvd.	24 *	24
	SL05	Ayala Bridge	16	16
	SL06	Nagtahan Bridge	16	16
	SL07	Lambingan Bridge	16	16
	SL08	Guadalupe Bridge	24 *	24
	SL09	Bambang	16	16
	SL30	Makati-Mandaluyong Bridge	16	16
	SL33	C5	16	16
North-South Screen (San Juan River)	SL10	EDSA near Roosevelt	16	16
	SL11	Del Monte Avenue	16	16
	SL12	Quezon Avenue	24 *	24
	SL13	E.Rodriguez Avenue	16	16
	SL14	Aurora Avenue	24 *	24
	SL15	N.Domingo	16	16
	SL22	Shaw Blvd.	16	16
	SL23	Bagbaguin	16	16
	SL24	Quirino Highway -Tandang Sora	16	16
	SL25	Quirino Highway	16	16
	SL31	Araneta Avenue	16	16
	SL34	Caroline	16	16
	SL35	Road 20	16	16
North-South Screen (PNR)	SL16	Pedro Gil	16	16
	SL17	San Andres	16	16
	SL18	Vito Cruz	16	16
	SL19	Buendia Avenue	24 *	24
	SL20	Pasay Road	16	16
	SL21	EDSA	24 *	24
	SL26	Nichols McKinely Road	16	16
	SL27	Dona Soledad Avenue	16	16
	SL28	Dr.M.L. Carreon	16	16
	SL29	M.L. Quezon	16	16
	SL32	Don Basco	16	16
	SL36	C5	16	16
	SL37	Manalac Avenue	16	16

* traffic count survey was conducted continuously for one-week (7 days)

(2) Vehicle Occupancy Survey

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 vehicle type using the survey form (Annex 3).

The survey was conducted for 16 hours for all stations except the 6 selected stations where 24-hour survey was conducted.

Although, the sample rate was determined based on the traffic volume by vehicle type, the number of vehicles observed was at an interval of least 1 per minute for buses and 2 per minute for other vehicles or all vehicles when traffic volume is small.

5.4 Survey Schedule

The field survey was conducted in September and the beginning of October 1996.

The survey on one station (SL28) was not conducted since the road was closed to traffic due to the ongoing repairs and construction of pavement.

6 PUBLIC TRANSPORTATION OPERATION/UTILIZATION CHARACTERISTICS SURVEY

6.1 Objectives

In the course of this study, policy setting for fostering the effective role of public transportation such as bus and jeepney will be discussed. For this purpose, the present conditions of public transportation shall be analyzed and evaluated in terms of operational and financial aspects.

Regarding data indicating operational aspect of bus and jeepney, it is so limited and not enough except ones done in JUMSUT. However, it is also necessary to update the previous JUMSUT's data.

Therefore, this public transportation operation and utilization characteristics survey is undertaken to obtain current operational characteristics of bus and jeepney such as travel speed, number of passengers, load factor and number of units running on the route:

6.2 Survey Coverage

The representative 102 jeepney routes and 45 bus routes were selected for the survey. These routes were selected based on the similarity of routes such as OD and "via" roads and service frequency so that all the bus/jeepney routes in the study area are covered and are shown in Table 6.1. The service frequency was obtained from bus/jeepney/tricycle terminal survey.

This survey was conducted on sample basis. The number of sampled vehicles by route was at least 3 round trips and considered depending service frequency by route.

This survey was conducted for specific time periods of the day as:

1) morning peak hours (7:00 - 10:00);
2) evening peak hours (16:00 - 19:00); and
3) interpeak hours (12:00 - 15:00).

TABLE 6.1
LIST OF BUS/JEEPNEY ROUTES SUBJECT TO THE SURVEY

No.	ORIGIN	DESTINATION	No.	ORIGIN	DESTINATION
Jeepney Route					
1	Acacia	Monumento	52	Divisoria	Velasquez
2	Alabang	Baclaran	53	EDSA Central	Pasig
3	Alabang	Bicutan	54	Evangelista	Libertad
4	Alabang	FTI	55	Fairview	Lagro
5	Alabang	GMA	56	Fairview	Philcoa
6	Alabang	Pasay	57	Fairview	T.M.Kalaw
7	Alabang	Pasay Rotonda	58	Frisco	Pantranco
8	Alabang	Zapote	59	Galleria	San Juan
9	Andalucia	BBB/Tullahan	60	Gasak	Recto
10	Angono	Binangonan	61	Grotto	Novaliches
11	Antipolo	Crossing/United	62	Guadalupe	Leon Guinto
12	Araneta Ave.	Sta. Mesa	63	Guadalupe Tulay	Pateros
13	Arroceros	Cubao	64	Junction	San Juan
14	Arroceros	Pag-asa	65	Karuhatan	Valenzuela
15	Arroceros	Proj.8	66	Katipunan	U.P. Campus
16	Ayala Center	Libertad	67	Lagro	Novaliches Bayan
17	Baclaran	Divisoria	68	Lagro	Q. City Hall
18	Baclaran	Sucat	69	Lapaz Dolo	Vito Cruz
19	Bagonbayan	Pasig	70	Lawton	Zapote
20	Balintawak	Meycauyan	71	Lealtad	Quiapo
21	Balintawak	Monumento	72	Little Baguio	San Juan
22	Banal	Novaliches	73	Malabon	Monumento
23	Bangkusay	Divisoria	74	Malabon	Sangandaan
24	Bicutan	Pasay	75	Malanday	Polo
25	Blumentritt	Divisoria	76	Malinta	Malolos
26	Blumentritt	Novaliches	77	Malinta	Meycauayan
27	Blumentritt	Novaliches	78	Malinta	Novariches
28	Blumentritt	Pasay Rotonda via Mabini	79	Marikina	Pasig
29	Blumentritt	Pasay Rotonda via Taft Ave.	80	MCU	Sangandaan
30	Blumentritt	Quiapo	81	Meycauayan	Paltok
31	Blumentritt	Remidios	82	Meycauyan	Sto. Nino
32	Bocaue	Marinta	83	Monumento	Navotas
33	Boni H-way	Stop and Shop	84	Monumento	Pier South
34	Cainta	Galleria	85	Monumento	St. Michael
35	Cogeo	Cubao	86	Munoz	Pantranco
36	Cubao	Divisoria	87	N. Harbor	Pier South (Don Bosco)
37	Cubao	Fairview	88	Paco	San Andres
38	Cubao	Lagro	89	Pantanco	Philcoa
39	Cubao	Philcoa	90	Parang/Fortune	Stop & Shop
40	Cubao	Pier South	91	Pasay Rotonda	Sucat
41	Cubao	Proj. 2&3	92	Philcoa	Quiapo
42	Cubao	Quiapo	93	Proj. 4	T.M.Kalaw
43	Cubao	Remedios	94	Proj. 6	Recto
44	Cubao	Vito Cruz	95	Proj. 8	T.M.Kalaw
45	Dapitan	Quiapo	96	Punta	Quiapo
46	Delta	Philcoa	97	Q. City Hall	Tandang Sora
47	Delta	Proj. 4	98	Quiapo	San Miguel
48	Delta-Pantraoco	Fairview	99	Rosario	San Juan
49	Divisoria	Moriones	100	Sangandaan	Sangandaan Boundary
50	Divisoria	San Juan	101	Silang	Zapote
51	Divisoria	Sangandaan	102	SSS Village	Stop and Shop
Bus Route					
1	Alabang	Bagon Silang	24	Cavite City	Zapote
2	Alabang	Calanba	25	Cubao	Dagupan
3	Alabang	Cubao	26	Cubao	Malolos
4	Alabang	Fairview	27	Cubao	Monumento
5	Alabang	Lagro	28	Divisoria	San Mateo
6	Alabang	Lawton	29	EDSA/Crossing	Tanay
7	Alabang	Lemery	30	Fairview	Gil Puyat
8	Alabang	Malanday	31	Fairview	Pedro Gil
9	Alabang	Novaliches	32	Fairview	Taft
10	Alabang	Sta. Cruz	33	FTI	Monumento
11	Alabang	UE Letre	34	Gil Puyat	Fairview
12	Angat	Divisoria	35	Gil Puyat	Monumento
13	Ayala	Fairview	36	Gil Puyat	Sta. Cruz
14	Ayala	Malabon	37	Lagro	Sapang Palay
15	Ayala	Quiapo	38	Lawton	Moonwalk
16	Baclaran	Fairview	39	Lucena	Pasay/Taft (Buendia)
17	Baclaran	Malabon	40	Makati	Quiapo
18	Baclaran	Naic	41	Moonwalk	Sta. Cruz
19	Baclaran	Novaliches	42	Pacita (San Pedro)	Pasay/Taft (Buendia)
20	Baclaran	Trece Martirez	43	Pandacan	Quiapo
21	Cabiao	Monumento	44	Pasig	Quiapo
22	Cainta	Quiapo	45	San Mateo	Tutuban
23	Cavite City	Vito Cruz			

6.3 Methodology

The survey was conducted on weekday except singular day using the survey forms (Annex 4). The buses and jeepneys on the selected routes were surveyed. The surveyors went to the terminal/turning points and rode on a vehicle of selected route and recorded continuously the number of passengers boarding/alighting by stop point until a vehicle came back to the terminal where vehicle started. The following data/information were observed in this survey:

1) Vehicle type
2) Travel Time by stop and location of stop
3) Number of passengers loading/unloading by stop
4) Load Factor
5) Number of units running on the route

6.4 Survey Schedule

Based on the results of the service frequency survey on the bus and jeepney, on-board passenger traffic count was conducted for 3 weeks starting from the 3rd week of November on the selected route with high frequency.

7 PUBLIC TRANSPORT PASSENGER INTERVIEW SURVEY

7.1 Objectives

In the course of this study, the direction for public transportation terminal improvement will be discussed and some priority projects regarding terminals will be analyzed and assessed. For this purpose, the present transfer characteristics have to be clarify.

The objective of this public transportation passenger interview survey is to obtain the present transfer characteristics of public transportation passengers at terminals. as well as their willingness-to-pay attitude for a terminal improvement which cost will be shared by them.

7.2 Survey Coverage

For this survey, 25 transport terminals were selected as the survey site including 12 jeepney terminals, 8 bus terminals and 5 LRT stations. The terminals subject to this survey were specifically determined the results of bus/jeepney/tricycle terminal survey and selected by considering combination of modes at terminal and were listed in Table 7.1.

TABLE 7.1
LIST OF TERMINALS/STATIONS SUBJECT TO THE PASSENGER INTERVIEW SURVEY

Mode	No.	Terminal	Mode	No.	Terminal
Bus	1	Alabang	**Jeepney**	1	Alabang
	2	Ayala		2	Baclaran
	3	Baclaran		3	Cubao
	4	Buendia / Leverisa		4	Divisoria
	5	Cubao (Fermar's Market)		5	Blumentritt
	6	Divisoria		6	Libertad
	7	Monumento		7	Quiapo
	8	Malanday		8	Monumento
LRT	1	Monumento		9	Zapote
	2	Blumentritt		10	Pasay Rotonda
	3	Central		11	Binan (Laguna)
	4	Gil Puyat		12	Cainta Junction (Rizal)
	5	Baclaran			

7.3 Methodology

This survey was conducted at terminals of bus, jeepney and LRT shown in Table 7.1 for 16 hours starting from 6:00 a.m. on one-weekday except singular day using the survey form (Annex 5). The passenger at the selected terminals/stations were interviewed. The information such as origin-destination, transfer route and mode of transport, willingness-to-pay for the improvement of terminals facilities were obtained from this survey.

This survey was conducted on sample basis. Although, the sample rate has to be determined based on the number of passengers transferring at the terminal, it was desirable that number of passengers to be interviewed shall be as many as possible.

The number of sampled passengers was at least 10 per hour or all passengers when the passengers volume is small.

7.4 Survey Schedule

The field survey was conducted at selected bus/jeepney terminals and LRT stations in the 2nd week of December 1996.

8 BUS / JEEPNEY / TRICYCLE TERMINAL SURVEY

8.1 Objectives

In conducting a comprehensive transportation planning based on an updated transportation database system, one of the important data/information is to grasp current service level and characteristic of public transport modes such as buses, jeepneys and tricycles.

Regarding the data of public transport route, the available bus/jeepney route inventory was updated by DOTC in 1994. However, there have been changes since then. Further, the data/information relating to the terminal facilities of each mode as well as service levels of public transport are insufficient for transportation planning.

Therefore, bus/jeepney/tricycle terminal survey aims to fill the gap in the existing data/information. To understand the current conditions, the survey was broadly divided into following 3 surveys:

1) Route Reconnaissance Survey; this survey aimes to revise the lists of bus and jeepney routes compairing with the previous official lists.

2) Terminal Location/Characteristics Survey; this survey aims to obtain the data on the location, operation and physical characteristics of all the terminals/ turning points of all public transportation mode types in the study area.

3) Bus/Jeepney Service Frequency Count Survey; this survey intends to obtain the service levels of bus/jeepney such as frequencies by route by hour. Therefore, vehicular traffic count survey shall be conducted at selected major terminals of each mode.

