

Figure 5.12
Major Traffic Demand
Distribution for C-3, 1990

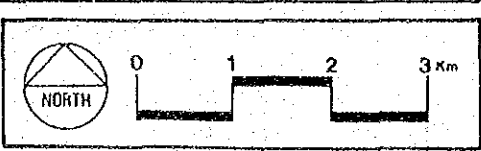
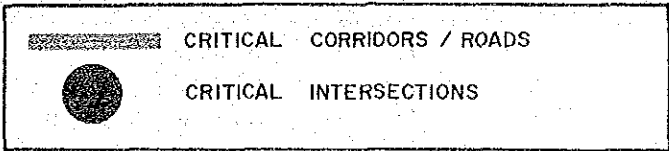
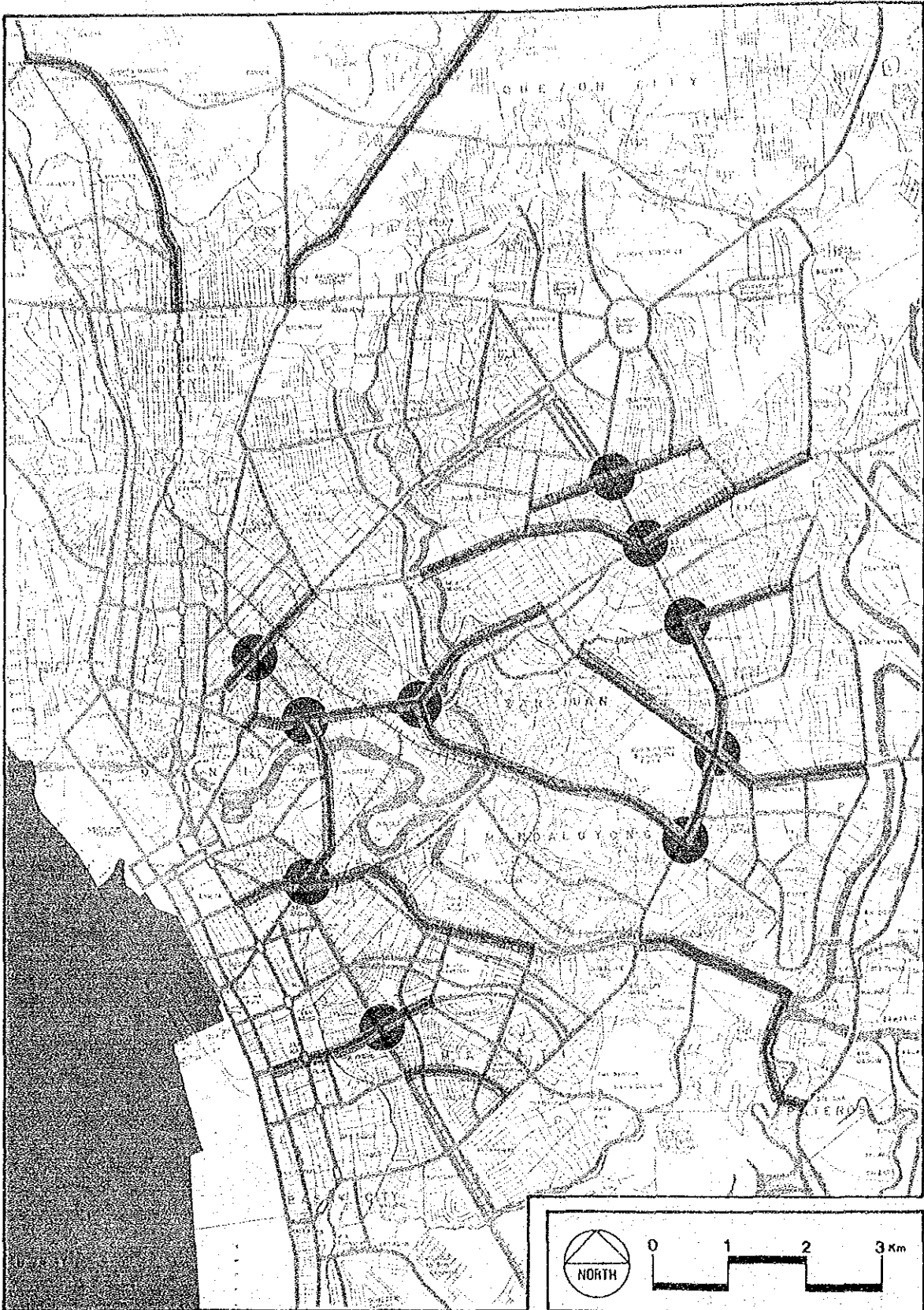


Figure 5.13
 Determined Mid-term Problem
 Corridors/Roads, and
 Intersections

5.4.2 Impact of PNR

PNR carried approximately 26 thousand commuters a day in 1982, which was only 0.3% of the total passenger demand. The PNR South line carried 23 thousand a day or 88% of the total, while North line and East line picked up only 2,000 and 1,000 a day, respectively.

Table 5.11
PNR Commuter Passenger Load by Line

Line	No. of Passengers (000/day)	Section
South Line	23	Manila – Carmona
North Line	2	Caloocan – San Fernando
*East Line	1	Cordillera – Guadalupe

Source: PNR Commuter Study, July 1982

Note: *not existing at present

The PNR Commuter Study (July 1982), suggested the improvement of the commuter service via higher frequencies up to twice the 1982 levels with minimum investment. It also estimated that the number of PNR passengers could jump to 102 thousand a day by 1992 after doubling the service frequency and improving the access to PNR stations.

To test the impact of PNR improvement on public transport passenger flow, TRANSTEP Public Transportation Assignment Model was run using the improved parameters for PNR. The results of the simulation are as follows:

- a) Undoubtedly, the impact is small. Passenger movements on most of the Metro Manila roads showed no change.
- d) Noticeable change occurred on the following roads:
 - South Superhighway (P. Quirino – South) – 7 to 8% decrease in number of public transportation passengers, which corresponds to approximately 2% of the total traffic.
 - Boni Avenue and a part of Shaw Boulevard – 5 to 7% decrease in number of public transportation passengers, which corresponds to approximately 3-5% of the total traffic.

These results were on the assumption that the PNR east line had been reopened.

5.4.3 Impact of the LRT

a) Overall Impact

JUMSUT Phase I analyzed in detail the ridership and the impacts of the LRT vis-a-vis other modes. Table 5.12 shows the increase or decrease in jeepney and bus ridership with LRT Line No. 1. Although an increase is seen in some parallel streets, these will suffer a reduction of public transportation passengers.

b) Ridership on the South Line

On December 1, 1984, the South Line of the LRT Line No. 1 started commercial operation. Table 5.13 presents the actual ridership recorded in the first month of operation. On a normal weekday, approximately 111 thousand passengers use the LRT South Line. By station, the South Terminal claims the largest share of about 30%, followed by the Central Station (25%), U.N. Avenue (13%) and EDSA (9%).

Table 5.12
Summary of Impact of LRT Line No. 1^{1/}

Road Names	Increase/Decrease in Jeepney and Bus Passenger Traffic Volume (%)	Increase/Decrease in Total Vehicular Traffic Volume (%)
1) Rizal Ave. & Rizal Ave. Ext.	-32 to -65	-25 to -55
2) Taft Avenue	-35 to 80	-18 to -44
3) H. Lopez	-20	-12 to -15
4) J. Luna/A. Mabini	+15 to -35	+ 4 to -11
5) J.A. Santos	+40 to -35	+ 3 to - 7
6) Andalucia	+15	+ 8
7) Mabini/M.H. del Pilar	+40 to -50	-18 to -26
8) F.B. Harrison	+10 to +20	+ 8 to +17
9) Roxas Blvd.	+15	+ 3
10) South Super Highway	+10	+ 1

Source: JUMSUT I

^{1/} rerouting plan proposed by JUMSUT I is incorporated

Table 5.13
 Number of Boarding Passengers of the LRT South
 Line by Station and by Direction
 (Dec. 1984, Average of Weekday and
 Saturday, Excluding Wednesday)^{1/}

Station	No. of Passengers (000/day)		
	Northbound	Southbound	Total
South	—	33	33
EDSA	0	10	10
Libertad	0	7	7
G. Puyat (Buendia)	1	2	3
Vito Cruz	2	2	4
P. Quirino	4	1	5
P. Gil	6	1	7
U.N. Avenue	14	0	14
Central	28	—	28
Total	55	56	111

Note: 1/ Because of the attraction of the Wednesday mass held in Baclaran Church every Wednesday, the number of passengers shoots up by about 50% against ordinary days.

With such a loading pattern, an interview survey of LRT passengers was launched during the period December 8 to 20, 1984. While the number of samples (693) is small, the findings are instructive, viz.:

a) Characteristics of interviewees:

Sex	— Male: 58%	Female: 42%
Age	— 17-20 . . . 26%	
	21-29 . . . 38%	
	30-39 . . . 19%	
	40- . . . 17%	
Occupation	— Service	6%
	Administrative/Professional	24%
	Sales/Clerical	13%
	Factory/Transport	7%
	Student	34%
	Others	16%
Car Ownership	— 21% (household)	
	11% (own use)	

b) Most of the passengers (87%) had a specific purpose in riding the LRT. That means, regularity of use. Only 13% answered “for experience only” as their reason for riding the LRT.

- c) Before the opening of the LRT, 88% of the interviewees were using Taft Avenue. Out of these 73% were regular commuters and 92% shifted from jeepney (3% from bus and 4% from private car).
- d) Only 20% of the interviewees reside along the LRT South Line. Others are from various places inside Metro Manila (73%) and outside Manila (7%).
- e) Trip purpose composition of the interviewees as compared to that of the 1980 HIS is shown in Table 5.14. "To Work" and "Private" purposes have a higher share than in the 1980 HIS.

Table 5.14
Trip Purpose Composition of
LRT Passengers

Trip Purpose	LRT1/ Passengers	1980 HIS2/ (All Modes Unlinked Trip)
To Work	21	18
To School	15	16
Private	20	14
Business	3	4
To Home	41	48

Source: 1/ JUMSUT II
2/ JUMSUT I

- f) In going to and from an LRT station, 55% of the passengers use jeepney, 39% walk and 4% use the bus.
- g) Almost 100% of the passengers who regularly used Taft Avenue before signified their intention to ride the LRT regularly. This seems to be true also for most of the former non-users of Taft Avenue.
- h) The impression of the interviewees about the LRT is quite favorable, with the following aspects scoring highly:
 - clean
 - fast
 - safe
 - comfortable
 - economical
 - fashionable

If the foregoing is any gauge, then the LRT is well on its way of becoming an important fixture in daily commuting, catching the public's favor.

5.4.4 Towards Inter-modal Complementation

The issue of inter-modal competition and complementation has always been contentious. To shed light on this debate, interview surveys are conducted for the jeepney, ordinary bus, love bus, LRT, and private car. The surveys were carried out along Taft Avenue, where all the modes are available. Especially for jeepney and ordinary bus, similar routes were selected (from Baclaran to the direction of Quezon Avenue or vice versa). The number of samples obtained was 110-160 for each mode.

The results were analyzed using the Disaggregate Behavior Model, which explains people's behavior as a probabilistic choice among possible alternatives.

The choice of a jeepney or a bus behaves as follows:

- a) Passenger characteristics alone do not explain the modal choice. The following relationships, however, are discernible.
 - income levels is the strongest single variable influencing modal selection, though not sufficient;
 - as the income level increases, a passenger tends to select the jeepney;
 - choice is not differentiated by sex and age.
- b) The difference in the supply characteristics of jeepney and bus (e.g., the difference in travel time, fare and number of transfers) is more explanatory of modal choice. Thus,
 - If there is no tangible difference between jeepney and bus service, the probability of the jeepney being selected is higher than the bus. As shown in Figure 5.14 in order for the bus to be chosen, its travel time must be shorter than the jeepney by approximately four (4) minutes on the average or, in terms of fare, the bus must be cheaper than the jeepney by about 23 centavos. In addition, the time cost perceived by jeepney/bus passengers equates to ₱3.70/hour from the above relation.
 - Among the service variables, the difference in the number of transfers is the most significant. When there is no difference in the number of transfers between a jeepney and a bus, the jeepney is still preferred unless the bus is faster by more than four (4) minutes.

However, if the number of transfers on a jeepney is one more than that on a bus, the jeepney needs to be faster than the bus by about 13 minutes to be chosen as shown in Figure 5.15. From this relationship, it can be concluded that one transfer is equivalent to 17 minutes or ₱1.05 for jeepney and bus passengers.

- c) Lastly, the combined explanatory power of passenger and supply characteristics was tested on the model. Although the result has the same tendencies, the explanatory rate went up to 80%. (For details, see JUMSUT II's Technical Report on Public Transportation Route Structure Improvement Study).

The same disaggregate model was applied in an effort to explain the modal choice behavior of various public transportation passengers based on passenger characteristics and trip purpose. The results are as follows:

- Intermodal competition between the jeepney and the Love Bus is strongly influenced by income level and occupation of passengers. The income level of the Love Bus passenger is higher than that of a jeepney passenger; more than 50% of the former belong to administrative/professional workers. The trip purpose is also significantly different between the two modes; “private” and “business” purposes have a larger share on Love Bus.
- The model is inappropriate in predicting choice between the jeepney and the LRT. Similarity in the distribution of occupation and trip purpose could not overcome the difference in income level.
- The choice between Ordinary and Love Bus behaves similarly as the jeepney vs. Love Bus. The important factors are income level, occupation, and trip purpose.
- Between the Ordinary bus and the LRT, the most influential factor is income level, followed by occupation (for the LRT, the share of clerical/service/sales is high) and trip purpose.
- The intermodal relationship between the Love Bus and the LRT is explained fairly well. Although income level is neutral on both modes, the following factors are found influential:
 - a) Occupation — Administrative/professional workers are more than 50% for the Love Bus; while the LRT gets a larger share of clerical/service/sales, student and housewife/others.
 - b) Trip Purpose — For the Love Bus, the “private” and “business” purpose share a high percentage while “to work”, “to school” and “to home” purposes are dominant on the LRT.

The basic choice between public and private modes is well explained by the model. In this case, income level virtually dictates the modal split. This is not surprising since 65% of private car users belong to the highest income bracket (more than ₱7,000/month) while that of public mode users are on the low side (the share of the highest income bracket on the Love Bus is only 4%). Since the explanatory rate is quite high compared to the other tests, the modal split between public and private modes can be determined mainly by the household income level.

Figure 5.16 shows schematically the choice between private and public (the jeepney in this case) modes in relation to household income level. Compared to the same result of the 1980 HIS, the curve has shifted to the right because of inflation.