The results of these surveys provide the basis for expanding the data of other public transportation surveys conducted on a sampling basis. At the same time, the surveys themselves gives an overall view of public transportation operations of the study area.

8.2 Survey Coverage

1) Route Reconnaissance Survey

The major terminals of bus and jeepney in the study area were observed.

2) Terminal Location/Characteristics Survey

All bus/jeepney/tricycle terminals in the study area were observed.

3) Service Frequency Survey

The terminals subject to service frequency survey were determined by reviewing ones of DOTC and JUMSUT so that all the bus/jeepney routes in the study area are covered and are shown in Table 8.1.

TABLE 8.1
LIST OF TERMINALS SUBJECT TO BUS/JEEPNEY SERVICE FREQUENCY SURVEY

Bus Terminal					
1	Alabang	11	FTI	21	Moonwalk
2	Baclaran	12	Gil Puyat (Buendia)	22	Muntinlupa
3	Bagong Silang	13	Kamias	23	NAIA
4	Cavite City	14	Lagro	24	Novaliches
5	Cubao	15	Lawton	25	Pasay
6	Dapitan	16	Makati	26	Quiapo
7	Divisoria	17	Malabon	27	Sampaloc
8	EDSA Central	18	Malanday	28	Sta. Cruz
9	EDSA/New York	19	Marikina	29	Taft Ave.
10	Fairview	20	Monumento	30	Zabarte

Jeepney Terminal					
1	Alabang	31	Kalentong	61	Auezon Ave.
2	Amorsolo	32	Kamuning	62	Quezon City Hall
3	Angono	33	Karuhatan	63	Quiapo
4	Antipolo	34	Katipunan Ave.	64	Quirino H-Way
5	Arroceros	35	Lagro	65	Recto
6	Ayala Center	36	Leon Guinto	66	Roxas Blvd.
7	Baclaran	37	Libertad	67	San Juan
8	Balic-balic	38	Malanday	68	Sangandaan
9	Balintawak	39	Malinta	69	Scout Reyes
10	BBB/Tulahan	40	Marikina	70	SM North EDSA
11	Bicutan	41	MCU	71	San. Andres
12	Binagonan	42	Meycauayan	72	SSS Vill.
13	Blumentritt	43	Monumento	73	Sta. Cruz
14	Boni	44	Munoz	74	Stop & Shop
15	Cavite	45	N. Harbor	75	Sucat
16	Claro M. Recto	46	Novaliches	76	T.M. Kalaw
17	Cogeo (Gate 2)	47	Paco	77	Tanay
18	Crossing	48	Pag-Asa	78	Tandang Sora
19	Cubao	49	Panay Ave.	79	UP Campus
20	Dagat-Dagatan	50	Pantranco	80	Vito Cruz
21	Dapitan	51	Pasay	81	Washington
22	Delpan	52	Pasig	82	Welcom Rotonda
23	Divisoria	53	Philcoa	83	Zapote
24	EDSA Central	54	Pier South		
25	Espana	55	Project 2&3		
26	Fairview	56	Project 4		
27	Frisco	57	Project 6		
28	FTI	58	Project 7		
29	Gate 5	59	Project 8		
30	Guadalupe	60	Q-Mart		

8.3 Methodology

1) Route Reconnaissance Survey

The major 10-20 terminals of bus and jeepney in the study area were surveyed. Ocular survey was done and filled out the survey form (Annex 6). At each terminals, route name starting from these terminals and frequencies by tally method were observed.

2) Terminal Location/Characteristics Survey

All the bus/jeepney/tricycle terminals in the study area were surveyed. Ocular surveys was conducted to fill out the survey form (Annex 6) and also draw specific terminal layout plans in appropriate scale.

3) Bus/Jeepney Service Frequency Count Survey

The bus/jeepney service frequency count survey was conducted on weekday except singular day at selected 30 bus terminals and 83 jeepney terminals in the study area. At these terminals, the number of buses/jeepneys arriving/leaving was counted by route by hour for 16 hours starting from 6:00 a.m. and recorded using the survey form (Annex 6).

8.4 Survey Schedule

The route reconnaissance survey visiting major 10-20 bus/jeepney terminals was conducted in September for 2 weeks. The terminal location/characteristics survey was conducted in October. Based on the list of bus/jeepney terminals and routes which were prepared from the results of characteristics survey, service frequency survey was conducted on the selected routes. In parallel with above works, the location and characteristics of tricycle terminals in the study area, including the service area were observed in November.

9 PARKING SURVEY

9.1 Objectives

As the road traffic demand in Metro Manila has been rapidly increasing, parking problem such as shortage of parking spaces and increase of illegal parking has been becoming visible with the years. Parking restriction is one of the measures of Traffic Demand Management (TDM). At present, however, comprehensive data and information regarding parking is so limited. Therefore, it is very important for transportation planning to understand the current situation of parking system.

The parking survey aims to prepare parking database and to analyze the current situation of parking in Metro Manila, including capacity and utilization of parking spaces on and off street and typical utilization characteristics of parking and attitude of car users to parking.

For this purpose, following 3 surveys were conducted:

1) Parking Inventory Survey
2) Parking Behavior Survey
3) Car User Interview Survey

9.2 Survey Coverage

Parking spaces were physically divided into 2 types of on-street and off-street parking. The coverage of the surveys by parking type is described below.

(1) Parking Inventory Survey

For on-street parking, the coverage of this survey is entire Metro Manila.

While, for off-street parking, all buildings and spaces in selected business and commercial areas of Makati, Ortigas, Ermita/Marate, Cubao, Mandaluyong, and Binondo were surveyed.

The building use was classified into private office, government office, shopping center, hotel and others. Parking type was also divided into on-ground, under-ground, multi-story building and others.

(2) Parking Behavior Survey

For on-street parking, typical 6 road sections were selected (1 section = about 50 meter) from inside Metro Manila.

while for off-street parking, 24 parking spaces/buildings were selected from the business/commercial areas covered by the inventory survey.

The duration of survey was basically 16 hours, starting from 6 a.m.

(3) Tenant/Parking User Interview Survey

The tenant/parking user survey was conducted at same parking spaces/buildings as parking behavior survey. Survey duration was also 16 hours, starting from 6 a.m.

9.3 Methodology

(1) Parking Inventory Survey

For on-street parking, the survey used a Metro Manila road map, not a survey form, indicating a following on the map as the surveyors pass by:

1) road section used for on-street survey
2) number of parked vehicles by section
3) parking type such as parallel and right-angled
4) parking restriction such as "no-parking" and "no-parking 7 a.m. to 7 p.m."

While, for off-street parking, the surveyors visited all buildings and spaces in selected business/commercial areas such as Makati, Ortigas, Ermita/Malate, Cubao, Mandaluyong and Binondo and following items were surveyed based on the survey form (Annex 7).

1) Building Information: building name, street name, building use and number of floors
2) Parking Information: parking type, number of parking spaces, parking fee, operating period

With the result of this survey, average parking cycle a day, average utilization rate, distribution of parking hours etc. are calculated.

(2) Parking Behavior Survey

The surveyors recorded plate number of cars in the selected parking spaces/buildings every 15 minutes using the survey form (Annex 7). At the beginning and the end of the survey, the plate number of parked cars was also recorded.

(3) Tenant/Parking User Interview Survey

The tenant/parking user interview survey was conducted on one-weekday except singular day at the same selected parking space/buildings as the parking behavior survey using the questionnaire forms (Annex 7).

The parking condition and attitude to the parking charge were interviewed.

9.4 Survey Schedule

The field survey for the parking inventory was conducted in November 1996. The parking behavior and parking user interview survey were conducted in the beginning of December 1996.

10 TRAVEL SPEED SURVEY

10.1 Objectives

Recently, schemes of the Traffic Demand Management (TDM) has been installed in Metro Manila to reduce a traffic congestion. The odd-even restriction was implemented in December 1st. 1995 to regulate the entry of private vehicles in the selected major corridors. Further, as the Unified Vehicular Volume Reduction Program (UVVRP), the color coding restriction which covers all roads/streets except subdivision roads in Metro Manila was implemented in May 1996, while odd-even restriction was terminated in June 1996.

By these restrictions, it is suspected that the traffic movement pattern and travel speed on the restricted roads have been changed. Travel speed is one of the index indicating a situation of traffic congestion, and it can be also found out the road sections of bottle neck. Since 1988, the Traffic Engineering Center (TEC-DPWH) is conducting travel speed survey in the several selected routes in Metro Manila. In this study, travel speed survey aims to work out following objectives:

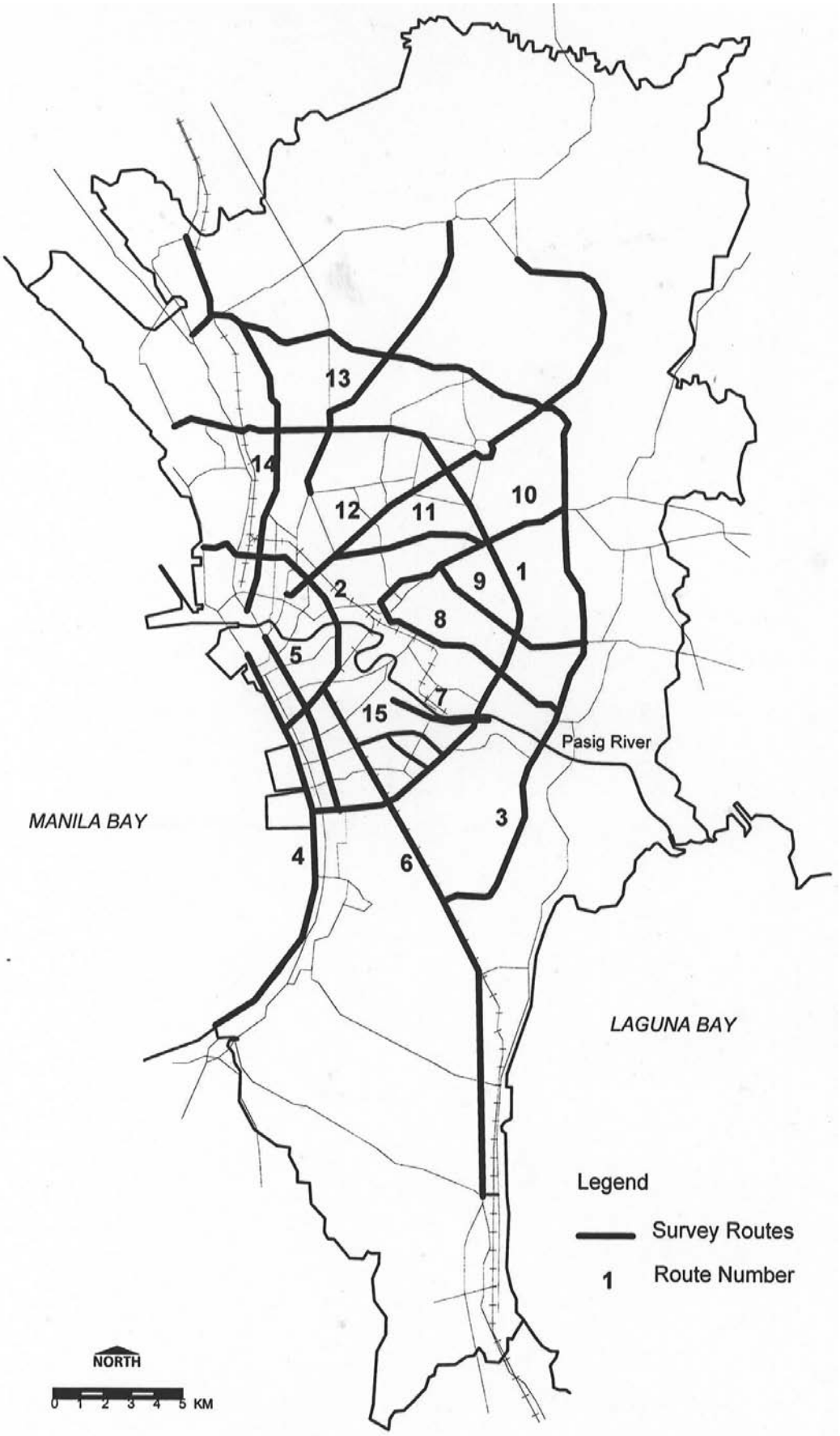
1) To understand the actual present conditions of road traffic in Metro Manila after color coding and odd-even restriction;
2) To assess the effectiveness/function of the current comprehensive TDM schemes in comparing with previous TEC data;
3) To provide data basis for analysis of the TDM schemes which will be proposed in this study; and
4) To provide data basis for calibration of current road traffic assignment.

10.2 Survey Coverage

This survey was conducted on weekday except singular day such as “Baclaran day” etc. In this survey, following 15 major routes inside Metro manila were covered and shown in Figure 10.1.