Figure 5.14
Schematic Illustration of
Modal Choice Behavior of
Jeepney/Bus Passengers in
Relation to the Difference in
Travel Time and Fare

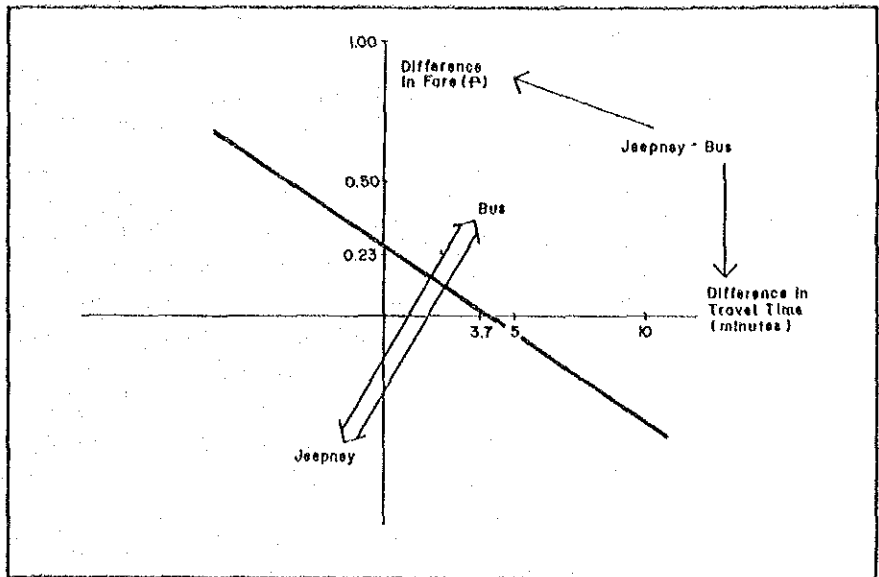


Figure 5.15
Schematic Illustration of Modal
Choice Behavior of Jeepney/Bus
Passengers in Relation to the
Difference in Number of
Transfers and Travel Time

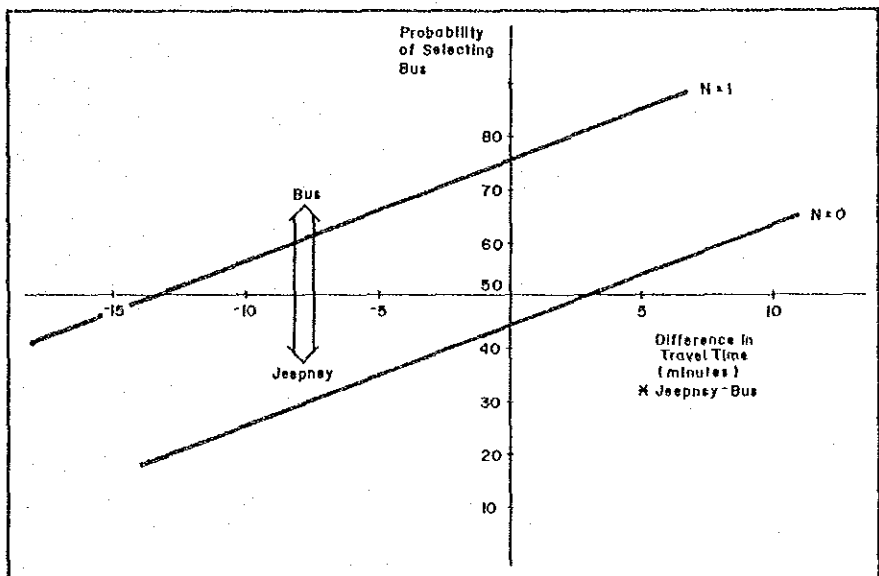
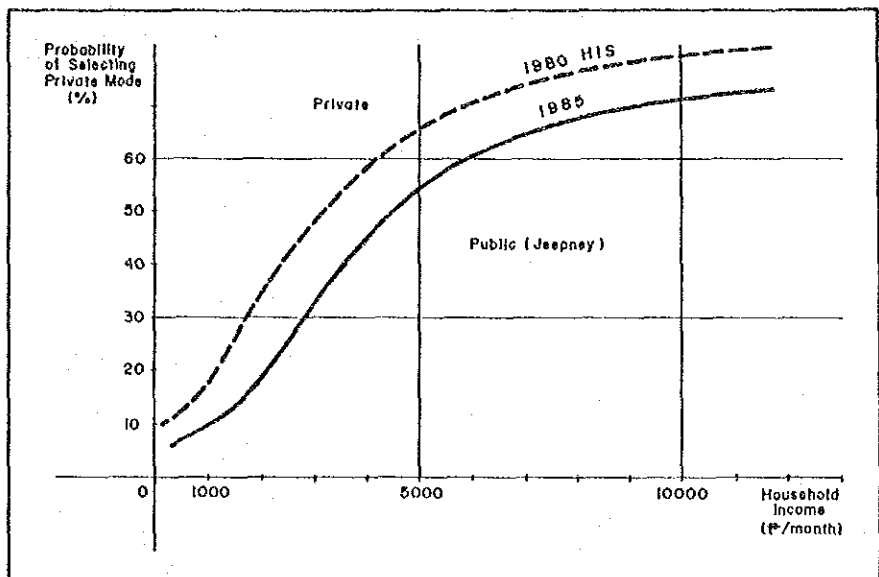


Figure 5.16
Schematic Illustration of Modal
Choice Behavior of Public and
Private Transportation Passengers
in Relation to the Income Level



5.5 RECOMMENDED ROUTE IMPROVEMENTS

5.5.1 Short-term Solutions

Plans and proposals were formulated for each of the problem areas identified. Existing information and pending proposals were reviewed as to their validity; additional surveys were conducted where necessary before proposals were drafted for discussions and refinements. The short-term planning considerations are:

- a) Maximum use of sidestreets – as a means of increasing traffic capacity of the areas as a whole as well as alleviating congestion on major roads without costly investments;
- b) Improvement of circulation at turning points/circuits – as a means of diffusing unnecessary traffic conflict among and between vehicles and pedestrians.
- c) Improvement of facilities – complementary to new circulation and re-routing proposals is the improvement of facilities such as road surface, sidewalk, pedestrian facilities, etc.
- d) Stricter enforcement – low-cost proposals almost always require observance and/or enforcement of rules and regulations.
- e) Other policies and guidelines for the short-term planning include the following:
 - Fifteen (15) kilometers ceiling for jeepney route length
 - Restriction of provincial jeepneys' entry to Metro Manila CBDs with corresponding designation of terminal areas outside EDSA.
 - Integration of routes – for simplification, a number of similar routes are integrated.
 - Development of additional feeder routes to the LRT.

Table 5.15
Summary of Short-Term Proposals

Problem Area	Description of Problem	Proposed Solution
1) Marikina Town Proper	<ul style="list-style-type: none"> *Conflict among pedestrians, jeepneys, and tricycles on W.C. Paz and Shoe Avenue *Sidewalk and carriageway on W.C. Paz and Shoe Avenue are occupied by vendors *On-street parking along W.C. Paz and J.P. Rizal *J.P. Rizal/A. Bonifacio intersection is reaching its capacity 	<ul style="list-style-type: none"> *Rerouting of the SSS bound jeepneys from J.P. Rizal to E. Rodriguez *Rerouting of jeepneys from E. de la Paz to Shoe Avenue *Improvement of dispatching systems on Shoe Avenue *Banning of tricycle on W.C. Paz *Minor road improvement *Sign posting
2) N. Domingo	<ul style="list-style-type: none"> *Queueing/parking jeepneys and cars along N. Domingo, especially in front of Agora Market, and Blumentritt *Haphazard of PUV's loading/unloading *N. Domingo/Blumentritt and N. Domingo/Pinaglabanan intersections have reached their full capacity 	<ul style="list-style-type: none"> *Prohibition of on-street parking from the corner of Blumentritt and Pinaglabanan *Utilization of the public-owned parking area in front of the elementary school *Rerouting of the Crame and Tropical Meralco bound jeepneys which will result to the elimination of right/left turn movements into and out of Pinaglabanan *Rerouting of the Kalentong-bound jeepney route *A change in turning point of Cubao bound jeepneys
3) Sta. Mesa	<ul style="list-style-type: none"> *Conflict between thru-traffic and going out/coming in traffic *Traffic at the entrance, on-street parking, and poor condition of the service road. *Queueing/parking jeepneys along Santol Stop & Shop *Haphazard loading/unloading and on street parking in Old Sta. Mesa *Large volume of loading/unloading PUP students at Old Sta. Mesa/Valenzuela *Conflict between traffic and pedestrian movements at R. Magsaysay/Old Sta. Mesa intersection 	<ul style="list-style-type: none"> *Rerouting of Santol – Stop & Shop jeepney route which will reduce the service road load by 15% and the R. Magsaysay/Santol road. This will also eliminate queueing/waiting of jeepneys on Santol, between Old Sta. Mesa and R. Magsaysay *Provision of a terminal for the Santol and Stop & Shop jeepney route *Rerouting of the Divisoria – Sta. Mesa jeepney route which will result in an increase in convenience of PUP students *Passing through jeepneys should pass R. Magsaysay and jeepneys turning to Sta. Mesa should pass the service road *Strict prohibition of loading/unloading activities and on-street

Problem Area	Description of Problem	Proposed Solution
		<p>system at the bus bay</p> <ul style="list-style-type: none"> *Segregation of bus routes which use either the bus bay or the EDSA service road *Installation of pedestrian railings *Prohibition of entry from United Avenue to EDSA service road *Cutting of islands at the intersection of EDSA/Shaw
6) Kalentong	<ul style="list-style-type: none"> *Bothsides on-street parking and haphazard loading/unloading activities along Kalentong *Jeepney queueing in front of Kalentong Market, between P. Martinez and PNR and near the corner of G. Aglipay *Left-turn jeepneys from Kalentong to G. Aglipay conflict with thru-traffic vehicles *Narrow road width of Kalentong under the PNR overpass *Haphazard pedestrian crossing on Kalentong due to poor sidewalk condition *Conflict caused by the jeepney terminal near the intersection *Jeepneys queueing on the carriageway and making a U-turn on Shaw Blvd. (mainly intercity routes) *Shaw/Kalentong intersection is reaching its capacity 	<ul style="list-style-type: none"> *Parking restrictions *Installation of pedestrian railings and waiting sheds *Rerouting of Kalentong bound Pinatubo and Vergara jeepney routes from Kalentong to sidestreets *Change of turning point of the San Juan-Kalentong jeepney route *Removal of stalls along the sidewalk *Traffic signal relocation from the center of the intersection to the corner *Route cut at crossing for JRC bound intercity jeepney route *Improvement of road surface
7) Guadalupe	<ul style="list-style-type: none"> *Oversaturation of J.P. Rizal, EDSA ramps and Sgi. Yabut intersection caused by overlapping movements, left turning vehicles, and poor road condition of J.P. Rizal/EDSA ramp intersection. *Dangerous driving maneuvers caused by unparking cars in front of ABC and along EDSA frontage. *Waiting of pedestrians on the EDSA carriageway 	<ul style="list-style-type: none"> *Rerouting of westbound jeepney routes to J.P. Rizal, the EDSA ramp, Bernardino, and Carballo *Cutting of the Cartimar – Guadalupe jeepney route at the Buendia/EDSA intersection *Rerouting of the Crossing – Guadalupe jeepney route, after the construction of the new bridge *Improvements on EDSA westside <ul style="list-style-type: none"> – Widening of sidewalk – Relocation of the waiting shed – Installation of pedestrian barrier fence and prohibition of loading/unloading on the northside of the pedestrian overpass – Removal of stalls on the sidewalk

Problem Area	Description of Problem	Proposed Solution
		parking at the entrance of and along the service road * Channelization at the foot of R. Magsaysay overpass
4) Pasig Town Proper	* Bothsides on-street parking along A. Mabini and Dr. Sixto Antonio * Haphazard PUV's loading/unloading and pedestrians crossing along A. Mabini * Lack of the lane markings at Dr. S. Antonio & U. Velasco which contributes to the oversaturation of the intersection * Oversaturation of Dr. S. Antonio & U. Velasco intersection	* Pavement of the road surface of B. Aires and Anonas St. * Construction of waiting sheds * Installations of pedestrian railings and provision of pedestrian crossing * Prohibition on-street parkings Provisions of the lane markings to avoid conflict at the intersection * Channelization of the intersection of Dr. S. Antonio/U. Velasco * Rerouting of Crossing, Rosario and Ugong bound jeepneys from Dr. S. Antonio to M. H. del Pilar/Raymundo * Jeepney routes bound for Marikina, Cainta, Taytay, Antipolo, Quiapo, JRC & Stop & Stop should use Market Avenue/Mercedes Avenue/ Raymundo Avenue
5) EDSA/Shaw	* Queueing buses on EDSA service road * Queueing jeepneys on Shaw Blvd. * Dangerous weaving of buses using the underpass * Right-turn traffic from United Avenue to EDSA service road conflicts with thru-traffic * U-turn vehicles from South to south on EDSA account for 40% of the total inflow traffic of the EDSA service road bound for the north	* Banning of tricycles at the intersections of Dr. S. Antonio/Pasig Blvd. and A. Mabini Avenue * Traffic signal of Pasig Blvd./Dr. S. Antonio should be repaired * Rerouting of U-turn jeepney route at the intersection of EDSA/Shaw to the new bridge across Pasig and Libertad * Cutting of routes bound for JRC-Kalentong and U-turn jeepney routes using the gas station at the intersection's southwest corner * Rerouting of Kalentong-crossing jeepney route to the sidestreets in order to avoid crossing EDSA * Paving of Sheridan * Removal of the existing jeepney terminal (Crossing-Kalentong, Crossing Guadalupe) and use the space as a bus bay * Change the geometric design of the outer island for better utilization of the bus bay * Install waiting sheds * Improvement of the dispatching

Problem Area	Description of Problem	Proposed Solution
		<ul style="list-style-type: none"> – Strict prohibition of loading/unloading along EDSA between EDSA ramp and Bernardino *Improvement of EDSA eastside <ul style="list-style-type: none"> – Widening of sidewalk – Removal of existing steps on sidewalk (proposed by MMUT-STRAP BI) – Installation of a pedestrian barrier fence and prohibition of bus loading/unloading on the northside of the pedestrian overpass – Removal of stalls on the sidewalk – Installation of new waiting sheds. *Signalization and channelization of two intersections of EDSA ramps and J.P. Rizal *Sealing of the J.P. Rizal shoulder between the east and west ramps *Improvements of the road surface along J.P. Rizal *Installation of barrier fence type median outside ABC *Improvement of the dispatching system of buses on EDSA and of jeepneys on Bernardino *Widening of the bridge (mid-term) *Signalization of J.P. Rizal and Carballo intersection
8) J.P. Rizal	<ul style="list-style-type: none"> *Haphazard PUVs loading/unloading *On-street parking *J.P. Rizal has reached its capacity and is further aggravated by MWSS diggings *No traffic signals along J.P. Rizal 	<ul style="list-style-type: none"> *Installation of pedestrian railings in the proper location *Prohibition of on-street parking *One-way couple between P. Gil and South Avenue proposed by MMUTSTRAP BI *Rerouting of jeepneys along J.P. Rizal between South Avenue and Makati Avenue
9) Paco	<ul style="list-style-type: none"> *Jeepney queueing *On-street parking *Presence of vendors' stalls 	<ul style="list-style-type: none"> *Rerouting of jeepney routes along P. Gil *Rerouting of south-bound jeepney route *Prohibition of bothsides on-street parking which was proposed by MMUTSTRAP BI

Problem Area	Description of Problem	Proposed Solution
10) Buendia	<ul style="list-style-type: none"> *Uncoordinated traffic signals *Long cycle time of traffic signals *Parking and unparking vehicles cause serious congestion on side-streets *Poor access to the PNR Station *Poor access to the LRT Station 	<p>*Removal of vendors' stalls on the carriageway of P. Cil</p> <p style="text-align: center;">Short-term</p> <ul style="list-style-type: none"> *Adjustment of traffic signal phases and cycle time *Strengthening of parking control *Signal phase modification of the P. Tamo/Buendia intersection (no left turn from P. Tamo to Buendia) coupled with the opening of the Buendia/Washington intersection *Strict banning of on-road parking between Tripa de Gallina and SSH *Traffic management near the P. Tamo/Buendia intersection which includes the relocation and new designation of pedestrian crossing and PUV stops; installation of pedestrian fences along the curb and central median; widening of the sidewalk near Crispa *Improvement of access which involves the paving of the dirt portion of Medina St. in front of the station, as well as the PNR crossing; sidewalk construction in front of the station, coupled with the construction of a barrier fence between the sidewalk and the canal; and the detour of the Libertad-PRC jeepney route from Buendia to dela Rosa (east-bound), between Medina and P. Tamo *Improvement of access which includes the re-installation of traffic signals; designation of pedestrian crossing around the intersection; and the improvement/widening/construction of sidewalks around the intersection such as Leveriza, P. Burgos, and Dominga. <p style="text-align: center;">Mid-to Long-Term</p> <ul style="list-style-type: none"> *Synchronization of traffic signals *Strict control of on-road parking and encouragement of constructing multi-storey parking buildings *Construction of Makat-Mandaluyong Bridge *Opening of the PNR Railways at Malugay and de la Rosa, coupled