1) EDSA
2) Pres. Quirino - Tayuman
3) C5
4) Roxas Blvd. / Quirino Highway
5) Taft Ave.
6) South Super Highway
7) J.P. Rizal
8) Shaw Boulevard
9) Ortigas Boulevard
10) Aurora Boulevard
11) E. Rodrigues
12) Espana Ave. - Queson Ave. - D.M. Marcos
13) Rizal Ave. / A. Bonifacio - Quirino Highway
14) J.A. Santos - Rizal Ave. Ext. - McArthur Highway
15) Buendia - Ayala

FIGURE 10.1
ROUTE OF TRAVEL SPEED SURVEY



Further, this survey covered following three (3) time period:

1) Morning Peak Hours (7:00 - 10:00);
2) Evening Peak Hours (16:00 19:00); and
3) Interpeak Hours (12:00 - 15:00).

10.3 Methodolody

This survey was done by floating car method. 3 round trips survey by route by time period was conducted using survey form (Annex 8). In this survey, following survey items were indicated on the this form:

- Starting/Arriving Time
- Travel Time by Intersection
- Time of Stop/Start and delay cause

10.4 Survey Schedule

The field survey has been started in the beginning of October 1996 and accomplished within November 1996. It took 2 to 3 days to cover 3 round trips for one survey route because of the route distance and traffic congestion.

11 TRUCK TRAFFIC SURVEY

11.1 Objectives

The truck survey was conducted to work out following objectives:

1) To understand the characteristics of current goods flow in and around Metro Manila;
2) To obtain the information of goods origins/destinations by commodity type;
3) To assess the present condition of truck terminals, truck routes and time restrictions; and
4) To provide data basis, for instance, for development of truck terminals and planning of truck routes and time restrictions.

For this purpose, following surveys were conducted:

1) Traffic Count Survey
2) Roadside Interview Survey

11.2 Survey Coverage

To obtain the information of goods flow, truck survey was conducted not only at the gates of Manila port where is main origin and destination of goods flow, but also at same stations as in cordonline survey on the Metro Manila boundary.

8 gates at Manila port and 5 cordonline stations were selected as stations of this survey. These stations were listed in Table 11.1, and their locations were shown in Figure 11.1 and 11.2.

The survey was conducted for 16 hours at all stations, starting from 6:00 a.m.

TABLE 11.1
SURVEY STATIONS AT MANILA PORT AND ON CORDONLINE

Code	Station	Location
Gates at Manila Port		
MP01	North Harbor	Pier 2 Gate
MP02		Pier 4 Gate
MP06		Pier 12 Gate
MP08		Pier 16 Gate
MP09	South Harbor	Gate 1 (Manila Hotel Side)
MP11		Gate 6 (8th Street)
MP12		Gate 7 (Muelle Tacoma)
MP13	MICT	Access Road of MICT (Manila International Container Terminal)
Cordonline Stations		
CH04	McArthur Highway	boundary of Valenzuela & Meycauayan (Bulacan)
CH05	Quirino Highway	boundary of Quezon City & San Jose D.M. (Bulacan)
CH08	Antipolo Road	outside of intersection of Marcos & Sumulong Highway
CH09	Ortigas Avenue	boundary of Pasig & Cainta (Rizal)
CH12	Manila-Cavite Coastal	boundary of Las Pinas & Bacoor (Cavite)

FIGURE 11.1
LOCATION OF TRUCK SURVEY STATIONS AT PORT OF MANILA

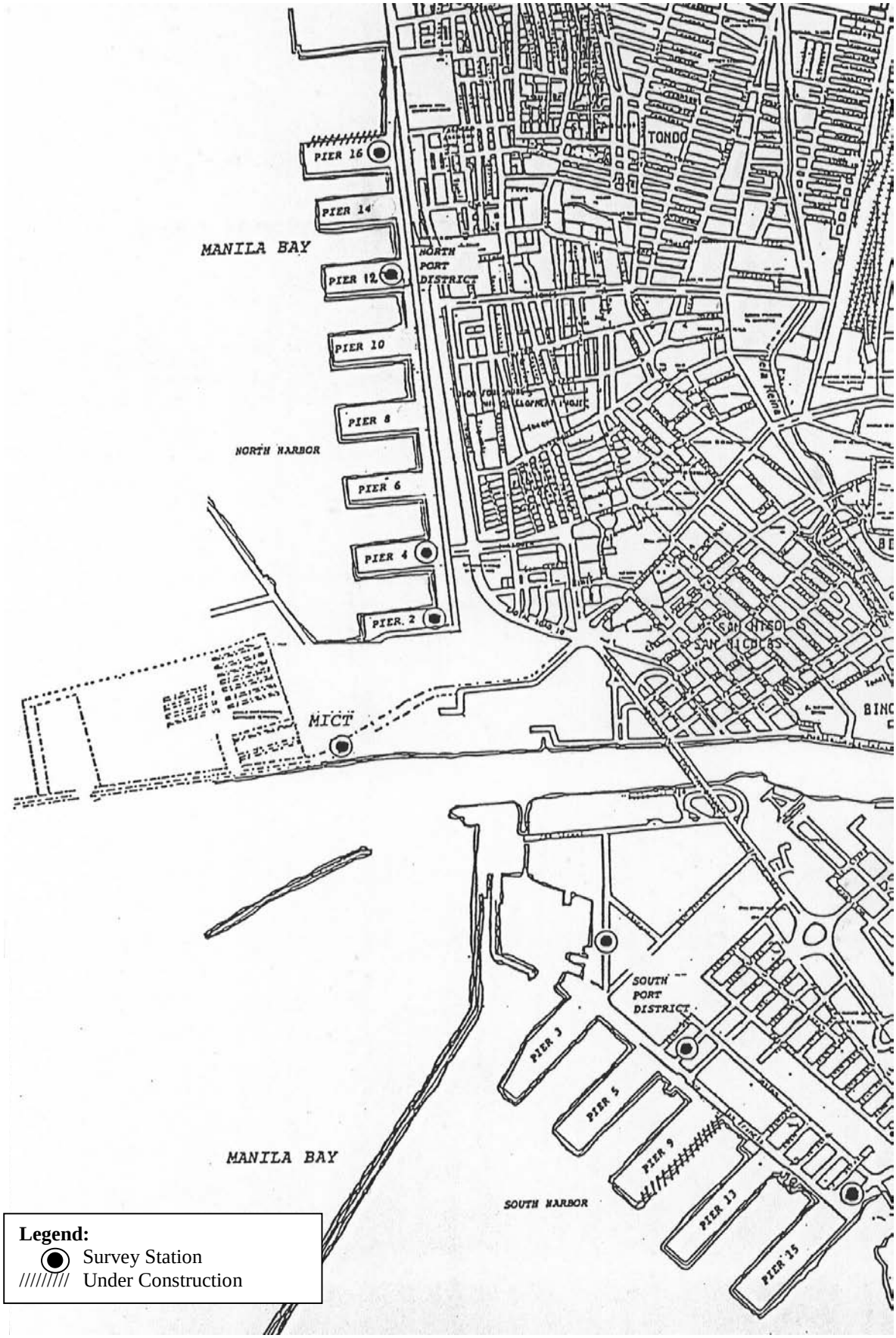
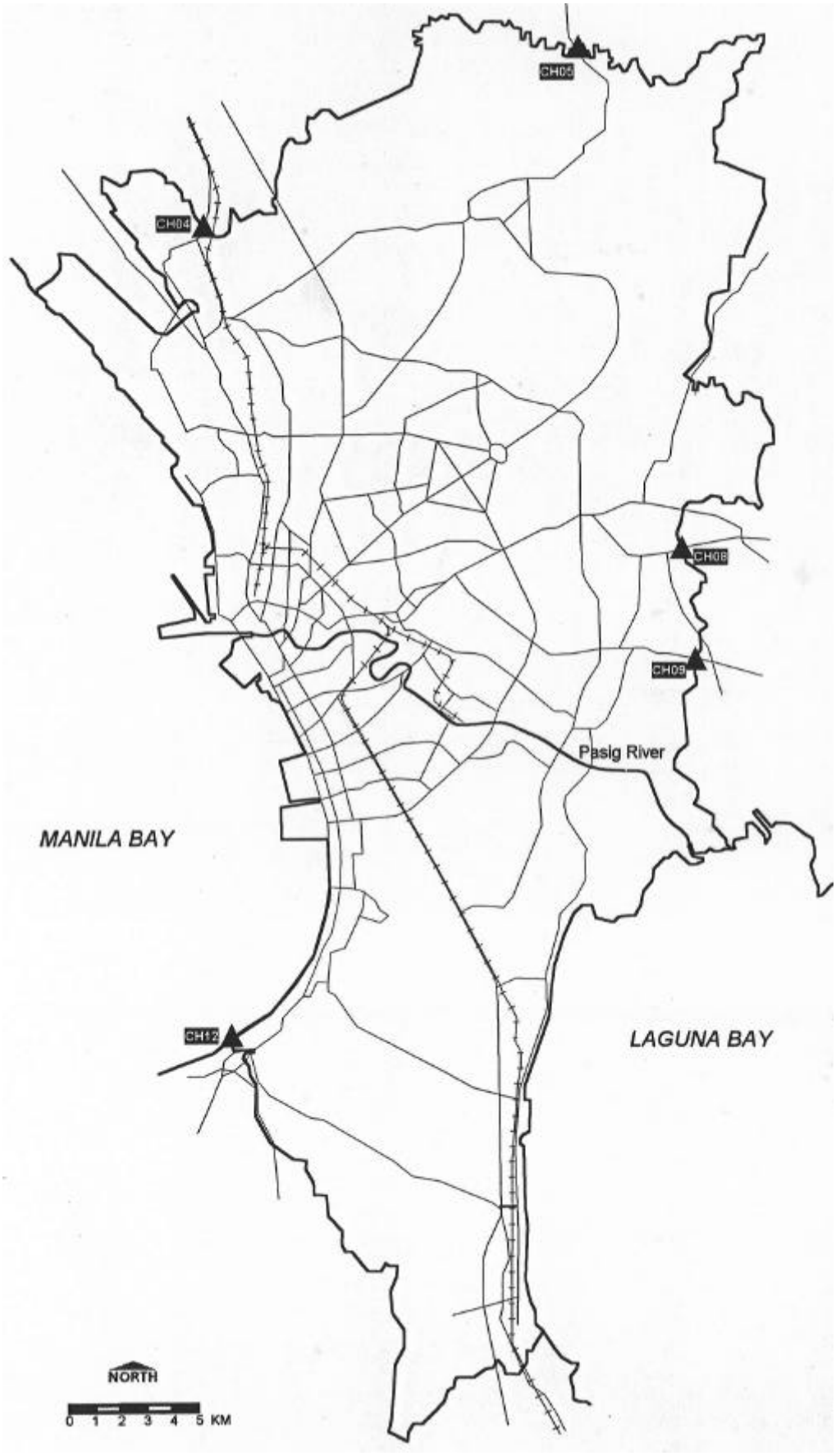


FIGURE 11.2
LOCATION OF TRUCK SURVEY STATIONS ON CORDONLINE



11.3 Methodology

(1) Traffic Count Survey

This survey was conducted for 16 hours on one-weekday except singular day. The hourly cargo vehicular traffic volume by vehicle type and direction was counted using the form (Annex 9). The cargo vehicle type shall be classified as follow:

1) Jeepney / Van / Pick-up / Station Wagon
2) Light Cargo Truck
3) Truck 2-axle
4) Truck 3-axle
5) Dump Truck
6) Trailer w/ Container
7) Trailer Head Only
8) Tank Lorry
9) Mixer

(2) Roadside Interview Survey

The roadside interview survey was conducted on same day as traffic count survey for 16 hours using the survey form (Annex 9). The cargo vehicle drivers were interviewed. The information such as origin-destination, loading capacity, commodity type, load factor and so on was obtained from this survey.

It was desirable that vehicles as many as possible are interviewed. However, the sample rate of this survey was carefully determined by the supervisor at site that the survey itself does not create the queue at the survey station.

11.4 Survey Schedule

The field survey was conducted simultaneously with cordonline and screenline surveys for 2 weeks in October 1996.

12. BUS / JEEPNEY / TRICYCLE / TAXI DRIVER INTERVIEW

12.1 Objectives

In the course of the Metro Manila Urban Transportation Integration Study, policy setting for fostering the effective role of public transport such as bus, jeepney, tricycle and taxi were discussed based on the condition of public transport industries evaluated in terms of financial and operational aspects.

In the case of Metro Manila, it is usual that drivers of public transport vehicles are not the operators. Most drivers are just borrowing the vehicle from operators and getting profit from fare income excluding boundary fee for operator and expenses such as fuel cost, terminal fee, etc. The operators are considering only the supervision of boundary fee and repayment of loans made for acquiring the vehicle.

Therefore, to know the actual working conditions of the drivers of public transport and to supplement the operational characteristics data obtained by operator survey, it was necessary to conduct the interview survey of the public transport drivers.

12.2 Survey Coverage

For this survey, 10 representative transport terminals were selected by mode type in consultation with the counterpart agencies and after the review of the JUMSUT output. These terminals are listed in Table 12.1.