Problem Area	Description of Problem	Proposed Solution
		<p>with the widening of the bridge over the Estero de Tripa de Gallina, access improvement from the Bridge to Emilia and Finlandia and the intersection improvement at Ayala/Buendia, Malugay/Kamagong and Salcedo/Ayala</p> <ul style="list-style-type: none"> *Construction of R-4 *Grade separation of the intersections EDSA/Buendia and R-4/EDSA *Widening of Buendia between Tripa de Gallina and SSH
11) R. Magsaysay/ Nagtahan	<ul style="list-style-type: none"> *Intersection is oversaturated Long queue (500 m. or more during peak hours) 	<ul style="list-style-type: none"> *Grade separation (mid or long term) *Modification of signal phases (TEAM) *Detour of jeepney routes with the use of sidestreets such as Loreto, G. Tuazon, etc.
12) Rosario Junction	<ul style="list-style-type: none"> *Congestion at the intersection of Ortigas and Raymundo Avenue, Ortigas /Dr S. Antonio *Poor road condition of Ortigas Avenue 	<ul style="list-style-type: none"> *Designation of Er. S. Antonio and Raymundo Avenue as one-way couple *Signalization *Improvement of the turning circuit using the available vacant lot
13) España	<ul style="list-style-type: none"> *Reaching its capacity 	<ul style="list-style-type: none"> *Improvement of the road surface *Detour of private vehicles in some sections of España *Use of well-developed sidestreets in order to increase the capacity of España <ul style="list-style-type: none"> - Designation of several streets as one-way couples - Make A. Mendoza four lanes, between P. Florentino and España, using the existing median which is 4 m. wide *Improvement of road surface of several road sections *Modification of traffic signal phasing
14) Ortigas/ EDSA	<ul style="list-style-type: none"> *Long queue length (300 m. on Ortigas Avenue throughout the day; 500 m. during peak hours) 	<ul style="list-style-type: none"> *Grade-separation (MPWH) *Modification of traffic signal phasing coupled with proper control
15) Ortigas/ Santolan	<ul style="list-style-type: none"> *Long queue length at the eastside of Ortigas (300 m. throughout the day) due to improper phasing of traffic signals 	<ul style="list-style-type: none"> *Modification of traffic signal phases

Problem Area	Description of Problem	Proposed Solution
16) D.M. Marcos Tandang Sora	<ul style="list-style-type: none"> *Long queue length on D.M. Marcos Avenue (about 400 m.) during peak hours *PUVs loading/unloading on the carriageway of D.M. Marcos *Jeepneys on Tandang Sora conflict with through-traffic 	<ul style="list-style-type: none"> *Installation of traffic signals (TEAM II) *Seal the shoulder for PUV loading/unloading (MMUTSTRAP B1 proposal)
17) Quezon Ave./Roosevelt Avenue	<ul style="list-style-type: none"> *On-street parking on Roosevelt *PUJs loading/unloading on Roosevelt *Parking vehicles occupy the PUV bay on Quezon Avenue 	<ul style="list-style-type: none"> *Enforcement of 'no parking' restriction *Installation of pedestrian railings and waiting sheds *Designation of loading/unloading zones *Rerouting of terminating jeepney routes from Gen. Lim (clockwise movement) to Quezon Avenue (counterclockwise movement)
18) EDSA/Kamias	<ul style="list-style-type: none"> *Queueing of jeepneys near the intersection 	<ul style="list-style-type: none"> *Rerouting of terminating jeepney routes *Improvement of the dispatching system
19) E. Rodriguez	<ul style="list-style-type: none"> *Loading/unloading by jeepneys on E. Rodriguez 	<ul style="list-style-type: none"> *Installation of pedestrian railings and waiting shed on E. Rodriguez (southside) *Strict prohibition of PUJ loading/unloading near the intersection (northside) *Cutting the routes coming from Proj. 8 and Muñoz at Welcome Rotonda (MOTC)
20) Aurora/Anonas	<ul style="list-style-type: none"> *Loading/unloading by jeepneys near the intersection *Lack of traffic signals *Existence of a tricycle terminal 30 m. from the intersection contributes to the congestion 	<ul style="list-style-type: none"> *Strict enforcement of PUV loading/unloading prohibition at the intersections *Installation of a traffic signal (TEAM II) *Relocation of the tricycle terminal to sidestreets *Removal or cutting of the median island on Anonas *Rerouting of jeepneys coming from Kamias to Tindalo (Westbound)
21) La Salle	<ul style="list-style-type: none"> *Pick-up/set-down of students by private vehicles *On-street parking 	<ul style="list-style-type: none"> *Extension of the open time periods of Gate 7 to say 6:30 a.m. – 8:00 a.m. and 11:00 a.m. – 6:00 p.m. *Expansion of the existing parking area of La Salle *Signposting for 'no loading/unloading' restriction
22) Broadway Centrum	<ul style="list-style-type: none"> *Long queue (200 m.) at the intersection of Aurora and D.J. Rodriguez 	<ul style="list-style-type: none"> *Installation of a PUV bay

5.5.2 Mid-term Plans

With the 1990 outlook as basis, mid-term plans and proposals have been formulated on the following aspects:

- a) Appropriate modal share between bus and jeepney to meet the 1990 public transportation demand.
- b) Directions of route improvements by corridor.
- c) Route modifications and improvement of mode interchange areas.
- d) Expansion of the road network and other specific actions on public transport.

1990 Modal Share between Bus and Jeepney

Evaluation of the 1990 road network vis-a-vis 1990 traffic demand reveals capacity constraints and serious bottlenecks in many locations. In setting a strategy for dealing with modal relationship between bus and jeepney, the following alternative scenarios were examined:

- a) *Do Nothing* – This is based on the assumption that existing bus and jeepney route structure is retained in 1990 without any bus and jeepney routes along the planned new roads.
- b) *Bus Priority (I)* – It is assumed that only bus routes are added along the new roads and all long jeepney routes (more than 15 kilometers) on congested roads are replaced by bus routes.
- c) *Bus Priority (II)* – It is assumed that only bus routes are opened along the new roads (as in the above case), and jeepney routes along the eastern corridor, where the most serious congestion are predicted in 1990, are replaced by bus routes.
- d) *Jeepney Priority* – This is based on the assumption that new roads are served only by jeepneys.

The results of the simulation under the four scenarios are summarized in Table 5.16, the highlights of which are

- a) If nothing is done, the total vehicle-kilometers of buses and jeepneys will go up by 11% during the period 1984 to 1990, and passenger traffic by 30%.
- b) If only jeepney services are provided in the new roads, total vehicle-kilometers of bus and jeepney will balloon by 25% and the road traffic situation will be no better.

- c) If priority is given to buses by 1990 – either by expanding its services along the new roads and/or replacing the jeepneys on congested roads – a dramatic change in the traffic situation is foreseen. Bus will carry more passengers as expected but the more significant impact is almost a static growth in vehicle-kilometers of bus and jeepney.

Table 5.16
1990 Public Transportation Situation
Under Different Scenarios

	1980	1984	1990			
			Do Nothing	Bus Priority (I)	Bus Priority (II)	Jeepney Priority
No. of Pass (000)	756	854	1,025	1,007	1,010	992
Jeepney	580	639	660	443	566	724
Bus	176	209	323	535	417	239
LRT	—	6 ^{1/}	42	29	27	29
Pass-kms. (000)	4,572	5,240	6,996	6,843	6,853	6,718
Jeepney	3,021	3,318	3,420	2,053	2,988	4,152
Bus	1,551	1,883	3,028	4,539	3,637	2,323
LRT	—	39 ^{1/}	348	251	228	243
Veh.-Kms. (000)^{2/}	398	421	467	363	438	525
	[671]	[717]	[839]	[752]	[822]	[893]
Jeepney	349	364	375	225	328	455
Bus	49	57	92	138	110	70

1/ LRT South Line only

2/ Figure in [] is translated veh-kms on PCU basis;

1 bus = 1.5 jeepney = 3 pcu

It is therefore recommended that the level of jeepney operation be maintained at present size, and priority given to bus services in new primary roads. Introduction of more buses along the congested major roads should be explored whenever feasible.

Route Changes by Corridor

For analytical convenience, the whole study area was divided into several corridors. (It is defined that a corridor is a set of almost parallel roads which can function as alternative routes to each other).

- Southern Corridor
- Southeastern Corridor
- Eastern Corridor (Lower/Upper)
- Northeastern Corridor
- C-2/C-3 Corridor
- C-4 Corridor
- Metro Manila Periphery

Directions for route restructuring or improvements by corridor are tabulated in Appendix 5.1. A common message from the corridor analysis is the severity of traffic congestion by 1990 without some reallocation of modal shares (between bus and jeepney) and greater use of sidestreets. Despite the implementation of suggested remedies, traffic congestion will remain in the Eastern corridor (which includes Legarda, R. Magsaysay, Aurora Boulevard, Shaw Boulevard, and Ortigas Avenue).

Public Transport Strategies

1) Priority to Bus on the New Roads to be Constructed.

The new roads to be constructed should be served only by bus. These are shown in Appendix 5.2.

2) Priority to Bus on the Eastern Corridor.

All jeepney routes of more than 10 kilometers on R. Magsaysay, Aurora Boulevard, Shaw Boulevard, and Ortigas Avenue should be replaced with bus.

3) New Bus Routes via C-2.

Judging from the current and future demand structure, the following bus routes should be developed:

- North Diversion Road/A. Bonifacio/Dimasalang/C-2/Taft Avenue/R-1 Extension
- McArthur Highway/Rizal Avenue Extension/C-2/South Superhighway

4) Improvement/Development of Sidestreets.

For the problem corridors, available sidestreets must be used more extensively.

5) Expansion of Jeepney Service Coverage in the Outlying Areas.

The public transport service areas are spread wide in the outskirts of the metropolis; extending jeepney service is desirable.

6) Strengthening Premium Bus Service.

More premium bus routes should be developed along EDSA and South Superhighway having Makati as a key service node.

Implementation of the proposals, (as shown in Table 5.17) will generate savings in vehicle operating costs to the tune of P3.3 million in economic terms or P3.0 million in financial terms per day. The travel speed of vehicles will also register substantial improvements, although still at low levels. The improvement in traffic situation will be dramatic for Aurora Boulevard, Shaw Boulevard, Ortigas Avenue and EDSA.

Table 5.17
Summary Result by the Assessment of Road
Traffic for the Selected Alternative ^{1/}

	1984	1990	
		Do-Nothing Case	Bus Priority on New Roads and the Eastern Corridor
Vehicle-Kms (000/day)			
Jeepney	3,415	3,518	3,079
Bus	483	779	933
Private	<u>11,050</u>	<u>14,106</u>	<u>14,087</u>
Total	14,948	18,403	18,099
Vehicle-Hours (000/day)			
Jeepney	384	448	375
Bus	45	88	91
Private	<u>913</u>	<u>1,385</u>	<u>1,355</u>
Total	1,342	1,921	1,821
Pass-Hours ^{3/} (000/day)			
Jeepney	3,456	4,032	3,375
Bus	1,350	2,840	2,730
Private	<u>1,826</u>	<u>2,770</u>	<u>2,710</u>
Total	6,632	9,442	8,815
Average Travel Speed (kms/hr)			
Jeepney	8.9	7.9	8.2
Bus	10.8	8.9	10.2
Private	12.1	10.2	10.4
Vehicle Operating Cost (P000/day) ^{2/}			
economic			
Jeepney	18,174	19,606	16,516
Bus	10,716	19,389	21,491
Private	<u>56,905</u>	<u>77,616</u>	<u>75,254</u>
Total	85,795	116,611	113,261
financial			
Jeepney	20,093	21,694	18,269
Bus	11,961	21,691	24,033
Private	<u>70,797</u>	<u>96,592</u>	<u>93,616</u>
Total	102,851	139,977	135,918

Note:

^{1/}Traffic assignment result

^{2/}1985 prices

^{3/}Average load factors assumed are 9 for jeepney, 30 for bus and 2 for private car.

5.6 IMPLEMENTATION: FROM PLANS TO REALITY

5.6.1 Investment Programming

Implementation of the proposals can follow a logical sequence dictated less by priority than by practicality. The following groupings were therefore adopted:

- a) *Ready for Implementation* – refers to projects that can be implemented immediately without any capital outlays.
- b) *Short-term* – projects that can be implemented within 1 to 3 years after preparatory discussions with relevant agencies; no substantial capital investments.
- c) *Medium to Long-term* – projects that require major construction works such as those in Buendia and Guadalupe.

Table 5.18 provides the budgetary estimates for implementation. The costs for the “Ready for Implementation” projects are negligible; “Short-term” projects may need up to P48 million. Out of the latter, about 60% or P29 million is for road improvements, 9% or P4 million is for traffic management. Rerouting per se entails no cost.

The “Medium to Long-term” projects had been estimated for Buendia and Guadalupe only. The total cost for Guadalupe is about P2 million; Buendia will require about P20 million, of which 92% or P19 million is for road works. Excluded from this estimate is the cost of grade separation of EDSA/Buendia intersection and R-4 construction.

Table 5.18
Cost Summary
by Priority and Type of Work Needed (P)

Area	SHORT TERM ^{1/}				MEDIUM TO LONG TERM ^{1/}			Total
	Road Component	Pedestrian Component	Traffic Management	Sub-Total	Road Component	Traffic Management	Sub-total	
1. Marikina	660,104	194,250	10,770	865,124	—	—	—	865,124
2. N. Domingo	—	—	1,681,232	1,681,232	—	—	—	1,681,232
3. Sta. Mesa	936,655	1,095,500	7,539	2,039,694	—	—	—	2,039,694
4. Pasig Town Proper	188,000	—	534,402	722,402	—	—	—	722,402
5. Shaw/EDSA	772,581	87,000	19,809	879,390	—	—	—	879,390
6. Kalentong	1,022,360	168,710	17,014	1,208,084	—	—	—	1,208,084
7. Guadalupe	627,060	427,038	2,501,385	3,555,483	1,846,000	—	1,846,000	5,401,483
8. J. P. Rizal	74,160	200,940	6,888,310	6,963,410	—	—	—	6,963,410
9. Paco	—	—	23,694	23,694	—	—	—	23,694
10. Buendia	942,940	771,716	1,707,100	3,421,756	18,542,184	1,685,540	20,227,724	23,649,480
11. R. Magsaysay/ Nagtahan	—	—	12,924	12,924	—	—	—	12,924
12. Rosario Junction	22,155,180	—	998,400	23,153,580	—	—	—	23,153,580
13. Espana	1,331,417	—	43,080	1,374,497	—	—	—	1,374,497
14. Ortigas/EDSA	—	—	—	—	—	—	—	—
15. Ortigas/Santolan	—	—	—	—	—	—	—	—
16. D.M. Marcos/ Tandang Sora	394,190	923,600	834,154	2,151,944	—	—	—	2,151,944
17. Quezon Avenue/ Roosevelt Avenue	5,115	146,560	3,231	154,906	—	—	—	154,906
18. EDSA/Kamias	—	—	—	—	—	—	—	—
19. E. Rodriguez/Banawe	—	109,530	11,847	121,377	—	—	—	121,377
20. Aurora/Anonas	467	—	8,616	9,083	—	—	—	9,083
21. La Salle	—	—	—	—	—	—	—	—
22. Broadway Centrum	—	—	—	—	—	—	—	—
TOTAL	29,110,229	4,124,844	15,103,507	48,338,580	20,388,184	1,685,540	22,073,724	70,412,304

1/ Agencies Responsible: a) Road Component – MPWH (national road), TCC, Municipal Government, other agencies concerned.

b) Pedestrian Component – MPWH, Municipal/Local Government, MWSS.

c) Traffic Management – MPWH, TCC, MMC, Local/Municipal Government, Traffic Enforcement agencies.

5.6.2 Fleet Requirements

As a natural outgrowth of the anticipated changes in population and other activities, the traffic demand on existing bus routes will expand by about 60% during the periods 1984 to 1990. In addition to this natural growth, the recommended bus priority strategy calls for an additional 33% boost in bus fleet. Table 5.19 presents the bus fleet estimation broken down into sub-areas.

In order to meet the demand expected on the new roads scheduled for opening on or before 1990, 1,400 additional bus units will be necessary. This is equivalent to 25% of the total fleet increments.

The conversion of long jeepney routes to bus routes in the congested eastern corridor will entail 300 additional bus units. Although this corresponds to only 5% of the total fleet increment during the period 1984 to 1990, its implementation will require careful management.

- a) When to start – The franchises on jeepney routes are scheduled for renewal in the first half of 1985 with validity of five (5) years. Therefore, the conversion process can commence in 1990.
- b) Where to relocate displaced jeepneys – Quite a number of the jeepney units plying the long routes along R. Magsaysay, Aurora Boulevard, and Shaw Boulevard can be redeployed on the same road but at shorter routes or to the sidestreets where traffic demand would have grown, too. The majority will have to be relocated to new feeder routes on the eastern outskirts where rapid population growth is foreseen.

For the new north-south routes proposed for C-2, 800 additional bus units (14% of the total fleet increment) will be required. This could be sourced partly from EDSA, whose current demand is inflated by the lack of circumferential routes.

In addition to the foregoing managed fleet change 3,100 additional bus units or 55% of the total fleet increment are needed to cope with the natural increase of traffic demand.

A realistic schedule for time-phasing of bus fleet additions is presented in Table 5.20. This is synchronized with the MPWH's tentative schedule for the construction of new roads.

To manage successfully the transition of 1990 on a bus-priority strategy, the following corollary steps are recommended:

- a) *No additional issuance of jeepney route franchise except route conversion from major roads to sidestreets.* This is to suppress the growth of jeepney fleet and facilitate the entry of new buses.

- b) *Sidestreet improvement along problematic corridors.* This is to expand the road capacity as well as to facilitate the rerouting of jeepneys.
- c) *Strengthen the control of jeepney operation.* To exact compliance, stricter enforcement of the following rules is necessary:
- prohibition against colorum (elimination of illegal units, "out of line", etc.)
 - traffic regulations on loading/unloading zone, turning point, curbside parking, etc.

Table 5.19
Bus Fleet Requirements of the Selected Alternative Plan

	No. of Bus Units ^{2/}
A. 1984 Estimated No. of Bus Units	6,000
B. Required No. of Additional Bus Units by 1990 for the Existing Bus Routes	3,100 ^{1/}
C. Required No. of Additional Bus Units by 1990 for:	
1. New Roads	
- C-3	600
- R-10	300
- Makati-Mandaluyong Rd.	100
- R-1 Extension	400
Sub-total	1,400
2. Replacement of Long Jeepney Routes along R. Magsaysay, Shaw Blvd. and Aurora Blvd.	300
3. New North-South Routes via C-2	
- McArthur Highway/Rizal Avenue Ext./Rizal Ave./C-2/South Super Highway	300
- North Diversion Rd./A. Bonifacio/Dimasalang/C-2/Taft Ave./Quirino Ave.	500
Sub-Total	800
TOTAL	2,500
GRAND TOTAL	11,600

Note: ¹after reduction of bus units absorbed by new routes

²those actually being operated

Table 5.20
General Program for Implementation of Mid-term Proposals^{1/}

	1985	1986	1987	1988	1989	1990
<ul style="list-style-type: none"> ● Additional Bus Fleet Requirement 						
<ul style="list-style-type: none"> 1. New Roads <ul style="list-style-type: none"> ● C-3 ● R-10 ● Makati-Mandaluyong Road ● R-1 Extension 		400	300	600	100	
2. Eastern Corridor						300
3. New North-South Routes	200	200	200	200		
4. Existing Bus Routes	500	200	400	200	1000	800
Total No. Required	700	800	900	1000	1100	1100
<ul style="list-style-type: none"> ● Complementary Steps 	<ul style="list-style-type: none"> • No additional issuance of franchise for jeepney routes (except the conversion from major road to sidestreet) • Improvement of sidestreets in the problem corridors (JUMSUT II short-term plans form its integral part) • Strengthening the control of jeepney operation • Jeepney Rerouting on the eastern corridor 					

^{1/} fleet requirement do not include the number required to replace the existing units

5.7

RECOMMENDATIONS FOR FURTHER STUDY

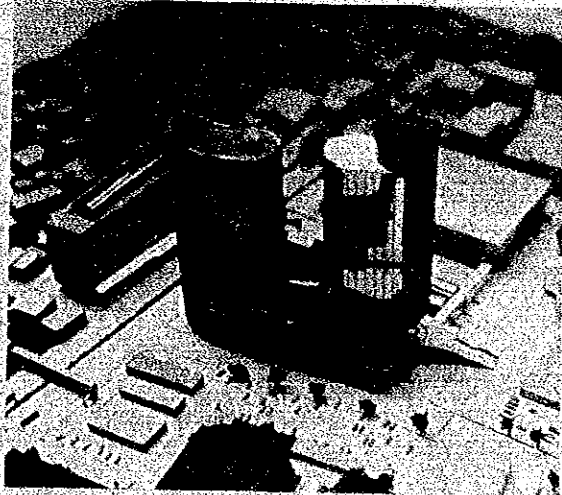
Because of the pessimistic outlook in the traffic conditions despite the assumed success of pending proposals, early consideration of the following issues are suggested:

- a) *C-2 Extension up to Makati.* This project is considered essential to rationalizing the road network and for maximizing use of R-10 Aurora Boulevard section of C-3. Since the feasibility study and detailed design had been done, resolution of objections and generation of alternative alignments to sidestep them should be explored.

- b) *Secondary Roads connecting C-3 and the Makati-Mandaluyong Road.* This can be considered as an alternative to the C-3 extension. It is important to identify and improve the best combination of secondary roads to connect C-3 with the Makati-Mandaluyong Road. Use of the ROW of PNR-Guadalupe line should be investigated. The project will also alleviate traffic congestion on Aurora Boulevard and Shaw Boulevard.
- c) *LRT Line No. 2 for the Eastern Corridor.* The Eastern Corridor will need a bold step to improve its capacity. It is recommended that a feasibility study be made for an LRT Line on this corridor, to cover the following:
 - Route Alignment
 - Demand Forecast
 - Preliminary Design
 - Jeepney/Bus Rerouting
 - Financial/Economic Feasibility
 - Implementation Schedule
- d) *Completion of R-4.* This will alleviate the current and future traffic congestion on J. P. Rizal and Buendia Avenue. Early implementation is also recommended.
- e) *Widening of Buendia.* This is to eliminate the current bottleneck between the section on Tripa de Gallina and South Superhighway. However, the feasibility should be reviewed in relation to the following alternatives:
 - Opening of PNR at: Malugay/Emilia
Finlandia/De la Rosa
Sampaloc/Arellano
 - Access Improvement from Buendia to Emilia and Finlandia
- f) *Grade Separation of Major Intersections* for the following problem intersections:
 - EDSA/Ortigas
 - EDSA/R-4
 - EDSA/Buendia
 - Nagtahan/R. Magsaysay
 - Espana/A. Mendoza

For the EDSA intersections, implementation awaits fund availability since detailed designs had already been completed. In addition, an investigation should be made on the feasibility of widening Ortigas Avenue from 4 to 6 lanes by reducing the central medians. For Nagtahan/R. Magsaysay and Espana/A. Mendoza intersections, it is recommended that a reassessment of the old grade separation proposal be made – possibly on a new design that would satisfy the security needs of the nearby Malacañang Palace.

6.0 MODE INTERCHANGE AREA PLANNING



6.0 MODE INTERCHANGE AREA PLANNING

6.1 INTRODUCTION

6.1.1 Policy Framework

The governing development strategy for public transport facilities are contained in the MMUTSTRAP – Part A Final Report. Its relevant elements which serve as guiding inputs to JUMSUT II are as follows:

- Government shall identify and develop (by itself or preferably through private enterprise) several sites which are currently functioning as transit interchanges to meet present and future demand.
- Large-scale commercial development shall be influenced positively and negatively to increase the total supply of terminal capacities and improve their facilities for ingress, egress, layover and other transport requirements.
- Special attention shall be given to intermodal terminals at major transport nodes with synergistic benefits and multiple impacts.

The five mode interchange areas chosen for this study followed from the preceding macro or policy directions on Metro Manila's transportation system.

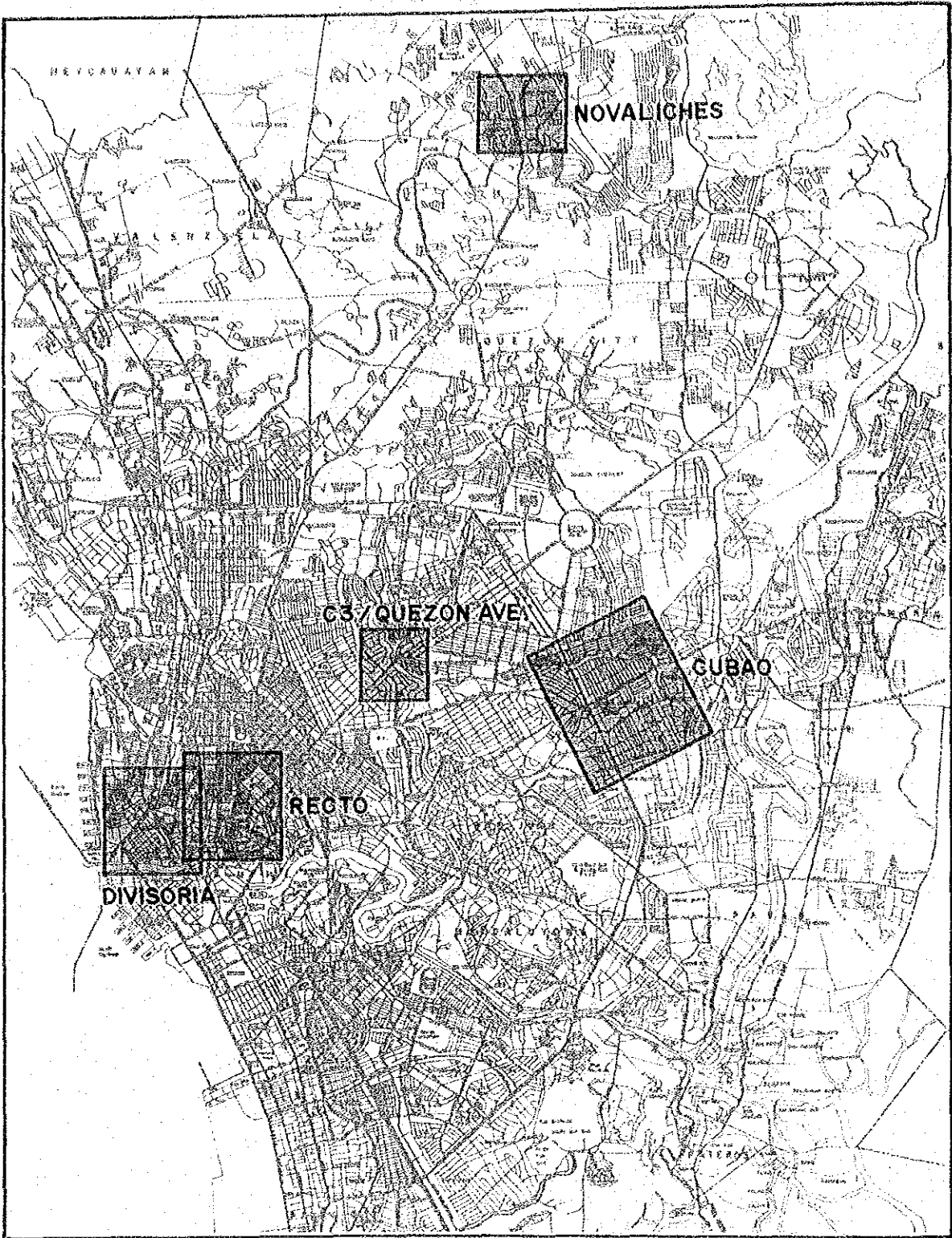
6.1.2 Selected Mode Interchange Areas (MIAs)

The mode interchange areas in Metro Manila selected for this study consists of Cubao, Recto, Divisoria, Novaliches, and C-3/Quezon Avenue. These are discussed separately in the succeeding sections. They represent a wide range of situations illustrative of the problems and opportunities in the National Capital Region.

The locations of the five areas are shown in Figure 6.1. Their respective catchment areas as commercial and business centers, whether potential or actual, are delineated in Figure 6.2. Table 6.1 provides a capsulized comparison of three of them among other "CBDs" as a general reference chart.

Cubao, situated at the strategic node of EDSA and Aurora Boulevard, has emerged as one of the most important commercial destinations in the Metro region. What sets it apart from the rest is its motive for development – which is private sector capitalizing on its accessibility. The dramatic growth of the Araneta Complex has made Cubao another CBD outside of the old Manila. The Cubao district lies between N. Domingo and 20th Avenue from west to east, and between Kamias and Santolan Road from north to south.

Within the old Manila district and abutting a traditional CBD is Recto. It is on the threshold of major redevelopment due to the favorable conjunction of space availability in the case of Old Bilibid Compound, the opening of LRT with a station nearby, and the near success of government to clear up the legal entanglements that have clouded its take-off. Furthermore, Recto has strong interchange potential, a high pedestrian density, and a business intensity amidst a blighted landscape. The study area is defined by C. M. Recto Avenue, Rizal Avenue, Fugoso Street, and A. Mendoza.



SELECTED STUDY AREAS



Figure 6.1
Location of JUMSUT II's
Mode Interchange Areas

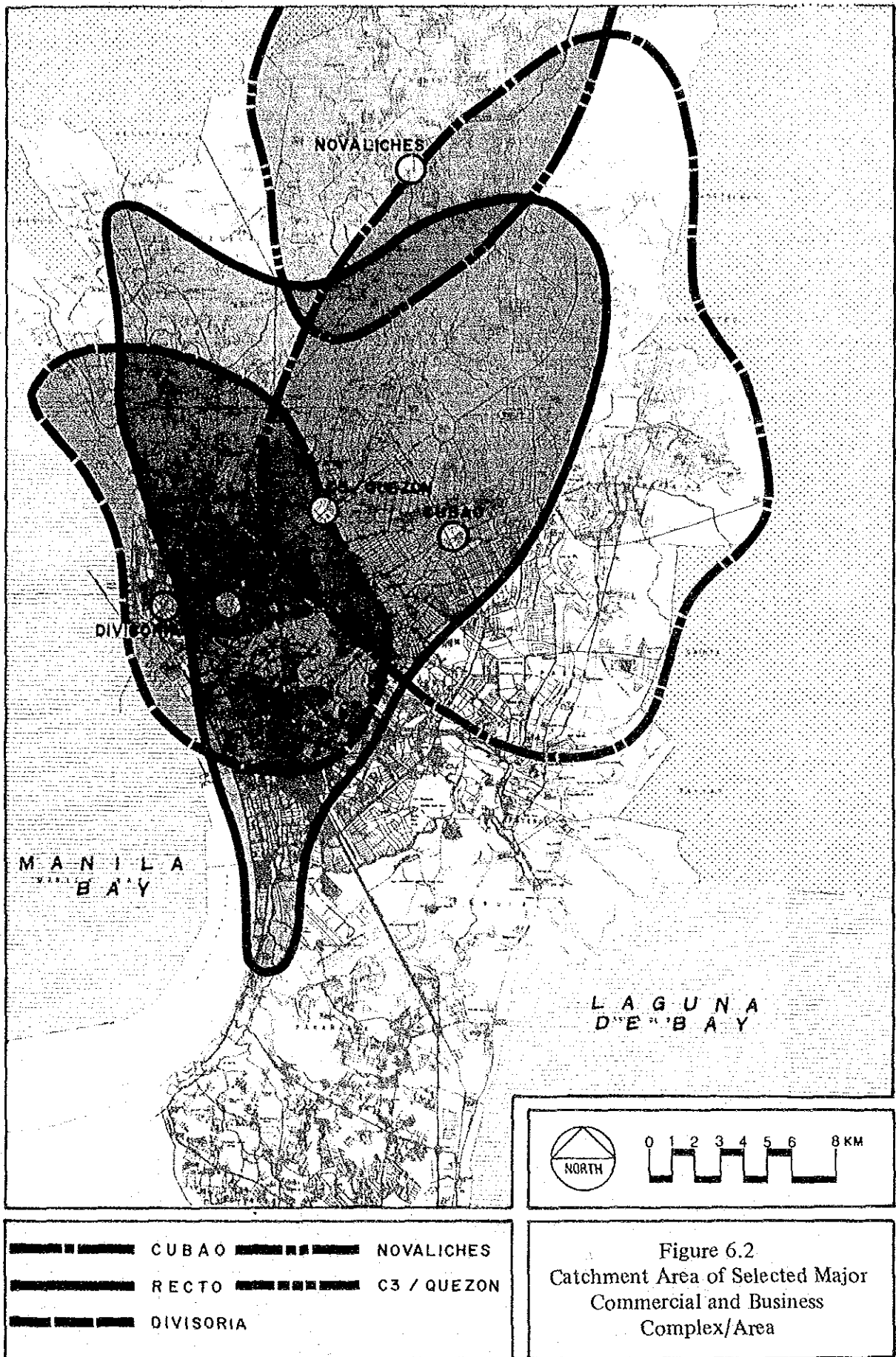
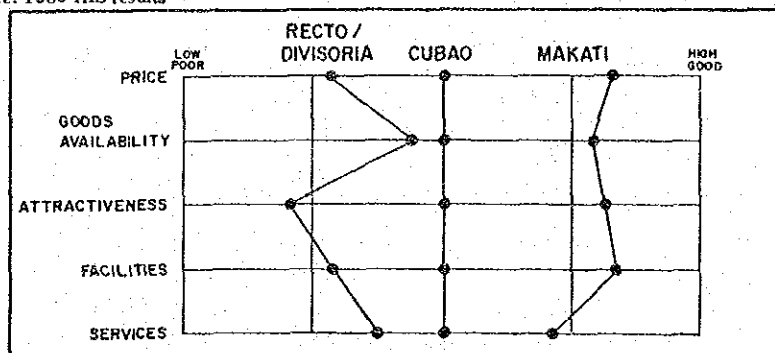