TABLE 12.1
LIST OF TERMINALS SUBJECT TO THE DRIVER INTERVIEW SURVEY

Mode	No.	Terminal	Mode	No.	Terminal
Bus	1	Alabang	**Tricycle**	1	Sta. Ana
	2	Ayala / Leveriza		2	Libertad St./ EDSA
	3	Baclaran		3	Trabajo / J.P. Rizal
	4	EDSA Central		4	Filinvest Homes
	5	Cubao		5	15th Ave., Q.C.
	6	Divisoria		6	Tolentino / Del Monte
	7	Monumento		7	Rizal Ave./ 6th Ave.
	8	PICC / Roxas Blvd.		8	Sucat Road / SSH
	9	Malanday		9	Marcos Alvarez/ Nat'l Highway
	10	Taytay (Rizal)		10	Cainta Junction (Rizal)
Jeepney	1	Alabang	**Taxi**	1	Cuneta Ave.
	2	Baclaran		2	Monumento / Victory
	3	Cubao		3	Libertad / Holiday Plaza
	4	Divisoria		4	Old Sta. Mesa
	5	Blumentritt		5	Pasig Blvd.
	6	Libertad		6	Makati Commercial Center
	7	Novaliches		7	MEGA Mall
	8	Pasay Rotonda		8	SM City
	9	Cainta Junction (Rizal)		9	Alabang Commercial Center
	10	Imus (Cavite)		10	Cainta Junction (Rizal)

12.3 Methodology

The survey was conducted at transport terminals for 16 hours starting from 6:00 a.m. on one weekday using the survey forms shown in Annex 10. The drivers at the selected terminals were interviewed. The information such as working conditions, operating information and so on were obtained from this survey.

This survey was conducted on sample basis. Although sampling by vehicle type was to be determined based on the number of vehicles turning at the terminal, it was decided that the number of drivers to be interviewed shall be as many as possible. The number of sampled drivers by vehicle type was at least 6-10 per hour or all drivers when the traffic volume was small.

12.4 Survey Schedule

The field survey was conducted at selected bus/jeepney/tricycle terminals and waiting spaces for taxi during the first week of December 1996.

13. AIRPORT TRAFFIC SURVEY

13.1 Objectives

The airport of Metro Manila, including NAIA (Ninoy Aquino International Airport) and the domestic airport, is one of the largest sources of trip generation/attraction. However, due to the nature of air trips which are made occasionally by airport users, the travel movements to/from the airport were hardly captured by the person-trip survey. Hence, in order to know the actual situation in relation to airport traffic, the following surveys were conducted:

1) Airport Employee Survey

This survey aimed to obtain the data from agencies/establishments in the airport such as major activities, traffic movement etc. and from their staffs/employees such as distribution of residence, mode of travel to/from the airport and working hours etc.;

2) Traffic Count and Vehicle Occupancy Survey

This survey aimed to obtain the hourly traffic volume of vehicles and passengers at entrances/exits of NAIA terminal, domestic terminal and other airport facilities;

3) Air Passenger Interview Survey

This survey aimed to obtain air passenger's/crew's trip information such as origin/destination, travel mode to/from airport and trip purpose and it was conducted at NAIA and domestic terminals; and

4) Well-Wisher/Visitor Interview Survey

This survey aims to obtain trip information from well-wishers/visitors and it was conducted in front of NAIA and domestic terminals.

13.2 Survey Coverage

(1) Airport Employee Survey

This survey was conducted on sample basis. Some agencies/establishments located in the airport were selected as the target of this survey to obtain their activities, traffic movement, etc. Staffs/employees from sampled agencies/ establishments were interviewed using the questionnaire shown in Annex 11.

(2) Traffic Count and Vehicle Occupancy Survey

The survey stations were located at all entrances/exits of NAIA, domestic and cargo terminals shown in Figure 13.1.

The traffic count and vehicle occupancy surveys were conducted for 24 hours at all stations starting from 6:00 a.m.

(3) Air Passenger Interview Survey

The air passengers and crews at NAIA and domestic air terminals were interviewed. The survey was conducted for 24 hours starting from 6:00 a.m.

The survey was conducted on sample basis. Although the sample rate was supposed to be determined based on the number of air passengers, it was decided that the number of passengers to be interviewed be as many as possible. The number of sampled passengers was at least 1 per 3 minutes or all passengers when the passenger volume was small.

(4) Well-Wishers/Visitors Interview Survey

The well-wishers and visitors in front of NAIA and domestic terminals were interviewed for 24 hours.

This survey was conducted on sample basis following the procedure adopted for the air passenger interview survey.

13.3 Methodology

(1) Airport Employee Survey

The questionnaires for agencies/establishments and staffs/employees (Annex 11) were distributed and collected to/from sampled agencies/establishments located inside the airport. The questionnaires were filled out by personnel in charge of management and/or operation and staffs employees of sampled agencies/establishments. The questionnaire consisted of following items:

a) Information of Agencies/Establishments
- Organization
- No. of Permanent/Contractual Employees
- No. of Vehicles Owned and Rented
- Inter-City and Inter-Terminal Traffic Movement
- Others

b) Information of Staffs/Employees
- Home Address
- Usual Working Hours
- Type of Commuting Mode to/from the Airport
- Working Days a Week
- Others

(2) Traffic Count and Vehicle Occupancy Survey

The hourly vehicle traffic volume by vehicle type by directions was counted on one weekday at all entrances/exits of NAIA, domestic and cargo terminals using the survey form shown in Annex 11. The survey was conducted for 24 hours. The vehicle type was classified in the same manner as the cordonline survey.

The vehicle occupancy survey was conducted at the same day and stations as the traffic count survey for 24 hours. The number of passengers on board and seating capacities of the sample vehicles chosen at random were observed and recorded by hour and by vehicle type using the survey form shown in Annex 11.

The sample rate of vehicle occupancy survey was at least 1 per minute for buses and 2 per minute for other vehicles or all vehicles when traffic volume was small.

(3) Air Passenger Interview Survey

The passengers and crews at NAIA and domestic terminals were interviewed for 24 hours using the survey form (Annex 11). The information such as origin-destination, travel mode to/from the airport, trip purpose etc. were obtained from this survey.

(4) Well-Wishers/Visitors Interview Survey

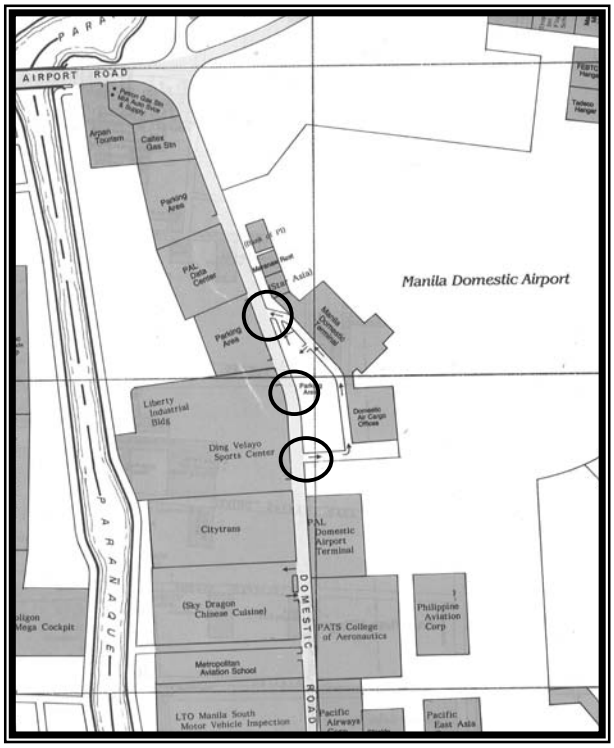
The well-wishers and visitors in front of NAIA and domestic terminals were interviewed for 24 hours using the survey form (Annex 11). The same information as the air passenger interview survey from well-wishers and visitors were obtained from this survey.

13.4 Survey Schedule

The field surveys were conducted at 4 terminals of NAIA, domestic, grand air and cargo in mid-November 1996.

Figure 13.1
Location of Survey Stations
(Traffic Count and Vehicle Occupancy Survey)

Domestic Terminal



International Terminal and Cargo Terminal

14. BUS/JEEPNEY OPERATOR INTERVIEW SURVEY

14.1 Objectives

It is recognized that the buses and jeepneys are major forces of the Metro Manila public transportation. Hence, policy setting for fostering the effective role of transport operators is important for future public transport improvement. However, documents and/or statistics in this field are so limited to allow a better understanding of the operational and financial conditions of public transport operators.

The Bus/Jeepney Operator Survey, therefore, was undertaken with the following objectives:

1) To understand the existing institutional/regulatory framework related to the bus/jeepney operators;

2) To make a list of bus/jeepney operators; and

3) To look into further operational/financial condition of bus/jeepney operators: organization, owned/operating vehicles, employment system, financial performance (balance between cost and revenue) and other information.

In order to obtain detailed and direct information from bus/jeepney operators, direct interview survey was conducted based on a specific questionnaire shown in Annex 12.

The results of these surveys will provide substantial information on the bus and jeepney industries and operations.

14.2 Survey Coverage

According to the data from DOTC, 438 bus operators have been operating in July 1995. All the bus/jeepney operators which have legal status in Metro Manila were subject to the survey, however, from the list, 51 bus operators, 49 jeepney operators and 18 jeepney cooperatives shown in Table 14.1 were selected as respondents of the direct interview survey in consultation with the counterparts.

14.3 Methodology

The interviewers visited the selected bus/jeepney operators to interview with right person such as operating and/or financial managers as respondents of this survey. The interview was based on the questionnaires shown in Annex 12 .

TABLE 14.1
LIST OF BUS/JEEPNEY OPERATORS INTERVIEWED SURVEY

No.	Bus Operator	Jeepney Operator	Jeepney Operator
1	Califolnia Bus Lines	Barnabe, Carmelita	Alabang TSCI
2	Santrans Bus Co.	De Castro, Melanio	Sta. Ana TSCI
3	MINA'S Transit	Sarmiento, Artemio	Basicano TSCI
4	Alladin & Viva Trans	Chavez, Monico	Lagro TSCI
5	St. Rose Transit	Terania, Mely	Commonwealth TSCI
6	Pascual Liner	Gagno, Abelardo	Marikina TSCI
7	JELL Transport	De La Cruz, Rodolfo	Antipolo TSCI
8	Columbus Phil Bus Corp.	Vergara, Helen	Crame TSCI
9	Delta	Velasco, Soledad	Pandacan TSCI
10	Marikina Auto Lines	Lepez, Anita	Majesa TSCI
11	ROVAL Express	Policarpio, Rolando N.	Sta. Quiteria TSCI
12	VILFRAN Lines	San Miguel, Rufino	Punta TSCI
13	MAFEL Transit	Magboo, Amelia	Tatalon TSCI
14	Desert Fox	Santos, Eustacio S.	A. Roces TSCI
15	Don Marinao Transit Corp.	Dilapdilap, Moises	Project 4, Quirino 2/3 TSCI
16	PRCG Transport System	Joyosa, Vidal	Quezon City TSCI
17	NS Transport	Villanueva, Catalina M.	KamiasTSCI
18	Ismael Bus Lines	Almeda, Florida	Kamuning TSCI
19	Ciudad Transport Service	Casabon, Melencio	
20	PRINCE	Nieto, Mamerto I.	
21	JMA/AMJ	Bernardo, Abraham	
22	Phil. Hawk Transport Corp.	Lopez,Eugenio	
23	Phoenix Transport Corp.	Villanueva, Rodolfo C.	
24	CIGN Transport	Draculan, Aurora	
25	Golden Highway	Tirona, Dominador (Richard)	
26	BBL	Juanson, Milagros	
27	Genesis	Santero, Roque	
28	Network	Songculan, Tita	
29	RAMT Transport Service	Alcazar, Richard	
30	RCJ Lines	Pantaleon, Brigeda C.	
31	Highway Star	Lim, Albert S.	
32	Solar Winds	Santos, Amable R. (Nora)	
33	Movers Express	Lopez, Lucrecia	
34	Crow Transport	Mamaril, Benjamin	
35	Fast Trans	Ladia, Cristiina A.	
36	EDT Transit, Inc.	Palla, Dionisio	
37	Gold Lion Transport Corp.	Ramos, Rudy	
38	MANLY Express	Del Rosario, Purificacion	
39	Bernika Transport	Flores, Raymundo	
40	Trans Travel Tourister	Gamboa, Evangeline	
41	JPT Transport	Capalungan, Inocencio	
42	M.A.C. Lines	Valdez, Romualdo	
43	Steadfast	Pangilinan, Candido	
44	Jason Liner	Urminite, Cristina	
45	FJ Transit	Solis, Conrado	
46	Fides	Riguerra, Victoriano	
47	Family Transport	Sta. Maria, Conrado	
48	ECR Transit	Monzon, Consolacion	
49	VL Transport	Miranda, Francisco	
50	City Lines		
51	KAT Lines		

14.4 Survey Schedule

The interviews with available public transport operators were conducted in August and October

15. ROAD INVENTORY SURVEY

15.1 Objectives

The survey aimed to establish a base road network for data collection, analysis and planning of various MMUTIS tasks with regard to roads in Metro Manila.

15.2 Survey Coverage

This survey covered all major roads inside Metro Manila and those in the adjacent municipalities (those included in the Study Area only). Actually, the survey coverage was as follows:

a) All the roads covered by JUMSUT;
b) New major roads completed after JUMSUT; and
c) All the roads serviced by bus or jeepney.