Figure 6.2
 Catchment Area of Selected Major
 Commercial and Business
 Complex/Area

Table 6.1
Characteristic of Commercial Complex/Areas
in Metro Manila

Complex	Characteristics	Access Transportation Mode ^{1/}
Cubao	<ul style="list-style-type: none"> ● non-traditional planned development with no associated planned residential zones ● mainly commercial activities ● further growth can be expected through denser development/redevelopment 	public 72% private 28%
Makati	<ul style="list-style-type: none"> ● a modern Western-type planned development with corresponding planned residential neighborhoods ● commercial and business activities ● intensive development still in progress though at a decelerating pace 	public 54% private 46%
Monumento	<ul style="list-style-type: none"> ● mainly traditional development similar in character to Cubao and Carriedo ● mixture of commercial and business activities ● not much room is available for future growth in the absence of a single large developer 	public 83% private 17%
Ermita South (including Harrison Plaza)	<ul style="list-style-type: none"> ● mixture of non-traditional and traditional development ● mixture of commercial and business activities ● little room for new development 	public 63% private 37%
Recto	<ul style="list-style-type: none"> ● traditional development that coasted along Quiapo's pace ● mixture of commercial and business activities with no focus ● a large block of land for development available but at tremendous constraints 	public 86% private 14%
Divisoria	<ul style="list-style-type: none"> ● traditional development of the old Manila ● mixture of commercial and business activities induced by the busy ports of entry ● no room available for new development except redevelopment 	public 78% private 22%

Source: 1980 HIS results



SOURCE: CONSUMER'S INTERVIEW SURVEY, JUMSUT II

Unlike the more recently-emerged commercial complexes of Cubao and Makati, Divisoria typifies the traditional market place which grew freely with the city of Manila. By a process of accretion, it has grown to its current position on the strength of the port activities, low cost goods, and variety of items sold. The area is approximately 1.8 kilometer square in size and bounded by R-10 in the west, J. Abad Santos in the east, Pasig River in the south, and Moriones in the north.

Outside the mainstream of the highly-urbanized core, Novaliches is a suburban center with adequate room for growth and expansion but already exhibiting the early manifestations of unplanned urbanization. Its major interchange point occurs in the town proper near the market amidst sorts of residential developments and linear-pattern of commercialization typical of small towns outside Metro Manila.

The 5th site chosen, C-3/Quezon Avenue, is located strategically at the crossroads of two primary roads: C-3 and R-7. Compared to the other MIAs, this one is virtually non-existent at present; its emergence as a MIA is predicated on the completion of a major artery – C-3. Because of the large influence zone characterized by households with high purchasing power, small slum population, and absence of a focal point, this junction could easily become a commercialized, once freed from its current constraint.

6.1.3 JUMSUT's Brief on the MIAs

This study has adopted a planning approach that considers the MIAs as broad-based centers of urban activities – in time and space – with associated transport interchange requirements. Instead of limiting itself to the physical aspect of building a terminal, JUMSUT II has assembled a package of recommendations that would lead to the gradual realization of passenger interchanges in the chosen locations.

a) Cubao

Its continuing growth and vitality hinge on a careful balancing of the purely commercial interests with the demands of accessibility. One without the other would create problems either in terms of congestion or declining business or both. Specific topics covered by JUMSUT II are the following:

- Rerouting of jeepneys converging along Aurora Boulevard
- Improving bus queueing along EDSA service roads
- Expanding the external access capacity into and out of the Araneta Center
- Improving the internal circulation of Araneta Center
- Provision of pedestrian facilities
- Reiteration of pending traffic management proposals along EDSA, Aurora, P. Tuazon, and Banahaw.

b) Recto

The contribution of JUMSUT II in the overall urban redevelopment of Recto is in the determination of the transportation interchange requirements of the plan drawn up by MMC over the Old Bilibid Compound. In addition, the traffic congestion in the Quiapo area caused by public transport can be alleviated by providing off-street loading/unloading facility: Recto offers such an opportunity. Specific issues addressed in the study are as follows:

- Rerouting of jeepneys coming from Rizal Avenue, Evangelista, and Central Market
- Efficiency in the use of A. Mendoza service road and Doroteo Jose
- Provision of pedestiran facilities
- Associated terminal operations within the Old Bilibid Area.

c) Divisoria

The key to the resurgence of Divisoria is in the removal of existing bottlenecks which have eluded low-cost traffic management solutions. A capital intensive solution appears to be the only workable approach and this in turn offers two options which JUMSUT II investigated, viz.:

- The conventional way of rebuilding an alternative site nearby with provisions for commercial space and transport terminal requirements which can only be satisfied by the Tutuban Station; and
- The unorthodox way of building an elevated road along C. M. Recto to bypass the congested sections in front of the market and thus formalized the terminal functions now occurring on-street.

While short-term measures are scarce and of doubtful efficacy, this report nevertheless included the following proposals:

- Jeepney rerouting
- Remedies along C. M. Recto to improve its utilization
- Redefinition of the roles and functions of selected sidestreets
- Improvement of pedestrian facilities in the area.

d) Novaliches

This is in the direction of desired expansion of Metro Manila. As a fast-growing suburban center, Novaliches needs a plan to guide its development in order to mitigate the problems of urbanization. As of now, it is already experiencing severe traffic congestion with no short-term relief nor simple solutions. JUMSUT II addressed these issues squarely and also raised several intermediate steps such as:

- Improving the route operations of bus and jeepneys, including possible rerouting
- Traffic management schemes within the Novaliches Town Proper
- Construction of a bypass road to reallocate traffic flow and reshape the urban structure
- The development of private lots into transport terminals.

e) C-3/Quezon Avenue

To anticipate the probable impact of C-3 and recommend possible countermeasures comprise the scope of work of JUMSUT II for this area. Using the broad concept of a mode interchange area, the study outlines the strategy and planning actions in the field of public transport and land development.

6.1.4 Previous Studies

Several studies in the past have been conducted which touched on a number of Mode Interchange Areas except for MMUTSTRAP B1, they revolved mainly around traffic management issues rather than transport interchange.

MMTEAM, for example, covers the planning, design and installation of traffic signals at about 170 locations between C-2 and C-4. Its completion may extend up to 1988. However, they can be assumed as given for the purposes of JUMSUT II.

MMUTSTRAP Part B1 studies five terminals, to wit: Alabang, Baclaran, Liwasang Bonifacio, Blumentritt, and Monumento. In addition, it examined Cubao and Divisoria as traffic management sub-areas. These were considered by JUMSUT II.

The different reports reviewed by JUMSUT II are arrayed in Table 6.2 with brief reference to their relationships to the selected MIAs of this study.

Table 6.2
Selected MIAs vis-a-vis Previous Studies

Other Studies/Reports	Cubao	Recto	Divisoria	Novales	C-3/Quezon
MMTEAM II	Traffic signals & associated work	Signalization under TEAM I	Signalization under TEAM I		Signalization and geometrics
MMUTSTRAP B1	Traffic management proposals		Traffic management proposals		
Araneta Center	Land development & phasing				
Redevelopment of O.B.A.		Land development & phasing			
R-10 and Related Road Project			Impact on vehicular traffic		
Tondo Foreshore Upgrading Project			Contiguous land development		
Northern Package				Road proposals/designs	
C-3 and R-4 and Related Roads and Project					Road proposals/designs

6.2 CUBAO MODE INTERCHANGE AREA

6.2.1 The Present Situation

A. Land Use and Socio-economic Characteristics

The land use pattern of the Cubao study area is not easy to describe, having gone beyond the linear stage. A dense commercial block sticks out in the form of the Araneta Center, while surrounding residential areas are in the low to medium density. This is illustrated in Figure 6.3.

Cubao covers six zones with a total population of 109,700. Residents belong to the lower-middle economic bracket where the average income ranges from P800 to P2,000 a month. The generally low car-ownership rate is reflective not only of the population's income but also of extreme dependence on public transport mode for access.

B. Road Systems and Traffic

The three primary roads, EDSA, Aurora Boulevard, and E. Rodriguez – form the backbone of what is generally a gridiron road network. Daily traffic volume ranges from 22 to 75 thousand with estimated volume capacity ratio ranging from 0.6 to 1.4. Secondary roads are P. Tuazon, Santolan, 15th Avenue, 20th Avenue, and New York. They function as alternative links between east and south and between east and north of Metro Manila, and have absorbed gradually traffic growth from the heavily congested major roads. Other collector roads further strengthen the road network in Cubao.

The Araneta Center-based traffic is considered the most important in the totality of traffic movements in the area. Total private vehicles using EDSA and Aurora Boulevard in going to or coming from the Araneta Center constitute from 29% to 81% of vehicular volume. Moreover, 73% (or 63,100 vehicles) of total traffic inflows and outflows are private cars as shown in Figure 6.4. Their more important access are P. Tuazon and 15th Avenue.

Present congestion along Aurora Boulevard and EDSA can be attributed to the fact that current traffic volume has reached the maximum road capacity. Other contributing factors are the following:

- 1) Undisciplined loading/unloading practice of jeepneys and buses
- 2) Heavy and disorderly pedestrian traffic

In the Araneta Center, one-way street concept is advocated except for Gen. Aguinaldo, Central Avenue and P. Tuazon. Currently, six sets of traffic signals are operated automatically during off-peak time and manually during peak time. A number of prohibitions were imposed on loading/unloading, turning and parking. In most cases, these regulations are not strictly adhered to by those concerned.

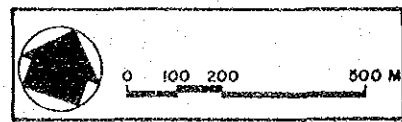
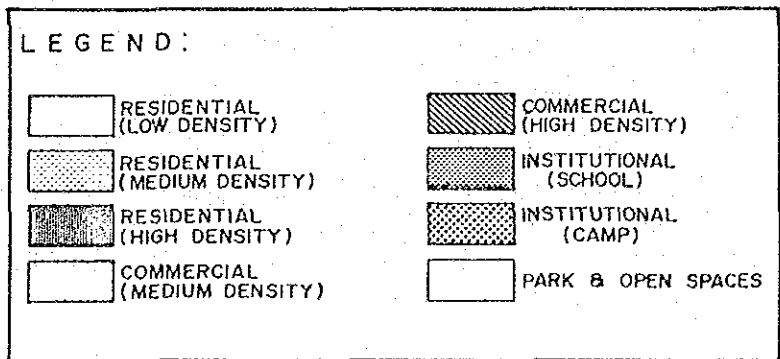
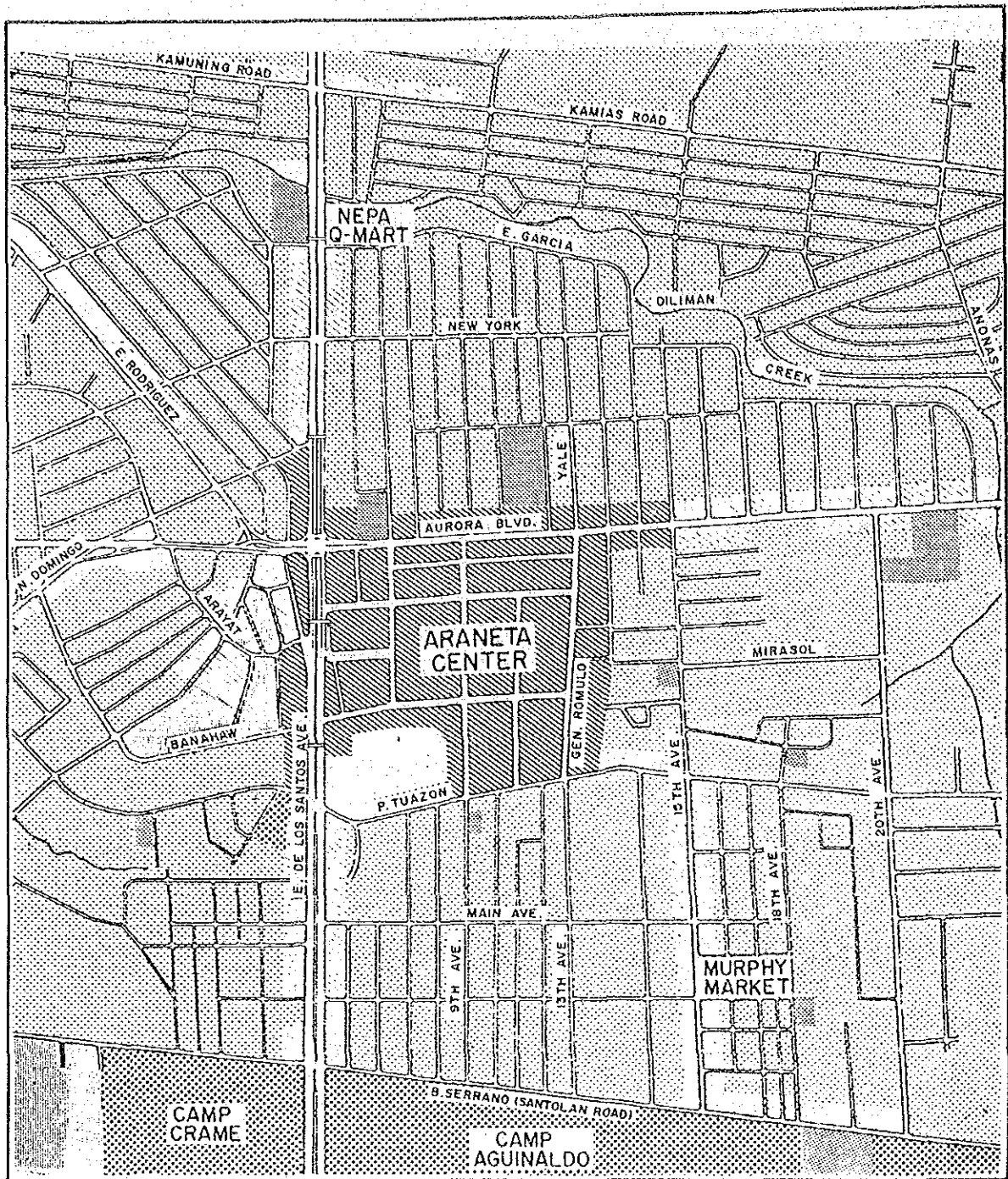
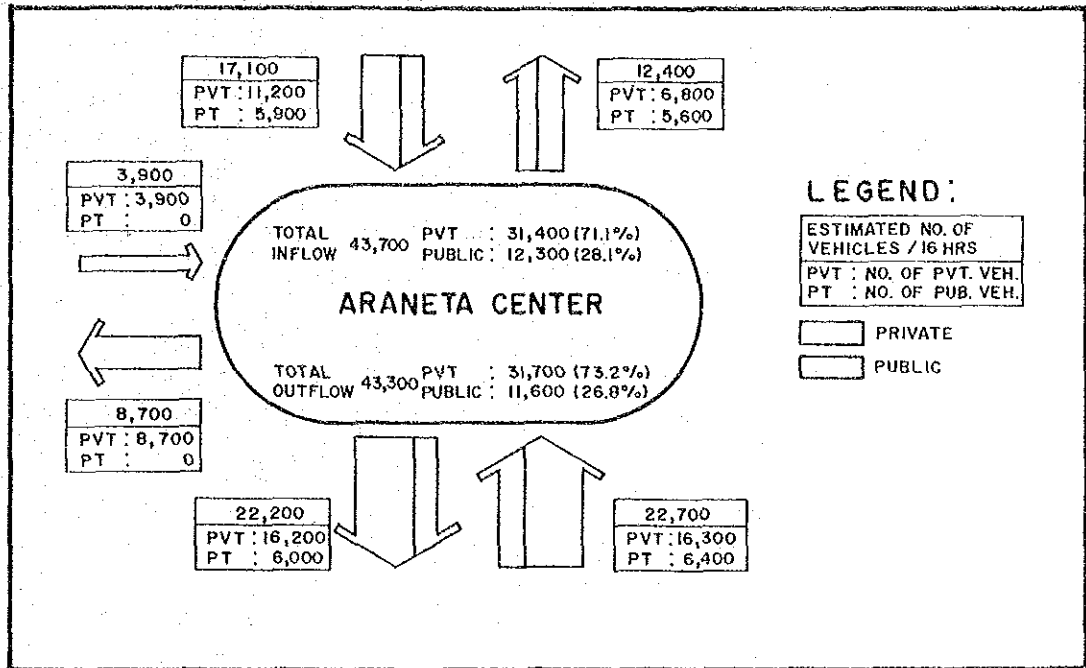


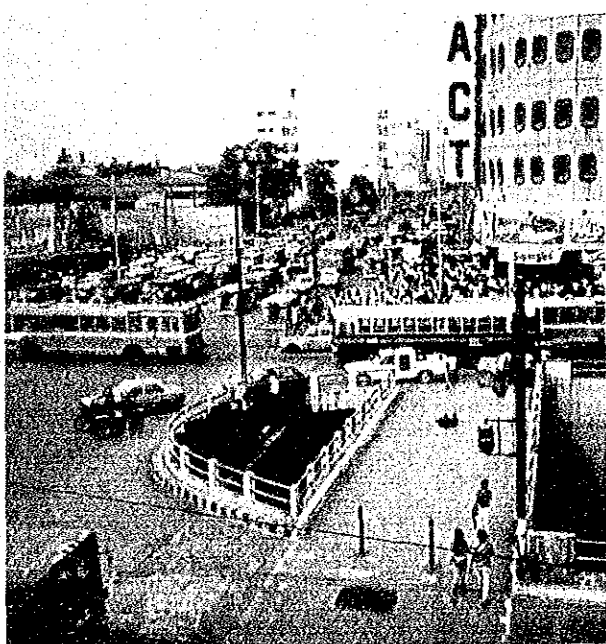
Figure 6.3
Existing Land Use of Cubao
Mode Interchange Area

Approximately 4,000 parking slots are available within the Araneta Center, 480 of which are integral part of shopping establishments. An estimated, 1,500 are off-road pay-parks, while the remaining are for “free” – though not for so long.

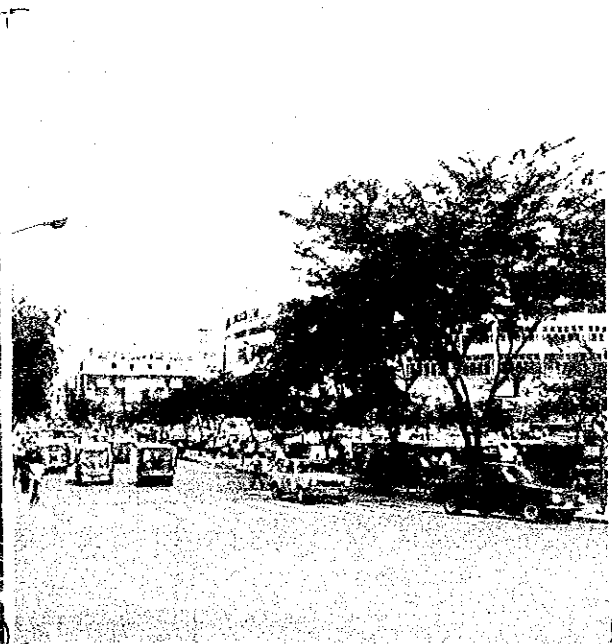
Figure 6.4
Overall Traffic Volume to/from Araneta Center by Direction



Aurora Blvd./EDSA Intersection



Araneta Center



C. Public Transportation Aspects

Cubao is served by 102 jeepney and 82 bus routes. One-half of the jeepney routes terminate at Cubao, while most of the bus routes pass through the area. Both passing through and terminating jeepneys heavily utilize Aurora Boulevard, while 90% of the total daily bus traffic converge along the EDSA service roads. These operations cause serious traffic congestions along Aurora Boulevard and EDSA service roads. Major terminating jeepney routes overlap along Aurora Boulevard across EDSA which amplifies the traffic congestion at and around the EDSA/Aurora Boulevard intersection (see Figure 6.5).

The existing terminals in Cubao function principally as turning points and lay-over areas. Boarding/alighting usually occur on major roads since loading/unloading points are arbitrarily fixed. More specifically, 14 jeepney and bus terminals, including bus stops are spread extensively in the area. Six provincial bus terminals are located off-road and equipped with better facilities and other amenities for waiting passengers.

The passenger traffic volume is approximately 690 thousand per 16 hours, where 92.5% are due to intra-city public transport and only 7.5% to inter-city or provincial transport. A greater portion of total passenger traffic served by the jeepneys with 67.1% and the remainder by buses.

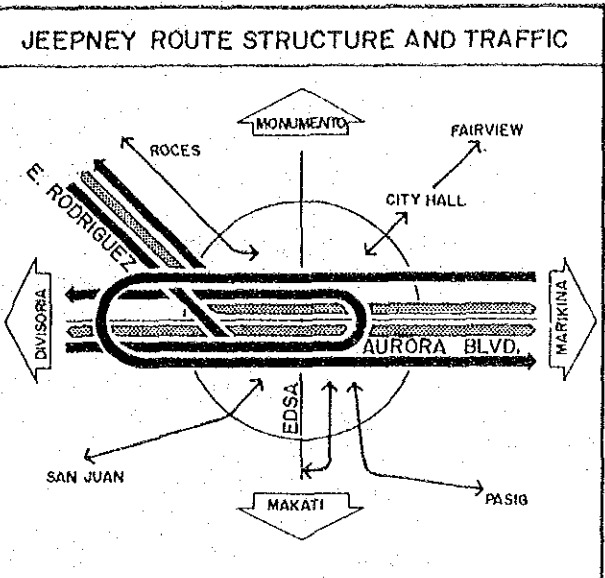
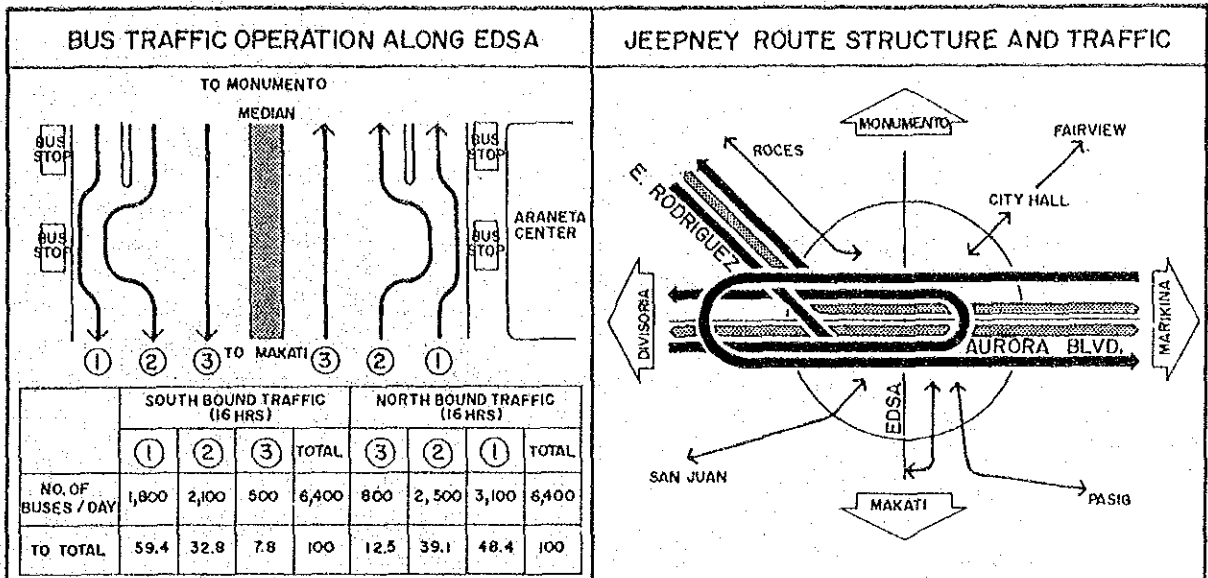
Of the total public transport passengers, approximately 40% and 28% are transferencees on weekdays and on weekends, respectively. Cubao is a prime destination and its attraction lies in its commercial and recreational activities. The major magnets are (about 34% of the total) Rustan, Shoemart and Ali Mall.

EDSA and that section of Aurora Boulevard immediately east of EDSA account for roughly 60% of total boarding and alighting passengers. Likewise, the major flow of transfer passengers is discernible within that eastern segment of Aurora Boulevard and between that section and the southern leg of EDSA (see Figure 6.5).

D. Pedestrian Facilities and Characteristics

As estimated total of 120 thousand pedestrians cross EDSA daily; 80% use the pedestrian deck in front of Farmers Plaza, and 15% use the one farther south. Another 5% cross EDSA atgrade to avoid perceived inconvenience, risks, and extra time associated with overpasses. Along Aurora Boulevard, the estimated number of pedestrians is 100 thousand a day. Traffic congestion is aggravated by pedestrians crossing outside the designated pedestrian lanes with only 45% using the zebra crossing between Gen. Santos and Yale.

Within the Araneta Center, roads are provided with sidewalks of sufficient width sometimes more than 3.0 meters. A high estimate placed pedestrian traffic at 750 thousand a day.



TRANSFER TRAFFIC FLOW OF PUV PASSENGERS IN CUBAO MODE INTERCHANGE AREA

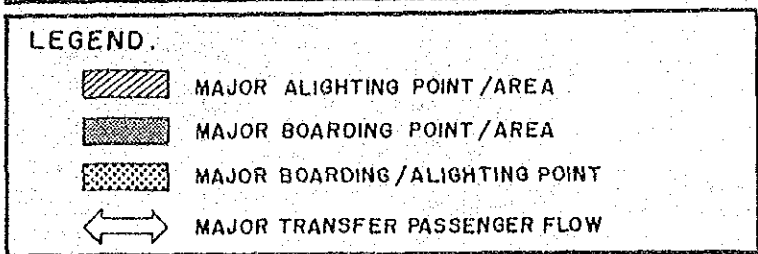
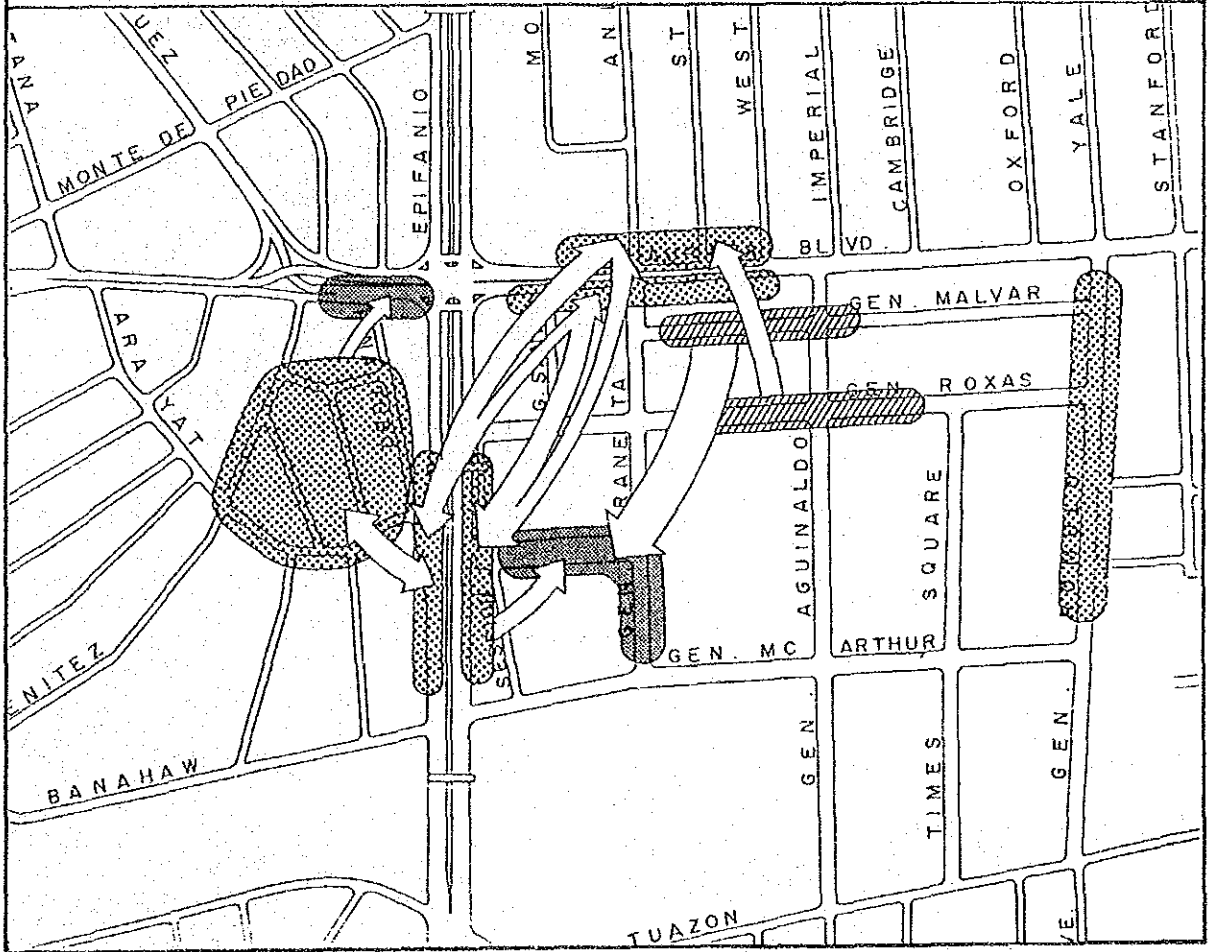


Figure 6.5
Public Transportation Traffic
Flow in Cubao Mode Interchange
Area

6.2.2 Summary of the Problems

The overarching objective is to transform Cubao into a vibrant yet pleasant center of commercial activities with its own nucleus of urban services within the Metro Manila region's multi-CBDs development framework. Central to this objective is the resolution of its transportation problems which act as bottleneck to its future growth. Broadly speaking, these problems stem from an imbalance between the prevailing pattern and volume of trip demands and the existing road network. With the latter further constrained by extraneous factors as to function below its full capacity.

Principal reasons for the concentration of the traffic demand in Cubao are two-fold, but intertwined. For one, the Araneta complex of commercial shops offer numerous attractions which are by themselves, major traffic generators. It is, for all intents and purposes, another CBD in Metro Manila. Of the total road traffic in the area, 20 to 55% are Araneta-bound. The second reason is that the area provides a convenient transfer point for commuters bound to other parts of the Metro region.

Overlapping jeepney routes along Aurora Boulevard across EDSA amplify the traffic congestions along Aurora Boulevard. By dispersing these routes through rerouting, a reduction in total jeepney traffic at the EDSA/Aurora intersection by approximately 40% from current levels can be expected. The penalty, however, is greater pedestrian traffic.