Survey items were identified by road section as follows:

1) Road Name, Section Name, Road Length (kms)
2) Road Width: No. of lanes
   Carriageway Width (m)
   Sidewalk Width (m)- right/left
   Median Strip Width (m)
3) Pavement: Type (Asphalt/Concrete)
   Pavement Condition (indicative)
   - Crack
   - Pothole
   - Pathwork
   - Others
4) Side Friction: (indicative) Parking (On-road, On-sidewalk)
   Vendors/ hawkers
   Passenger waiting for PUJ/PUB on Road
   Market

The last two items (pavement and side friction) were not covered by JUMSUT. Considering the worsening traffic situation, however, they were included in this study.

15.3 Methodology

A team of two surveyors went around in a car to all the predetermined streets in Metro Manila. They observed the streets at first, and, if any difference from the JUMSUT road inventory was observed, or if it was a new road, they measured the road by a tape measure. Pavement condition and side friction were observed and recorded for all the streets.

15.4 Survey Schedule

The field survey started and ended in November 1997 for roads in Metro Manila. The survey duration was 25 days in the metropolis. In January and February of 1998, the roads in the adjacent municipalities were surveyed.

16. LAND USE SURVEY

16.1 Objectives

The land use survey was principally conducted to determine the present land use patterns in the study area. The information derived by this undertaking was imperatively needed to outline the type of traffic generating and attracting areas. Moreover, the information is also intended to determine the changes and trends in land uses.

16.2 Methodology

The methodology of the land use survey entailed the identification of the land area according to use and plotting of the approximate location on the base map. The base map showed the boundaries, roads and blocks. Surveyors were trained in identifying the types of land uses based on the following land use categories:

(a) R1: areas with residential buildings of the single dwelling unit types.
(b) R2: areas with residential buildings of the multi-storey types.
(c) R3: areas with temporary housing units.
(d) RC: areas of mixed residential-commercial (i.e., houses with "sari-sari" stores, dress shops, barber shops, etc. and commercial buildings with residential units.
(e) BR: mixed business-residential areas.
(f) BC: mixed business-commercial areas.
(g) B: business
(h) C: buildings utilized solely for commercial purposes: department store, market, shopping centers.
(I) Ind1: large scale industrial
(j) Ind2: small scale industrial
(k) IndR: mixed industrial-residential
(l) Inst1: areas and buildings used for government offices
(m) Inst2: areas and buildings used for schools, learning institutions and cultutral activities.
(n) Inst3: areas and buildings used for hospitals and health centers.
(o) Inst4. areas and buildings used for churches, shrines, cemetery and other religious facilities.
(p) Rec: areas and buildings used for recreational purpose, theaters, gymnasia, sports center.
(q) M: military camps, etc.
(r) S: service utilities and related facilities
(s) T: transportation
(t) P: parking

The surveyors were made to investigate all buildings, structures and open spaces in the identified survey area. For buildings/structures, the surveyors noted the predominant activities within the buildings or of the area. The information gathered are then translated and consolidated on scaled maps per CBD.

As parking areas are identified in this survey, the listed places became the reference data for the undertaking of the parking survey. The selection of parking sites to survey was based entirely on this list which offered data on the location, the type of parking site (on road or off road), the number of stalls or lots and parking area size.

16.3 Survey Coverage

The identified areas covered for the survey were basically the following:

a) Old and new central business districts (CBDs);
b) Areas with marked changes in their land use;
c) Areas experiencing progressive growth in recent years; and
d) Areas with established land use framework.

The location of the selected areas are shown in Figure 16.1. They were segregated as areas within Metro Manila and those outside the metropolis but within the study area. For those outside the metropolis, only the town proper (populations) were surveyed.

Within Metro Manila

1. Makati
2. Ermita
3. Cubao
4. Ortigas
5. Binondo
6. Mandaluyong
7. Novaliches

North of Metro Manila within Study Area

1. Meycauayan
2. Malolos
3. Plaridel
4. Calumpit

East of Metro Manila within Study Area

1. San Mateo
2. Cainta
3. Antipolo

South of Metro Manila within Study Area

1. Kawit
2. General Trias
3. Trece Martires City
4. San Pedro
5. Dasmarinas
6. Carmona
7. Calamba

16.4 Survey Organization

The hierarchy of personnel that carried out this survey in both the field work and office processing of data is shown in Figure 16.2.

16.5 Survey Schedule

The chart in Figure 16.3 indicates the flow of activities for this survey.

FIGURE 16.1
SELECTED AREAS FOR THE LAND USE SURVEYS

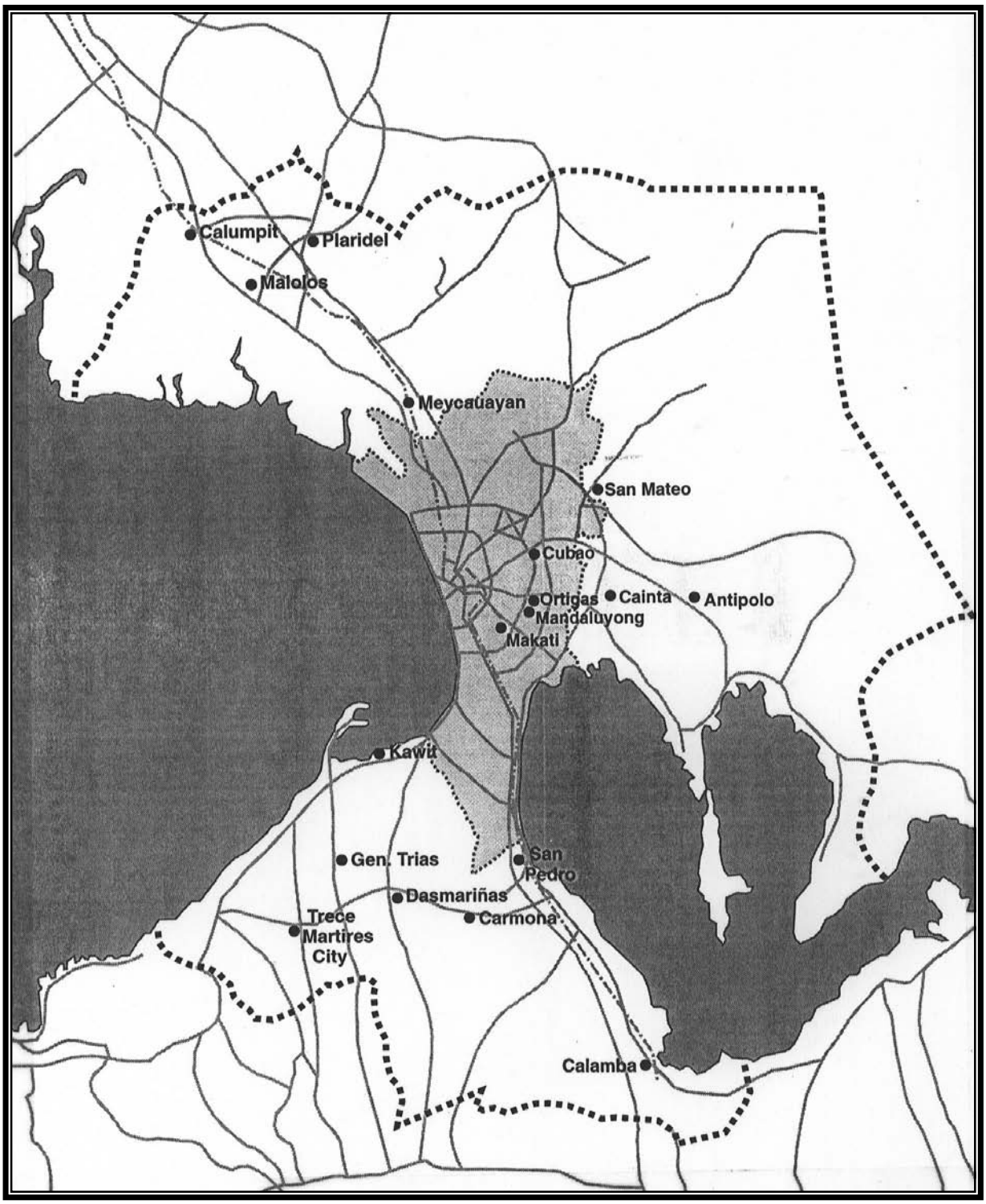


FIGURE 16.2
SURVEY ORGANIZATION CHART

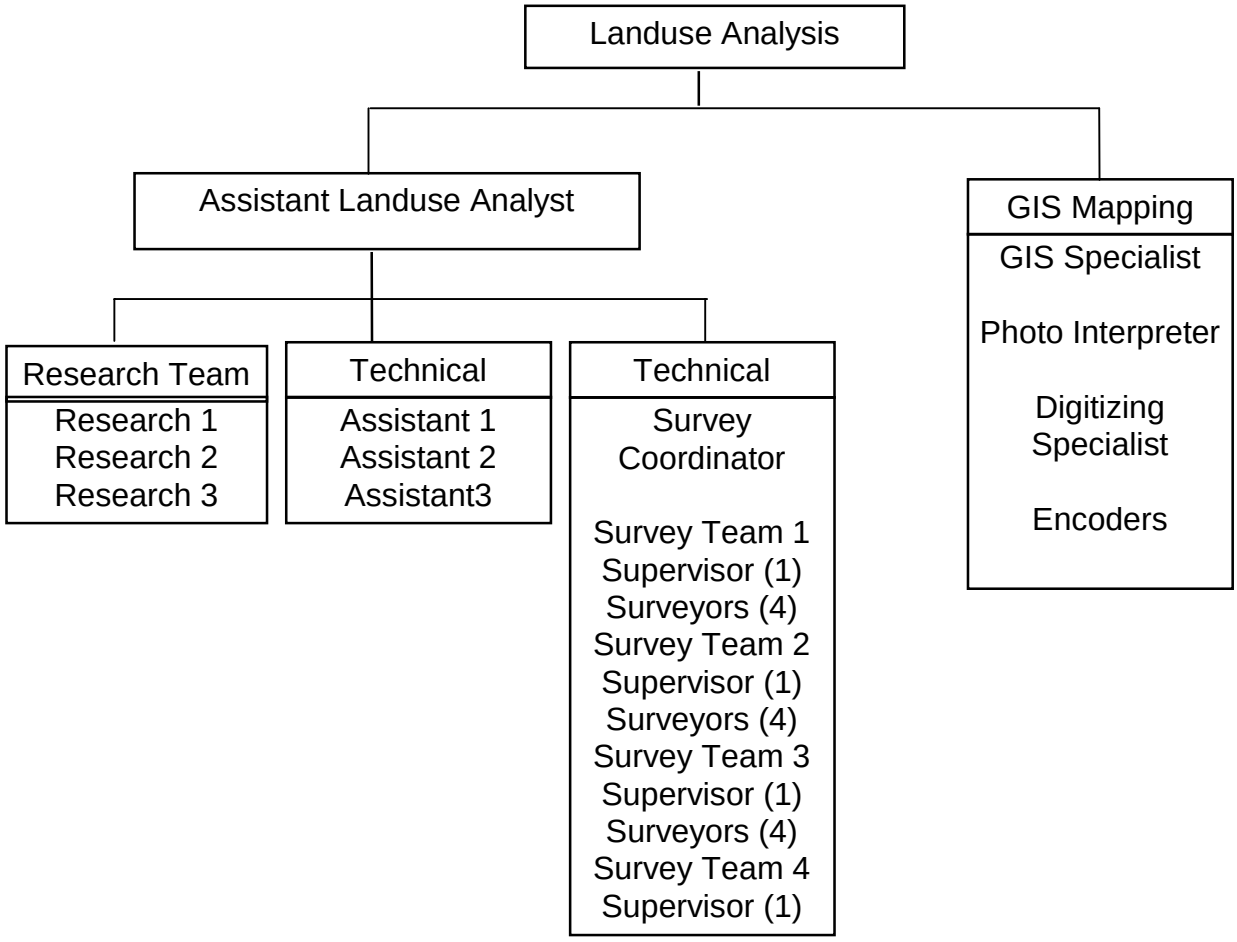


FIGURE 16.3
SCHEDULE OF ACTIVITIES

Activities	Oct.				Nov.				Dec.				Jan.				Feb.	
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2
1. Research																		
2. Field Survey																		
Urban Core																		
Metro Regional Center																		
Poblacion & Vicinity																		
3. Data Consolidation																		
4. GIS																		
5. Analysis																		

17. ROAD ENVIRONMENTAL SURVEY

17.1 Objectives

The road environmental survey aimed to obtain the existing data/information such as air pollution and traffic noise and to grasp the environmental condition in Metro Manila.

17.2 Survey Coverage

The survey had two phases in monitoring the air and traffic noise conditions in selected areas in the study area. The first phase was conducted at 6 survey stations located on the major road sections in Metro Manila. These stations were at the roadsides of the following:

a) Taft Ave. (near Gen. Malvar intersection);
b) EDSA (near Boni intersection);
c) Roxas Blvd. (near Libertad intersection);
d) Quezon Ave. (near Chuatuco intersection);
e) Quirino Highway (near Tandang Sora intersection); and
f) South Super Highway (near Dona Soledad intersection).

The next phase was conducted at 8 survey stations basically located along the periphery of the metropolis. These stations were:

a) roadside of Regalado Avenue;
b) roadside of Commonwealth Avenue;
c) roadside of MacArthur Highway;
d) within the campus of the Far Eastern University in Quezon City;
e) roadside of EDSA in Quezon City;
f) roadside of Aguinaldo Highway;
g) roadside of National Highway; and
h) within the C.M.D.C. in Cavite.

The survey was conducted for 24 hours starting from 6 a.m. for 3 weekdays continuously for air pollution survey (1 weekday for Pb only) and 1 weekday for traffic noise survey.

17.3 Methodology

(1) Air Pollution Survey

By using measuring instruments, following survey items were measured:

a) Air Pollution
- Nitrogen oxides (NOx)
- Carbon Monoxide (CO)
- Suspended particulate Matter (SPM)
- Lead (Pb)

b) Weather
- Wind Direction
- Wind Velocity

For all survey items except Pb, 1 sample was obtained per hour at each survey station during survey period. For Pb only, 1 sample was obtained per 1 day at each survey station.

(2) Traffic Noise Survey

In the traffic noise survey, following survey items were measured:

a) Environmental Noise
b) Traffic Noise

For both survey items, 1 sample was obtained per hour at each survey station during survey period. Sampling was done at the following points:

1) Roadside
2) 5m from the roadside
3) 15m from the roadside
4) 35m from the roadside

17.4 Survey Schedule

The field survey for the first phase was conducted for 6 weeks, starting from 4th week of October 1996. It needed one week to conduct the measuring setting and removal at 1 station. The field survey for the second phase was conducted during November of 1998. Table 17.1 shows a typical field survey schedule at 1 station.

TABLE 17.1
TYPICAL SURVEY SCHEDULE AT 1 SURVEY STATION
(ONE WEEK)

Survey Schedule	Monday	Tuesday	Wednesday	Thursday	Friday
Setting the Instrument	■				
Measurement		■	■	■	
Removal					■

18 GARBAGE TRUCK MOVEMENT SURVEY

18.1 Objectives

The trips made by trucks in relation to the collection and hauling of garbage or solid waste has been estimated to be about 10,000 trips per day in the Metro Manila. However, the trip movement of garbage trucks was hardly covered in other transport surveys. Hence, the garbage truck movement survey was conducted with the objective of identifying the quantitative and qualitative nature of traffic made by solid waste management in Metro Manila.

18.2 Methodology

Operational Framework on Solid Waste Management System

Available data/information related to the solid waste management system in the study area were collected. The following items were covered:

- Organizational Framework
- Number of Contractors by Municipality
- Manning Scale of Local Operators/Contractors
- Number of Garbage Collection Vehicles by Local Operator/Contractor
- Related Laws
- Related Plans/Projects
- Reporting process
- Reporting Forms
- Others

Profile of Landfill Stations

The information, which indicates the profile of landfills were likewise collected. The following items were covered:

- Year Started
- Area/Capacity
- Life Span
- Service Areas
- Vicinity Maps
- Operation Days/Time
- Others

Traffic Count Survey

A traffic count survey was conducted for one day at all the entrances/exits of survey landfills. The hourly vehicular traffic volume by vehicle type and direction was counted by using the manual counter and recorded. The survey was conducted for 24 hours, starting from 12 a.m.

The vehicles were classified into the following nine types:

1) Compactor C5 (5-8m^3): 2-axle
2) Compactor C8 (9-12m^3): 2-axle
3) Compactor C12 (13-15m^3): 2-axle
4) Compactor C15 (16-24m^3): over 3-axle
5) Special Trailer (25 m^3-)
6) Dump Truck 6wh: 2-axle
7) Dump Truck 10wh.:over 3-axle
8) Mini Dump: 2-axle
9) Others

OD Interview Survey

The OD interview survey was conducted at the same place and date as the traffic count survey. The sampled drivers of garbage trucks were interviewed by using the form. The following survey items were asked:

1) Final Disposal Site
2) Dispatch Office
3) Collection Areas
4) Garbage Type
5) Loading capacity
6) Load factor
7) Others

Although, it was desirable that as many as possible samples be obtained, the samples were determined by the supervisor at the survey station in a manner that no queue occurs at the entrances/exits.

Survey Form

Garbage Truck Movement Survey Form used in the field includes the following information:

1) Gate No.
2) Truck Operation Name
3) Working Time
4) Vehicle Type
5) Loading Capacity
6) Garbage Type
7) Load Factor
8) Others

18.3 Survey Coverage

There are two solid waste landfills and one transfer station operated by the Metropolitan Manila Development Authority (MMDA) and two other landfills in the study area operated by the Local Government Units (LGUs). They are:

- Under MMDA

  1) San Mateo Landfill (Rizal)
  2) Carmona Landfill (Cavite)
  3) Las Piñas Transfer Station (Metro Manila)

- Under LGUs

  4) Catmon (Malabon)
  5) Payatas (Quezon City)

  Traffic volume count survey and OD interview survey with sampled garbage trucks were conducted at the entrances/exists of above landfills.

18.4 Survey Organization

The survey was conducted under the supervision of JICA Study Team. The survey was undertaken with following organizational set-up.

1) Chief Supervisor: Chief Supervisor was responsible for overall survey activities and reporting works;

2) Supervisors: Supervisors assisted the Chief Supervisor in the course of the survey and was mainly responsible for survey and training and supervising surveyors: and

3) Surveyors/Interviewers: Surveyors/Interviewers conducted the interview and the traffic count.

18.5 Survey Schedule

The field survey was conducted in September 1997. The duration of the survey was for a period of one (1) month.

19 WILLINGNESS-TO-PAY SURVEY

19.1 Objectives

There are various transportation projects and improvements for Metro Manila that are now being implemented. One of this is the on-going construction of the Mass Rail Transit (MRT). The objective of this new mode of transportation is to lessen the traffic problems in Metro Manila. At present, there are public transport users or commuters that use Jeepney, Taxi, Bus (aircon /ordinary), Fx-Taxi, and LRT for their different trip purposes. However, due to heavy traffic any of these modes of transportation still require long travel time.

In preparation for the MRT as an alternative mode of transportation that can lessen travel time, there is therefore a need to have data on the "willingness-to-pay attitude" of public transport users if and when the total travel time is reduced. Moreover, there are possibilities of building expressways and toll roads in some areas of Metro Manila in the future that can affect travel time reduction.

Due to these reasons, a "willingness to pay" survey was undertaken to provide data on what amount the public commuters are willing to pay to use these transport improvements and facilities.

As such a "willingness to pay" survey was undertaken to provide the information needed.

19.2 Methodology

This survey followed similar procedure to other transportation study made by MMUTIS.

Sampling

The sampling was conducted through a direct interview on the passengers of the different transportation modes. The number of samples to be collected depends on the number of passengers to be interviewed.

1) Jeepney/Bus/Fx Taxi

   Passengers of these modes were interviewed onboard the vehicle to give enough time for the passengers to think and answer the questions on the form. The surveyors were given transportation allowance in each trip they made. All samples were taken at random since it was difficult to have a hundred percent sampling on a per trip basis.

2) LRT/Taxi

   The interviews of the passengers using these modes were conducted at the terminals. However, taxi users were interviewed at selected commercial areas (i.e., malls).

Survey Forms

The survey forms were prepared for the different mode users as shown in Annex 15. They basically covering the following:

1) General

   This includes the information as to when the interview was conducted (date and time); type of mode used; passenger type (on-board, getting on, etc.) and route station.

2) Trip Information

   This section is divided into two parts. The first part is about the Trip Purpose, and the second part is about the Trip OD (Origin/Destination).

3) Alternative Mode

   This part is the information as to what alternative mode the interviewee uses in making the trip with same purpose and same OD.

4) Willingness-to-pay for Travel Time Reduction

   There are two parts of this section. The first part is about the additional "willingness-to-pay" of the passengers when travel time is reduced; availability of seats provided; and air-conditioning of the vehicle. The interviewee writes their desired amount on the space provided.

   The second part is the same as the first part but focussed on the waiting time for the mode used.

5) Conversion to MRT

   This part has two cases (Cases A and B) for the passengers to choose. Each case has 5 types of travel time and travel cost pair.

6) Personal Attribute

   This includes personal information of the passenger such as age, sex, car ownership, and income.

19.3 Survey Coverage

The coverage area of this survey was Metro Manila. Passengers of Jeepney, Taxi, Bus (aircon/ordinary), Fx-Taxi, and LRT were the target samples of this study. Table 19.1 lists the mode, area, route, and zone number of where the interviews were conducted.

TABLE 19.1
COVERAGE AREA

MODE	ROUTE / STATION	ZONE
LRT	Monumento	170 - 171
	Blumentritt	08 – 017
	Buendia	060 – 061
	Baclaran	062 – 065
JEEPNEY	Kalaw-Firview	152 – 39
	Cogeo-Cubao	295 – 137/ 131
	Baclaran-Monumento	62/ 65 - 170/ 171
	Pasig-Quiapo	217 – 019
BUS (Aircon/Ordinary)	Monumento – Baclaran	173/ 711 – 227
	Ayala – Novaliches	79 – 154
	Monumento – Alabang	173/ 171 – 243
	Taytay – Quiapo	293 – 019
Fx- TAXI	Fairview – Ayala	152 – 084
	Cubao – Divisoria	137 – 09
	PhilCoa – Kalaw	146 – 039
	Muñoz – Ayala	122 – 019
TAXI	SM City (North Edsa)	161
	SM Megamall	104
	Ayala	81
	Makati Ave.	81

The target sample for each station was 250, thus, a total of 1,000 samples was expected per mode. However, the actual number of samples collected is shown in Table 19.2.

TABLE 19.2
ACTUAL NUMBER OF SAMPLES COLLECTED

MODE	ROUTE / STATION	Actual No. of Samples
LRT	Monumento	256
	Blumentritt	250
	Buendia	252
	Baclaran	250
JEEPNEY	Kalaw-Firview	251
	Cogeo-Cubao	251
	Baclaran-Monumento	250
	Pasig-Quiapo	250
BUS (Air- Conditioned)	Monumento – Baclaran	250
	Ayala – Novaliches	252
	Monumento – Alabang	250
	Taytay – Quiapo	251
BUS (Ordinary)	Monumento – Baclaran	250
	Ayala – Novaliches	250
	Monumento – Alabang	250
	Taytay – Quiapo	250
Fx- TAXI	Fairview – Ayala	276
	Cubao – Divisoria	252
	PhilCoa – Kalaw	266
	Muñoz – Ayala	252
TAXI	SM City(North Edsa)	263
	SM Megamall	250
	Ayala	251
	Makati Ave.	250
Total		**6073**

19.4 Survey Organization

The survey organization was composed of four supervisors and 40 surveyors. Every supervisor had ten surveyors. The work of the supervisor was to conduct the survey "bias-free" and well organize. The supervisor was responsible in checking and encoding all the samples. The surveyors conducted the interview onboard the transportation modes or at the terminals.

19.5 Survey Schedule

The entire survey was done on the last week of September 1997. The survey lasted for 1½ weeks and finished at the second week of October 1997. Each mode was finished on different schedules.

20 WATER TRANSPORT SURVEY

20.1 Objectives

In February 1997, Starcraft Ferry Corporation partially re-started the operation of a ferry service along the Pasig River from Plaza Lawton in the city of Manila to Guadalupe in Makati City. The operation of a ferry service along the Pasig River was expected to alleviate the traffic congestion on the roads in Metro Manila and promote the Pasig River as an alternative travel route within Metro Manila.

Furthermore, the Department of Transportation and Communication (DOTC) was interested in the potential operation of a water transport system along the Pasig River as well as in the Manila Bay area. If a sizable passenger demand for the Pasig ferry service can be established, the DOTC intended to develop a water transport network. As such the following surveys were conducted to provide the needed information:

1) River Ferry Passenger Interview Survey
2) Jeepney Passenger Interview Survey

20.2 Methodology

(1) River Ferry Passenger Interview Survey

The river ferry passenger survey was conducted using the questionnaire shown in the annex. The survey included the following items:

- Personal information (age, sex, personal income, and family income);
- Trip information (origin-destination, trip time, trip purpose, fare); and
- Others

Interviews were conducted on board the ferry boats (108 seats) operating along the Pasig River. The interviewers toke the ferry and conducted the interviews with passengers. The interview was conducted for 16 hours, starting from 6 a.m..

The survey was conducted on a sampling basis. The interviewers strove to interview all passengers on a boat ride (per one way trip takes about 45 minutes). The minimum quota that was set per trip was 20.

Additional interviews shall were also conducted for passengers taking the regular motor bancas crossing the Pasig River to/from the cities of Mandaluyong and Makati.

(2) Passenger Interview Survey

The jeepney passenger survey was conducted using the questionnaire form shown in Annex 16.

The survey collected the following information:

- Personal information (age, sex, personal income, and family income);
- Trip information (origin-destination, trip time, trip purpose, fare);
- Willingness-to-divert to river ferry from a road based public transport; and
- Others

The interviews were conducted on board jeepneys plying routes that were more or less serving the same areas that the Pasig River ferry boats were serving (see Table 20.1). The interviewers rode the jeepneys and conducted the interviews for 16 hours, starting from 6 a.m.