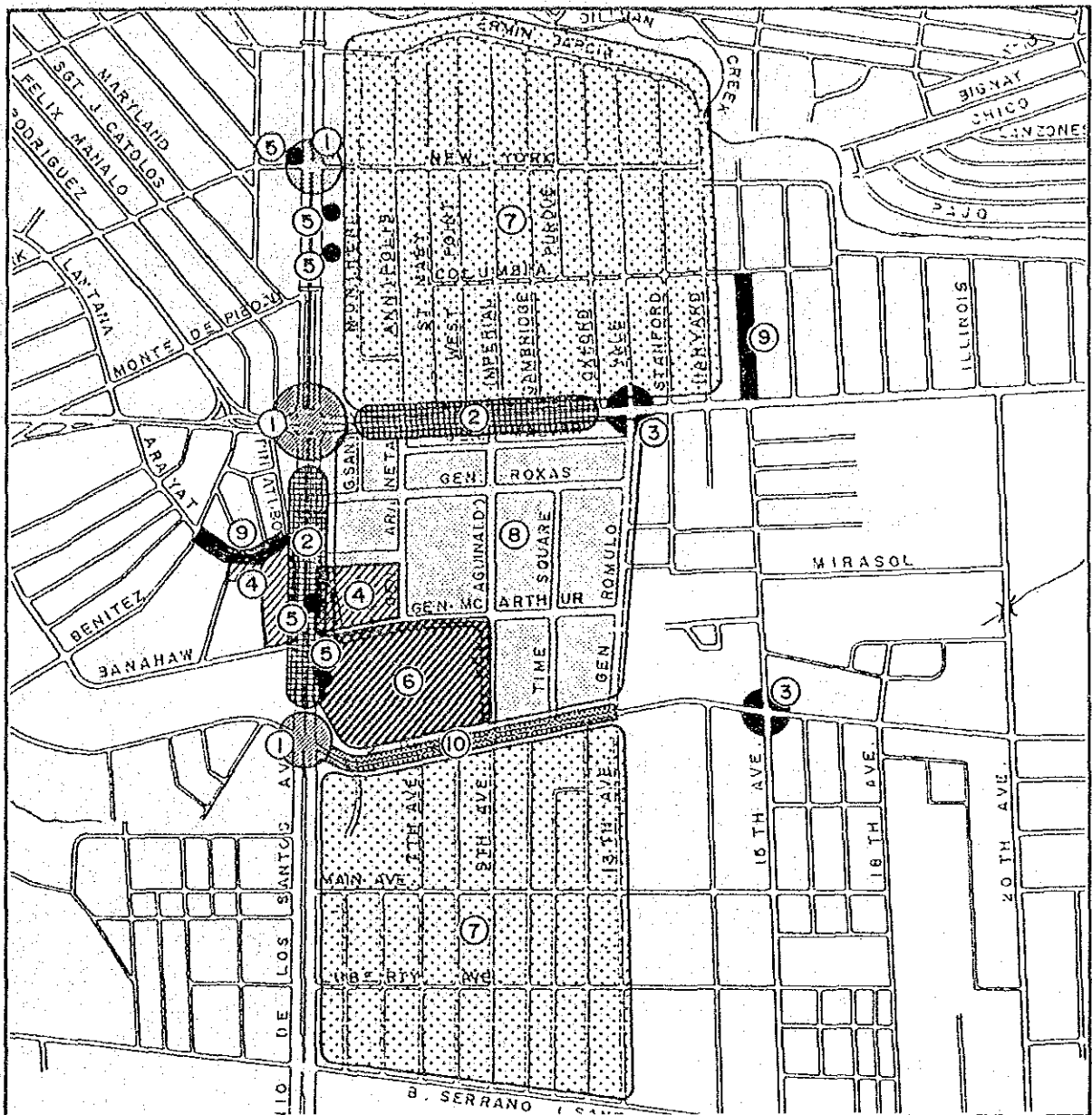
With this predicament, it is useful to view the transportation problems of Cubao as a system with short and long-term dimensions and in terms of the interrelated actions in traffic, public transport, road, and land development. Problems encountered on the short and long-term are summarized in Figure 6.6.

Congestion Along EDSA



Congestion Along Aurora Blvd.





LEGEND:

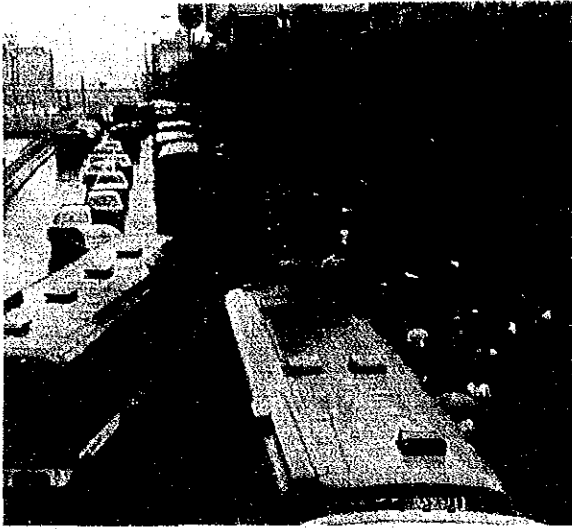
1. Problematic intersections (EDSA/Aurora, EDSA/P. Tuazon, EDSA/New York). East-bound and west-bound jeepney routes overlap at EDSA/Aurora intersection.
2. Uncontrolled loading/unloading of jeepneys and buses along Aurora and along EDSA. Lack of pedestrian facilities.
3. Malfunctioning traffic signals at Aurora/Gen. Romulo and P. Tuazon/15th Avenue.
4. Lack of well-defined public transport terminals to facilitate transfers.
5. Scattered provincial bus terminals along EDSA.
6. Imbalance between vertical development and public transport systems and road infrastructure.
7. Through traffic inside residential zones.
8. Inefficient internal traffic circulation in the Araneta Center Extraneous traffic caused by vehicles looking for free parking within the Araneta Center.
9. Deterioration of road pavements along Arayat, 15th Avenue and other secondary roads.
10. Narrow carriageway of P. Tuazon and lack of collector routes between primary roads and Araneta Center.



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Figure 6.6
Location of Problems
Encountered in Cubao Mode
Interchange Area

Uncontrolled Loading/Unloading of Buses



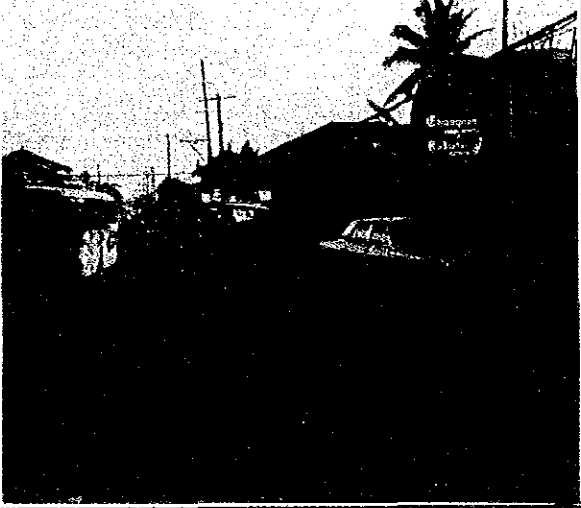
Through Traffic Inside Residential Zone



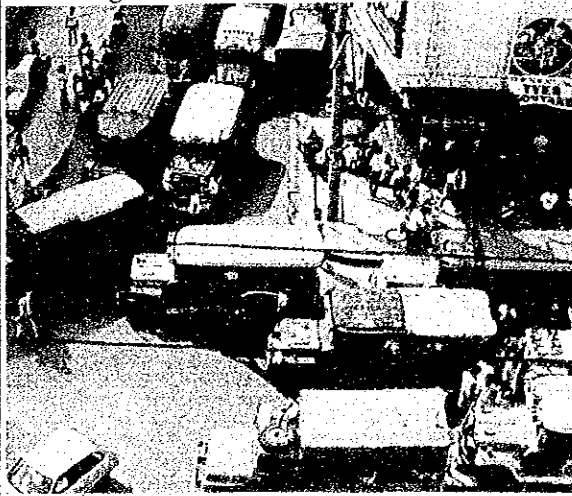
Internal Circulation in Araneta Center



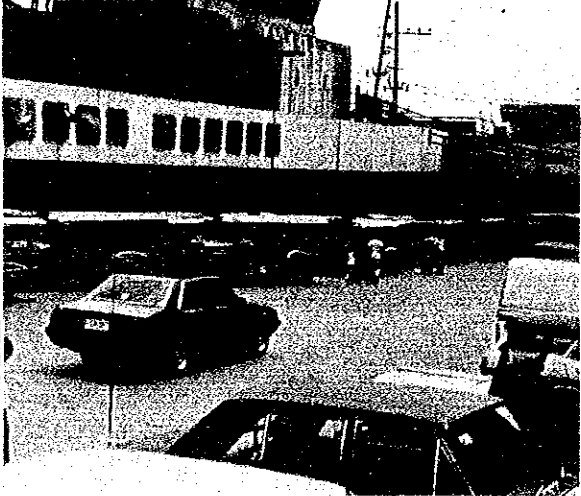
Deteriorated Road Pavement Along 15th Avenue



Lack of Pedestrian Facilities along Aurora Blvd.



Not Well Defined Public Transport Terminal



6.2.3 Planning Opportunities

The locus of planning for Cubao is derived from a thorough review of existing plans and past studies, reinforced by additional topical surveys and investigations. Instead of defining solution alternatives on the assumption that the transportation sector is the most critical, the approach taken was to consider all proposals from whatever sector as competing alternatives on the same footing initially. It is from this perspective that the JUMSUT II recommendations on public transport improvements and mode interchange facilities should be viewed. They cannot stand alone. Corollarily, the other proposals consistent with the resultant overall plan can be endorsed or revised accordingly.

Overall goals of the planning work are:

- a) to mitigate traffic congestion in the area
- b) to further expand/strengthen external access to the area
- c) to improve public transportation services both for vehicles and passengers
- d) to improve environment for pedestrian
- e) to encourage further growth/development of the area

To meet the above, plans were made and assessed under the following categories:

- a) rerouting of jeepneys
- b) improvement of bus operations along EDSA
- c) expanding external access capacity
- d) improvement of internal circulation of Araneta Center
- e) improvement of pedestrian facilities
- f) improvement of Aurora Boulevard traffic management
- g) development of mode interchange facilities.

The plans also consider implications/interactions among them and specific time for implementation.

6.2.4 Plans and Proposals

A. Jeepney Rerouting

Basic concept of jeepney rerouting is to eliminate overlapping turning movement across EDSA from the overloaded Aurora Boulevard near the EDSA intersection and then accommodate them into the proposed integrated terminal complex as shown in Figure 6.15. Seven jeepney routes shown in Figure 6.7

offer opportunities for improvements. Furthermore, route changes are foreseen as new access roads are constructed.

A1 Eastbound terminating jeepneys via Aurora Boulevard.

Rerouting of these jeepneys is possible over short-term to mid-term spans. Approximately 8,000 jeepneys (both directions per day) would be removed from the congested section of Aurora Boulevard.

A2 Westbound terminating jeepneys via Aurora Boulevard.

Rerouting of these jeepneys is proposed for mid-term implementation after the installation of traffic signal at Seattle/Aurora intersection and improvement of Arayat terminal. Impact is so high that approximately 6,000 jeepneys can be eliminated from the congested section of Aurora Boulevard.

A3 Westbound terminating jeepneys from Aurora Boulevard via E. Rodriguez.

This plan is also for mid-term implementation due to the same reason stated above. Impact is reduction in traffic volume along the congested section along Aurora Boulevard by more than 6,000 jeepneys per day.

A4 Terminating jeepneys in the Arayat Block.

Plans were prepared for short-term and long-term implementation. The former improves circulation of jeepneys, while the latter enables some of the jeepney routes to be transferred to the Araneta Center side via a proposed new link over Diliman Creek. Affected jeepney traffic level is approximately 8,000 a day.

A5 Terminating jeepneys within the Araneta Center Complex.

Plan is for short-term implementation which aims to direct the jeepneys from Aurora Boulevard to other secondary access roads and thus reduce the jeepney traffic along the congested section of Aurora Boulevard by approximately 5,000 to 10,000 a day.

A6 Passing-through jeepneys via Aurora Boulevard and E. Rodriguez.

No alternative routes are available for these jeepneys, but present route structure is considered the best for passengers and operators.

A7 Northbound terminating jeepneys via New York or E. Garcia.

Short-term plan is available to improve circulation. Impact to traffic flow is not great.

B. Bus Operations along EDSA

Six proposals were evaluated with the intention of minimizing the traffic congestion impact of buses along the EDSA service roads. Two of these schemes are software-type solutions requiring no investment in physical facilities but considerable time and effort from the institutional players. Similarly, proposals for further improvement of bus operations will depend on the provision of additional bus-bays and off-street terminals in the future (see Figure 6.8).

C. Improving External Access to Cubao

Figure 6.9 portrays the proposal calling for the introduction of one-way pair of streets to provide partial relief to the access problems of Cubao in the short- to medium-term period. These pairs are:

- Ermin Garcia as one-way westward and New York as one-way eastward, combined with Imperial as one-way southward and Yale one-way northward.
- In the mid-term and subject to installation of traffic signals and opening of Banahaw/EDSA Median, P. Tuazon as one-way eastward with Banahaw – Gen. McArthur as one-way westward.

New road links (extension of Kalayaan Avenue to Aurora) comprise the “meat” of the long-term proposals. By their nature, they are capital intensive and would entail prolonged rights-of-way acquisition. Widening of P. Tuazon could be implemented sooner than the others if the rights-of-way expansion occurs on the Araneta Center property.

D. Internal Circulation of the Araneta Center

No changes are supported in the short-term since the Center management has found the current traffic circulation as still workable.

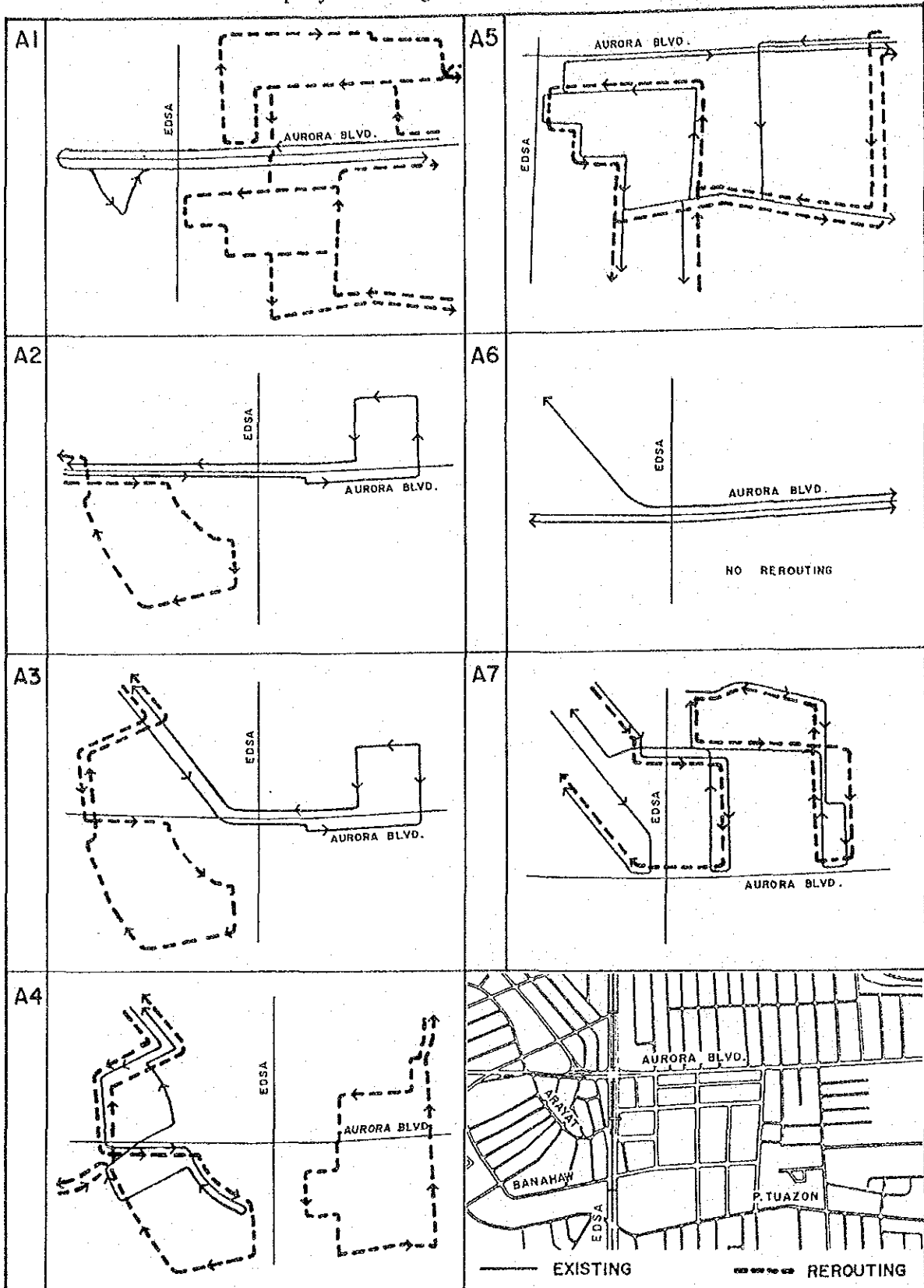
For the medium-term period, revision is imperative in conjunction with the implementation of Banahaw – P. Tuazon one-way couple.