TABLE 20.1
JEEPNEY ROUTES

Jeepney Route Name-From/To		Via of Routes
L. Guinto	-Sta Ana	P.Gil New Panaderos
Punta	-Quiapo	Sta. Ana
Bacood	-Quiapo	Mendiola
Divisoria	-Punta	Sta. Mesa, Legarda
Guadalupe	-Pateros	West, East Comembo
Guadalupe	-L.Guinto	
Guadalupe	-L.Guinto	San Andres, P. Line, JP Rizal
Guadalupe	-L.Guinto	P.Gil, Tejeron, JP Rizal
Guadalupe	-L.Guinto	P. Faura

The survey was conducted on a sampling basis. The number of samples per one-way trip was determined based on the number of passengers on board. A total target sample of 200 per route was targeted.

(3) Survey Form

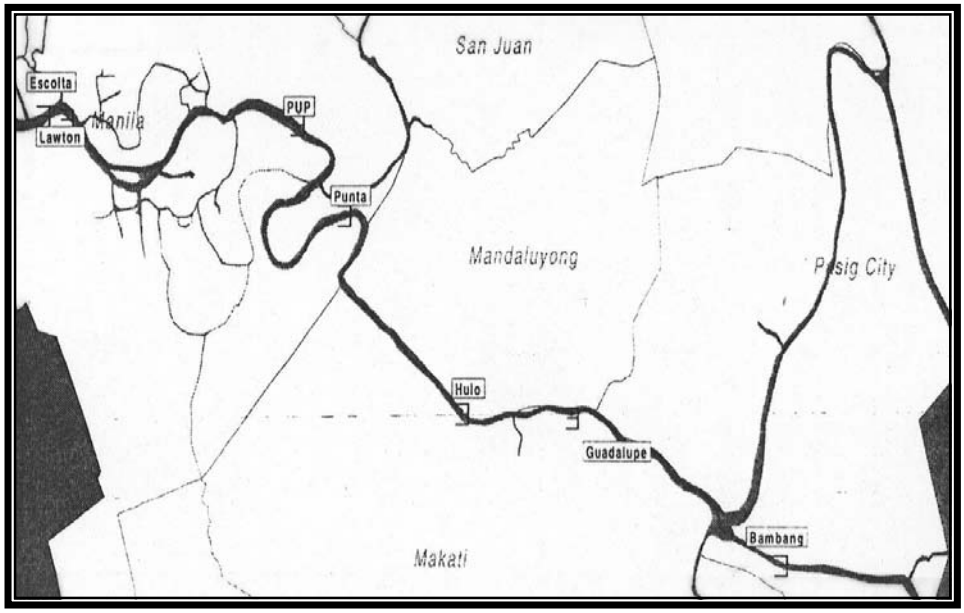
Water Transport demand Survey Form shown in the Annex 16 consists of the following information:

1) Mode
2) Route
3) Direction
4) Age
5) Sex
6) Personal / Family Income
7) CarOwnership
8) OD (Ferry Trip)
9) Trip Purpose
10) Purpose Trip (OD)
11) Others

20.3 Survey Coverage

The routes covered for both surveys are shown in Figure 20.1.

FIGURE 20.1
COVERAGE AREA FOR WATER TRANSPORT



20.4 Survey Organization

The survey was undertaken with the following organizational set-up:

1) Chief Supervisor: The Chief Supervisor was responsible for the overall survey activities and report requirements;

2) Supervisors: The Supervisors assisted the Chief Supervisor in the course of the survey and was mainly responsible for the conduct of the survey including the training and supervision of the interviewers; and

3) Interviewers: Interviewers conduced the interviews.

20.5 Survey Schedule

The survey was conducted in October 1997 and it was completed within one (1) month.

21. TRAFFIC ACCIDENT SURVEY

21.1 Objectives

Presently, the task of reporting traffic accidents in the metropolis is basically shared by the different traffic offices of the Philippine National Police (e.e., the Central, North, East, West, and South Traffic District commands) and the Traffic Management Command (Highway Patrol Group). Traffic Accidents usually get reported at the police stations. Information pertinent to the accident is reported and compiled in the traffic accident investigation report form.

Data on traffic accidents are used basically for road safety. Said data can afford planners and engineers with parameters to address safety by identifying areas for improvement such as geometric design of roads, pavement type, appropriate control measures, etc. However, embarking on a primary data collection on accidents as they occur is not possible on limited time and budget. As such, this survey was designed with the following objectives:

1) To collect traffic accident records from the different PNP traffic offices and traffic management groups in Metro Manila; and

2) To know the procedure for preparing the traffic accident data through interviews with traffic investigation.

21.2 Methodology

The survey followed basic steps from collection of secondary data from concerned offices to preliminary analysis. More specifically the following tasks were conducted:

1) Collection of traffic accident data - this entailed collecting recent 2-month traffic accident report forms (original intention was for 1 month only) from the different traffic accident reporting offices.

2) Documentation of Process and Problems - Interviews were conducted for the officers-in-charge of preparing the traffic accident data. Actual practices of reporting were recorded and problems encountered by the parties involved in the accidents and the reporting officers in the present procedure/process of reporting were listed

3) Processing of data - the collected raw data (accident report forms) were checked and processed according to the format specified by the study team. Initially a database was developed tailored for the new Traffic Accident Investigation Report (TAIR) Form. However, it was decided later to adopt the existing traffic accident analysis program available at the Department of Public Works and Highways (DPWH). The program was also tailored for the new accident report form and can produce a number of statistics including tables and graphs.

4) Preliminary analysis of data - based on the processed accident information for two months, the compiled data was analyzed to obtain planning parameters for road safety. Likewise, the process for accident reporting was analyzed to determine areas for procedural improvement.

Traffic Accident form contains the following information used during the investigation of Vehicular Accident (shown in Annex 17).

1) Location
2) Vehicle
3) Driver
4) Passenger Casualties
5) Pedestrian Casualties
6) Research Casualties
7) Others

21.3 Survey Coverage

The coverage of the survey included all the primary traffic accident reporting offices of the Philippine National Police on traffic accidents in Metro Manila as well as the MMDA metro traffic group. There are 5 police stations, 5 traffic district commands and a regional command office of the PNP and 3 reporting offices of the MMDA. The PNP offices are listed in Table 21.1 with their corresponding locations. The MMDA office, on the other hand, is located at Orense St., Guadalupe, Makati.

TABLE 21.1
TRAFFIC ACCIDENT REPORTING OFFICES OF THE PNP

Source Office	Location
National Capital Region Command	Camp. Gen. Ricardo Papa, Bicutan, Taguig
Central Police District Command	Gen. Karingal, Sikatuna Village, Q.C.
Police Station No. 3	Sangandaan
Police Station No. 8	Project 4
Northern Police District Command	Dagat-Dagatan, Malabon
Eastern Police District Command	Miguel Ver, Capitol Compound, Pasig
Police Station No. 4	San Juan
Southern Police District Command	Fort Bonifacio, Makati
Police Station No. 5	Muntinlupa
Western Police District Command	UN Ave., cor. San Marcelino St., Ermita
Police Station No. 7	J.A. Santos Ave., Manila

21.4 Survey Organization

The survey conducted was under the supervision of JICA Study Team. The following survey organization was adopted:

1) Survey Chief: He/she was responsible for the overall survey activities and coordination with the JICA Study Team.

2) Interviewers: They were responsible for the gathering of the required accident data and the interviewing of accident reporting officers.

22. SUBDIVISION ROAD INVENTORY SURVEY

22.1 Objectives

In Metro Manila, there are a lot of exclusive subdivisions developed by private sector. Roads inside subdivisions are mostly used for only residents/visitors and closed for public use. Therefore some exclusive subdivisions obstruct the development of appropriate road network in Metro Manila, because of its area size and geographical location.

In order to obtain the detailed information about subdivision roads for the planning of the Metro Manila road network, the subdivision road inventory survey was conducted with the following objectives:

1) To select subdivisions which could be open for public use, based on the criteria such as size and geographical location;

2) To investigate the roads in the selected subdivisions; and

3) To create the subdivision road inventory for the selected roads.

22.2 Methodology

Selection of the Subdivisions

In the selection of the subdivisions subject to the field survey, all the subdivisions located in Metro Manila were covered. The subdivisions with the specific conditions were selected by using the subdivision distribution map and aerial photos. The terms for the selection were defined as follows:

1) vast subdivisions between arterial road;
2) subdivisions obstructing the development of arterial road network.

As the results, approximate; 50 subdivisions were selected for the field survey. After the selection of subdivisions, roads subject to the field survey were determined.

Field Survey

The surveyors visited all determined subdivisions and its road sections. They observed, measured and recorded the following survey items by road sections:

- Subdivision's Information

    1) Road of Gates
    2) Gate Operation - Open/Close
    3) Boundary - Rivers/Creaks

- Road Information

1) Road Name, Section Name
2) Road Length (m)
3) Road width: No. of Lanes
   Carriage-way Width (m)
   Sidewalk Width (m) - Left/Right
   Median Strip Width (m)
4) Pavement : Type (Asphalt/Concrete)
   Pavement Condition (indicative)
   - Crack
   - Pothole
   - Patchwork
   - Others
5) Side Friction Parking (On-road, On-sidewalk) (indicative)
6) Obstacles No. of Humps

Data Processing

The collected data/information were checked and processed according to the format specified as shown the annex.

22.3 Survey Coverage

The following subdivisions were surveyed:

1) West Triangle Homes
2) Capitol Hills Subd./Alpha homes
3) Commonwealth Hobart Homes /Alpha Village, Q.C
4) Mapayapa Village I-III Q.C
5) BF Homes, Quezon City
6) Dasmariñas Village, Makati
7) Dasmariñas Village/Forbes South, Makati
8) Bel-Air, Makati
9) San MigueVilalge/Bel-Air, Makati
10) San Lorenzo Village, Makati
11) Villanueva Village, Parañaque
12) BF Homes Parañaque
13) Villanueva Village Parañaque
14) Multinational Village Parañaque
15) Moonwalk Village PH I-III
16) Sauyo Road
17) Green Meadows Ave./Giraffe St./Temple Drive
18) McKinley Road
19) Union St.- Mailang St. (Pasig Blvd.)
20) Pioneer St. - Banaag St. (Pasig Blvd.)
21) Zapote - Alabang Rd.- Sucat Road (Tionquiao
22) Zapote - Alabang Rd. -Sucat Road (Angelina Canaynay Rd)
23) Better Living Subd./Malacañang Village/San Antonio Village
24) Luzon Avenue

22.4 Survey Organization

The survey was conducted under the supervision of JICA Study Team. The survey was undertaken with following organizational set-up:

1) Chief Supervisor: Chief Supervisor was responsible for overall the survey activities and reporting works;

2) Supervisors: Supervisors assisted the Chief Supervisor in the course of the survey and was mainly responsible for survey and training and supervising surveyors; and

3) Surveyors: Surveyors conducted the observation and recording of the information needed from the subdivisions visited.

22.5 Survey Schedule

The field survey was conducted from August to September 1997. The duration of this survey was completed within one (1) month.

23 UNIFIED VEHICULAR VOLUME REDUCTION PROGRAM (UVVRP) SURVEY

23.1 Objectives

The systematic banning of vehicles on all roads is implemented in Metro Manila since 1996 under the Unified Vehicular Volume Reduction Program (UVVRP). This system is one of the traffic demand management (TDM) measures applied for the metropolis. However, unlike other schemes, this one includes the public transportation modes.

In the course of the study, TDM schemes similar to the current UVVRP are proposed by MMUTIS. As such, it was deemed important that perceptions of the people affected by the UVVRP be known and examined.

In the person-trip survey conducted by MMUTIS in 1996, the perception of the private car users on UVVRP was surveyed. As a result of the analysis, it was found that private vehicle users support the color coding system.

Therefore, in order to know the perception of public transport users on UVVRP, an interview survey was conducted for the public transport passengers.

23.2 Methodology

(1) Interview Survey

The interview was basically conducted on board or at stations/terminals of public transportation modes. The passengers of following public transportation modes were interviewed:

- Standard Bus (Aircon and Ordinary)
- Jeepney
- Tricycle
- LRT
- Taxi
- Tamaraw-FX Taxi

The interviewers were on board or stay at survey stations/terminals to interview as many passengers as possible. The interview was conducted continuously for 12 hours, from 6 a.m. to 6 p.m. at the selected survey sites. The samples were obtained at a minimum of 8 passengers per hour per survey site.

(2) Survey form

Survey forms on Perception of Public Transportation users on the UVVRP Scheme (shown in the Annex 19) was designed to capture the following sets information:

a) Personal Information: includes information on sex, age, personal and family income, and car ownership.

b) Trip Information: covers the characteristics of trips made by the passengers interviewed. These include the origin and destination, trip purpose, travel mode, transfer point, estimated travel fare, and estimated travel time.

c) Perception on the UVVRP Scheme: covers information pertaining to passenger awareness of the UVVRP and conditions as to where this scheme should be applied.

23.3 Survey Coverage

The survey area of the study covers major routes, stations and terminals within Metro Manila of the six identified public transport modes. The table below summarizes the survey area and the corresponding target and actual samples collected from the survey sites.

TABLE 23.1
SURVEY SITES AND SAMPLING

Mode	Survey Sites/Station Terminal	Target Samples	Actual Samples
Bus	Philcoa	100	111
	Cubao	100	110
	SM North	100	91
	Guadalupe	100	112
Jeepney	Philcoa	100	132
	Cubao	100	106
	Quiapo	100	108
	Recto/Avenida	100	106
LRT	Monumento	100	140
	Edsa Pasay	100	249
	Recto/Avenida	100	86
	Central Station	100	140
Tricycle	Philcoa	100	110
	Sikatuna	100	115
	Batasan	100	111
	Central(Heart Center)	100	113
Taxi	Cubao	100	104
	Makati Com. Ctr.	100	104
	Ortigas	100	103
	SM North	100	66
Tamarraw Fx (taxi)	Philcoa	100	145
	Cubao	100	104
	Batasan	100	100
	Makati Com. Ctr.	100	105
	TOTAL	**2400**	**2771**

23.4 Survey Organization

For a smooth conduct and management of the survey, a survey organization was established and its headquarters was based at the National Center Transport Studies. The survey organization is outlined in the table below.

TABLE 23.2
SURVEY ORGANIZATION

Personnel	Quantity	Responsibilities
Chief Supervisor	1	• Overall management of the conduct of the survey and preparation of the report • Close contact and coordination with JICA Study Team
Supervisors	6	• Assist the Chief Supervisor in the conduct of the survey • Supervise the enumerators under his/her area in the conduct of the survey • Responsible for the performance of the enumerators • Ensure the correctness and quality of data collected
Enumerators	24	• Interview respondents in the station/s assigned to him • Ensure the correctness of information given on the questionnaire sets
Encoders	6	• Encode the data from the questionnaire forms • Ensure the quality of the data sets encoded

23.5 Survey Schedule

The field survey was conducted in August 1997. The survey was completed within the one (1) month period.

ANNEXES

METRO MANILA URBAN TRANSPORTATION INTEGRATION STUDY

Transport Survey Group

DOTC ♦ MMDA ♦ DPWH ♦ NEDA ♦ PNP-NCR ♦ HUDCC ♦ UP Diliman ♦ EMB

1 August 1996

Dear Head of Family:

The Department of Transportation and Communications (DOTC) is undertaking a Household Interview Survey to obtain detailed information on the travel requirements of the inhabitants of Metro Manila and the adjoining municipalities of Bulacan, Rizal, Laguna and Cavite. This is part of the Department's task of determining present needs for transportation planning under the Metro Manila Urban Transportation Integration Study (MMUTIS) with technical assistance from the Government of Japan.

As you have been chosen as a sample household by random sampling, please permit the surveyors to interview your household members and yourself. All questions asked will only be in relation to your travelling habits and requirements. Your cooperation is essential if the study is to be successful.

The information you provide will be treated in strict confidence by this Department and will be used solely for the transportation study. Your cooperation in this project will be most appreciated.

Very truly yours,

DR. PRIMITIVO CAL
Undersecretary
Department of Transportation and Communications

96L-PCC-483

MMUTIS HIS QUESTIONNAIRE FORM

INSTRUCTIONS FOR ANSWERING QUESTIONNIARE FORMS

Please answer all the questions one by one sequentially. Print the information in the space provided or put a check mark in the appropriate box.

If you have doubts in answering any point in the questionnaire, please consult the interviewer.

Form 1. Household Information

Only the "head" of the household should complete Form 1. The head of the household is the Father, Mother or the household member who is responsible for the economic well being of the household.

Form 2. Household Member Information

Form 2 should be completed for every member of the households who is 4 years of age and above. It is one sheet per person.

Form 3. Trip Information

1. Form 3 should be completed for every member of the household who is 4 years of age and above.

2. Information about ALL THE TRIPS, both home-based non-home-based, should be provided for one survey day. The survey covers 24 hours beginning at 3:00 a.m. and ending at 3:00 a.m. of the following day. In the event that the car user cannot use the car on the survey date due to the Unified Vehicular Volume Reduction Scheme, the next weekday should be chosen as the survey day.

3. Start the first trip (TRIP NO. 1) and proceed sequentially to the next trips. Give all information on each trip.

4. If more than 8 trips were made on the survey day, record the other trips (i.e., TRIP 9, TRIP 10, etc.) on another sheet and number the trips accordingly.

Form 4. Additional Questions for Vehicle Users

Only vehicle users (i.e., persons with own vehicle or rented/company vehicle) in a household should complete this form.

Form 5. Additional Questions for the Specially Abled and Elderly People

The elderly persons (or those over 70 years old) and specially abled (handicapped) persons should be interviewed. A household member may be requested to assist in answering the form.

Form 6. Additional Questions for 1/10 Households

Every tenth household to be sampled should be requested to answer this form. It should contain the answers of at most 5 households members only.

Coordinator's Log

				Date	Name
THIS PORTIONS IS FOR OFFICE USE ONLY	HIS Zone No..	☐☐☐	For Interviewers		
	Household No.	☐☐☐☐☐☐	For Editors		
	No. of HH Member's Sheets	☐☐	For Coders		

FORM 1: HOUSEHOLD INFORMATION

INSTRUCTION: To be completed by HEAD of HOUSEHOLD

(1) NAME _____ _____ _____
Family name First Name M.I.

(2) ADDRESS OF HOUSEHOLD _____ _____ _____ ☐☐☐
No. Street Barangay

_____ Telephone ☐ Owned ☐ None _____
City/Municipality Tel No. (optional)

(3) HOW MANY PEOPLE RESIDE IN YOUR HOUSEHOLD?

	Under 4 yrs. old		4 yrs. and above		Household Helpers	
	w/o disability	w/ disability	w/o disability	w/ disability	w/o disability	w/ disability
Male						
Female						
Total						

(4) WHAT IS THE TOTAL MONTHLY HOUSE-HOLD INCOME? (pls. check one)

1. ☐ Under P3,000
2. ☐ P3,000-5,999
3. ☐ P6,000-9,999
4. ☐ P10,000-14,999
5. ☐ P15,000-19,999
6. ☐ P20,000-P29,999
7. ☐ P30,000-P39,999
8. ☐ P40,000-P59,999
9. ☐ P60,000-P99,999
10. ☐ P100,000-149,999
11. ☐ P150,000-199,999
12. ☐ P200,000-over

(5) HOW MANY VEHICLES ARE OWNED OR RENTED BY HOUSEHOLD MEMBERS

TYPE	NO. OF UNITS	
	OWNED	RENTED
1. Pedicab		
2. Bicycle		
3. Motorcycle		
4. Tricycle		
5. Jeepney		
6. Mini-bus		
7. Standard bus		
8. Taxi		
9. HOV Taxi		
10. Car/Jeep		
11. School/Co./ Tourist Bus		
12. Utility Vehicle		
13. Truck		
14. Trailer		
15. others		

(6) HOW MANY VEHICLES ARE GARAGED AT OR NEAR YOUR HOUSE BY HOUSEHOLD MEMBERS?

TYPE	NO. OF UNITS
1. Pedicab	
2. Bicycle	
3. Motorcycle	
4. Tricycle	
5. Jeepney	
6. Mini-bus	
7. Standard bus	
8. Taxi	
9. HOV Taxi	
10. Car/Jeep	
11. School/Co./ Tourist Bus	
12. Utility Vehicle	
13. Truck	
14. Trailer	
15. others	

(7) OWNERSHIP OF HOUSE AND LAND

	OWN	RENTED	P/MONTH
HOUSE	☐	☐	₱_____
LAND	☐	☐	₱_____

(8) LENGTH OF STAY IN PRESENT HOUSE

No. of years _____

FORM 2: HOUSEHOLD MEMBER INFORMATION

INSTRUCTION: To be completed every HOUSEHOLD MEMBER aged 4 yrs, and above.

(1) NAME _____ _____ _____ ☐☐
Family Name First Name M.I.

(2) AGE _____ (3) SEX: (pls check) Male ☐ Female ☐ (4) DISABLED: Yes ☐ No. ☐

(5) WORK ADDRESS _____ _____ _____ ☐☐☐
No. Street Barangay

_____
City/Municipality

(6) SCHOOL ADDRESS ____ _____ _____ ☐☐☐
No. Street Barangay

_____
City/Municipality

(7) OCCUPATION (Please Encircle)

1. Officials of Govt. & Special Interest Org., Corporate Exec., Mangers, Managing
2. Professionals
3. Technical & Assoc. Professionals
4. Clerical Worker
5. Service Workers & Shop & Market Workers
6. Farmers, Forestry Workers & Fisherman
7. Traders & Related Workers
8. Plant & Machine Operators & Assemblers
9. Laborers & Unskilled Workers
10. Student (Elem.)
11. Student (H.S. & Univ.)
12. Housewife
13. Jobless
14. Others, specify_____

(8) EMPLOYMENT SECTOR (Please Encircle)

1. Agriculture, Hunting & Forestry
2. Fishing
3. Mining & Quarrying
4. Manufacturing
5. Electricity, Gas & Water Supply
6. Construction
7. Wholesales & Retail Trade; Repair of Motor Vehicles Motorcycles, Personal & Household Goods
8. Hotels & Restaurants
9. Transport, Storage & Comm.
10. Financial Intermediation
11. Real Estate, Renting & Business Activities
12. Public Adm. & Defense; Compulsory Social Security
13. Education
14. Health & Social Work
15. Other Community, Social & Personal Service
16. Private Households
17. Extra-territorial Organizations

9) MONTHLY INCOME (Please Encircle)

1. Under P3,000
2. P3,000-5,999
3. P6,000-9,999
4. P10,000-14,999
5. P15,000-19,999
6. P20,000-P29,999
7. P30,000-P39,999
8. P40,000-P59,999
9. P60,000-P99,999
10. P100,000-149,999
11. P150,000-199,999
12. P200,000-over

(10) STATE THE TYPE OF DRIVER'S LICENSE HELD.

☐ 1. Student ☐ 2. Non-Prof. ☐ 3. Professional ☐ 4. None

(11) PLEASE LIST ALL THE PLACES VISITED ON THE SURVEY DAY. No of trips ☐☐

_____ _____
_____ _____
_____ _____

(12) DO YOU WORK ON (Office Hours): ☐ 1. Fixed Time ☐ 2. Flexible Time

Form 3: TRIP INFORMATION

INSTRUCTION: To be completed for every HOUSEHOLD MEMBER aged 4 years and above

ORIGIN AND DESTINATION

1. Residence (Home)
2. Commercial Institution
3. Office / Bank
4. Factory / Warehouses
5. School / Universities Educational
6. Recreational Place Park
7. Medical and Welfare
8. Religious and Social
9. Wholesale and Retail Shop
10. Restaurant and Entertainment
11. Others

TRIP PURPOSE

1. To Home
2. To Work
3. To School (to study)
4. Private business (other than 6,7,8, 9,10)
5. Employer's business (business engagement)

Private Purpose only:
6. Medical
7. Social
8. Eating
9. Shopping
10. Church

11. Accompany other household members
12. Others

MODE of TRAVEL

1. Walking
2. Pedicab
3. Bicycle
4. Motorcycle
5. Tricycle
6. Jeepney
7. Minibus
   7.1 Aircon 7.2 Ordinary
8. Standard Bus
   8.1 Aircon 8.2 Ordinary
9. Taxi
10. HOV Taxi
11. Car/Jeep
12. School/Co./Tourist Bus
    12.1 School Bus
    12.2 Company Bus
    12.3 Tourist Bus
13. Utility Vehicle
14. Truck
15. Trailer
16. LRT
17. PNR
18. Water Transport
19. Others

If Driver write D
If Passenger write P
after Mode of Travel

TRIP INFORMATION	1st TRIP
(1) ORIGIN Where did this trip begin? (Give address / land mark, famous bldg. nearby)	No. Street Barangay Municipality a.
(2) INSTITUTION of ORIGIN	b.
(3) TIME STARTED	c. Hours : Minutes AM ☐ PM ☐
(4) TIME of ARRIVAL	d. Hours : Minutes AM ☐ PM ☐
(5) INSTITUTION of DESTINATION	e.
(6) DESTINATION Where did this trip end? (Give address / land mark, famous bldg. nearby)	No. Street Barangay Municipality f.
(7) TRIP PURPOSE	g. To h.
(8) MODE of TRAVEL	Original Mode
(9) TRANSFER If you transfered to another vehicle / mode of travel during the trip, state the mode you changed to and the place. (Give street intersection / famous bldg. or land mark).	TRANSFER POINT 1st Transfer Next Mode 2nd Transfer Next Mode 3rd Transfer Next Mode 4th Transfer Next Mode 5th Transfer Next Mode 6th Transfer Next Mode 7th Transfer Next Mode 8th Transfer Next Mode

	Own	Rented/ Company
Chauffer Driven	11-1	11-2
Self Driven	11-3	11-4
Shared Ride	11-5	11-6