Several possibilities are slightly favored over the other schemes.

E. Improvement of Pedestrian Facilities

It is difficult to segregate short and long-term measures to facilitate pedestrian movement. Aside from crosswalk markings, the improvement of sidewalks and construction of pedestrian barriers and overpasses and the like can be programmed over a longer period consistent with other proposals for Cubao.

Figure 6.7
Jeepney Rerouting Plan for Cubao MIA



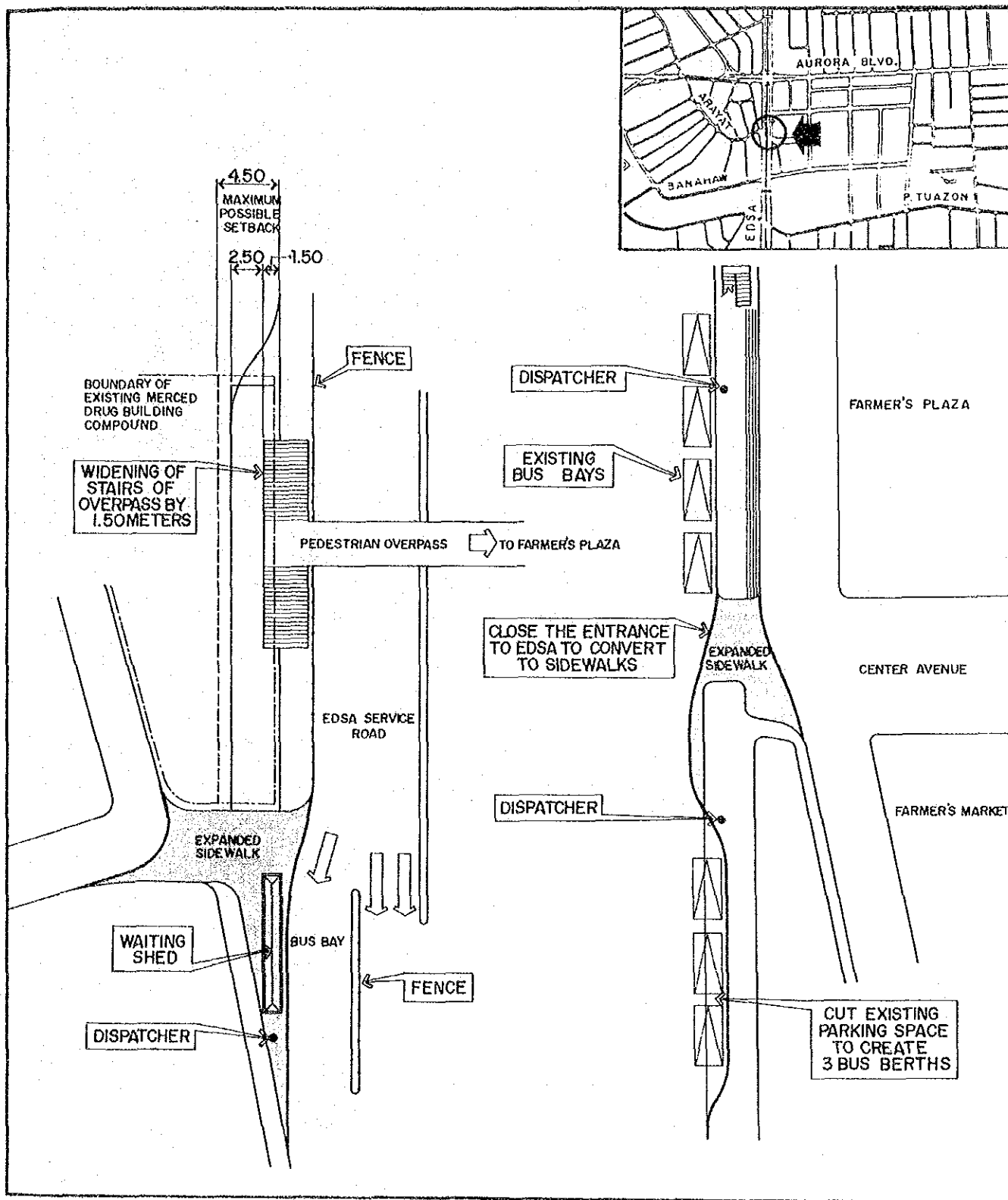


Figure 6.8
Improvement of Bus Operation
Along EDSA

JUMSUT II envisions the greater role of private developers in the construction/provision of such facilities.

F. Traffic Management Improvement along Aurora

All of the options under this category belong to the short and mid-term period. Introduction of better dispatching control for waiting jeepneys is supported, as a complementary measure to the prevailing enforcement drive against PU vehicles "parking" along Aurora. Conversion of available parking spaces into jeepney/bus bays is also beneficial. At a latter time, the construction of median fence and installation of traffic signals at Imperial would help markedly (see Figure 6.10).

G. Development of Mode Interchange Facilities

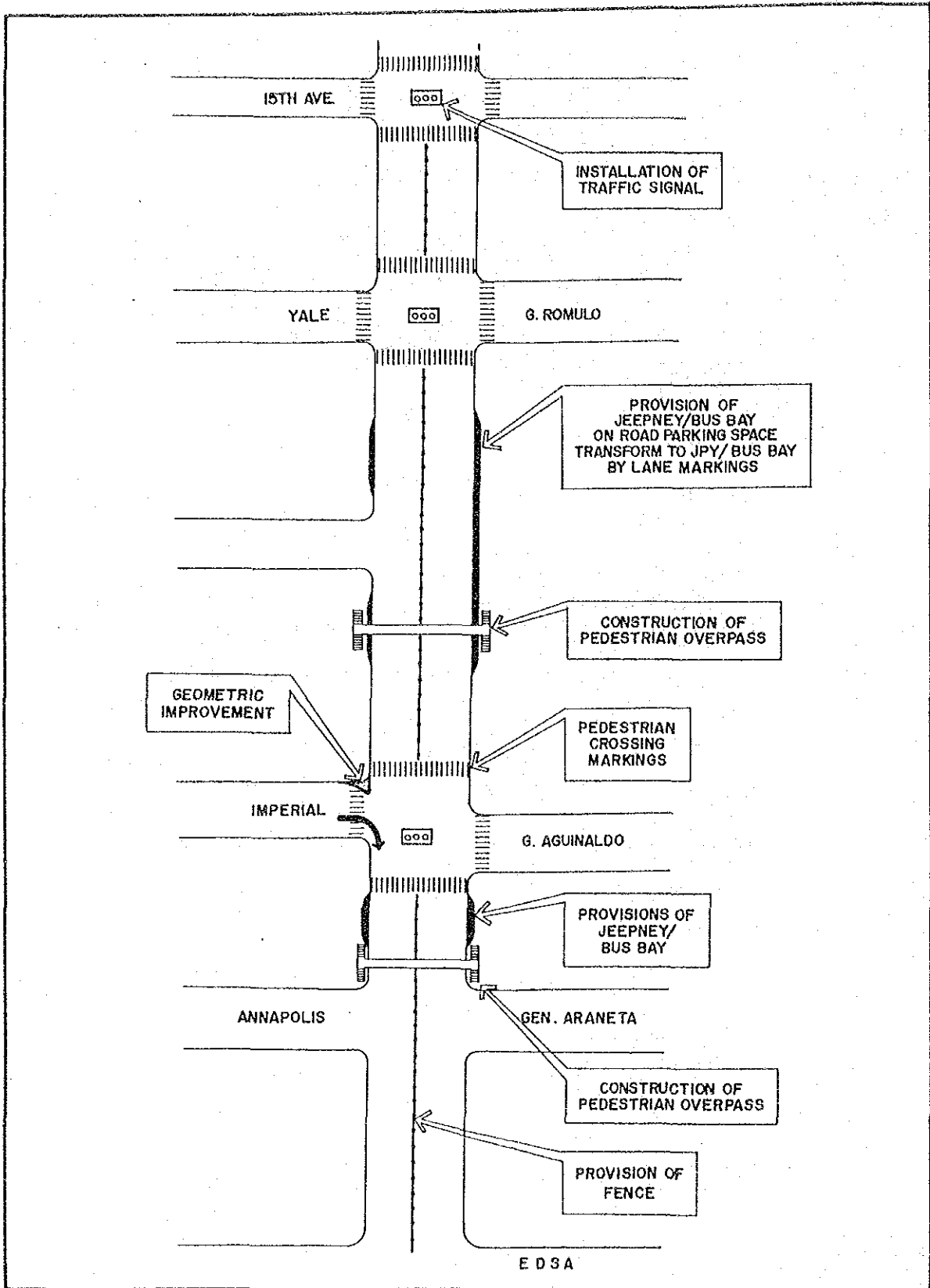
This aspect is the keystone of JUMSUT II recommendations for the long-term growth of Cubao.

The two most convenient sites are suggested in Figure 6.11, viz.: the Arayat-Pinatubo block and western block of the Araneta Complex. One or both should be developed into an integrated mode interchange facility.

If the LRT Line 2 is constructed radially along Aurora Boulevard, the most logical spot for its Cubao Station would be either of these two sites: It is conceivable for the Araneta Center to incorporate the LRT station and intermodal terminal. A positive action on the part of the Araneta management to adjust their future plans can swing the choice in favor of the Complex (with enormous commercial advantages) rather than the Arayat Block (which, if chosen, would represent a major competition to the Araneta complex).

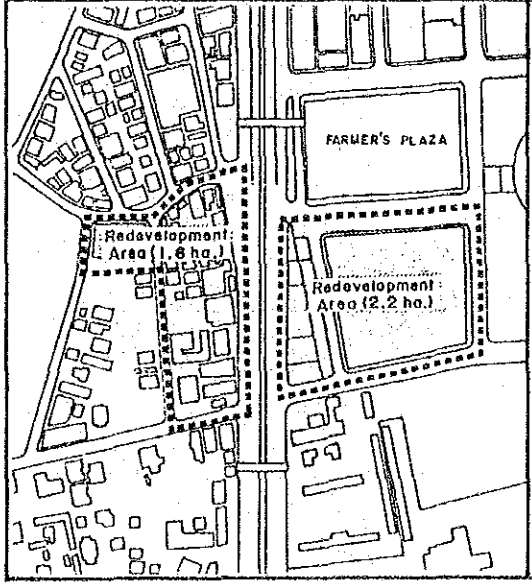
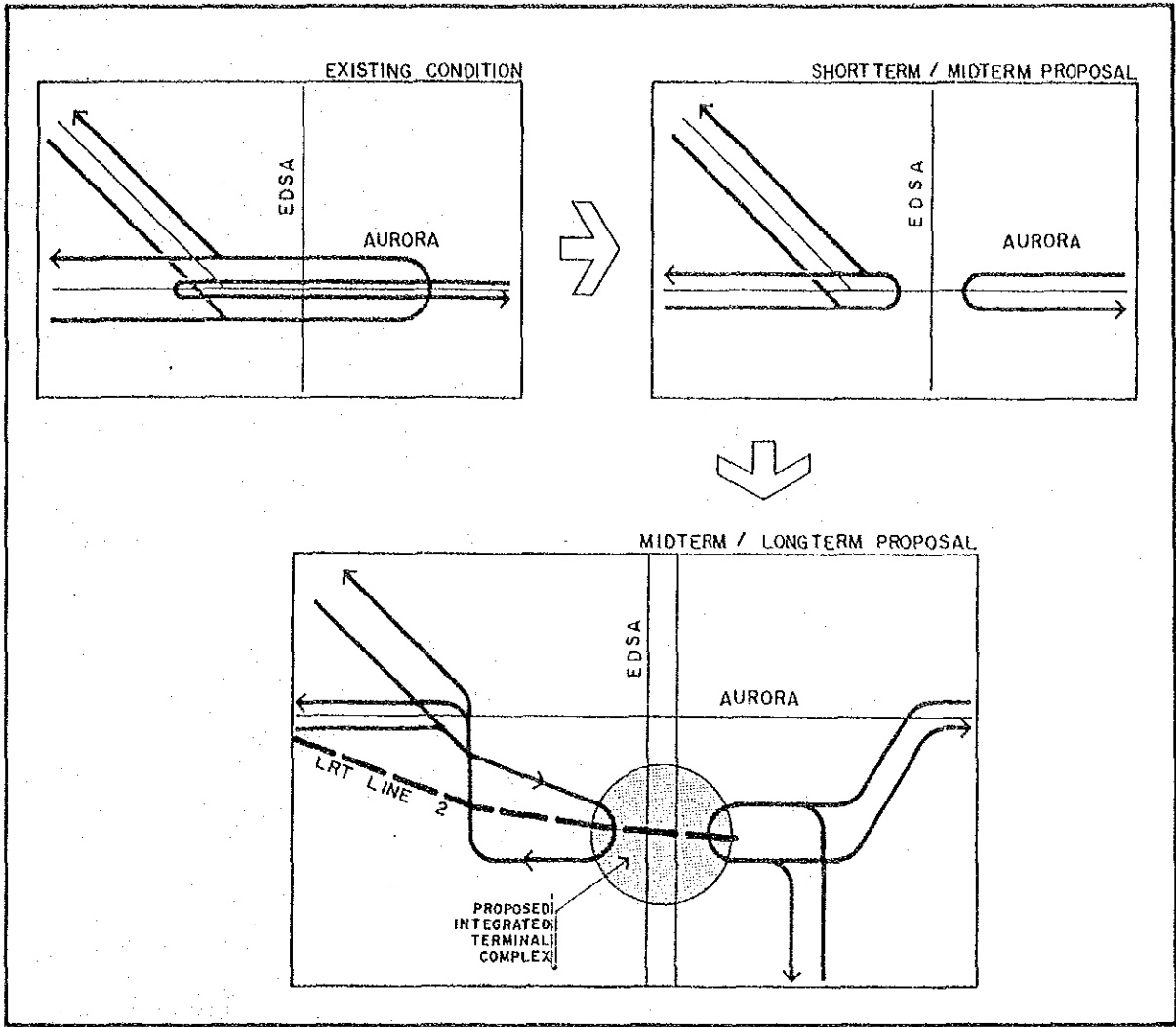
Other short-term and mid-term options rely on improving existing on-street terminals, these are:

- Exclusive use of Center Avenue for PUJs, with corresponding markings, signs, and dispatching control (see Figure 6.12 for details of recommendations).
- Efficient allocation of space along Gen. Araneta for PUJs in need of on-street lay-over areas. (Details are also depicted in Figure 6.12).
- Repaving of Arayat Road to expand width and accommodate greater jeepney parking. (This is portrayed in Figure 6.13).



EDSA

Figure 6.10
Better Utilization at Aurora
Boulevard



- * Development of integrated terminal facilities on the Western block of Araneta Center and Eastern block of Arayat/Pinatubo
- * Sites are ideal based on existing and forecasted traffic flow patterns
- * Opportunities for convenient intermodal connections/transfers
- * Possibility of LRT Line 2 passing Aurora Blvd. is real; if so, would most likely occur on these sites
- * Requires major investment

Figure 6.11
 General Schematic for Cubao
 Rerouting and Mode Interchange
 Facility Planning

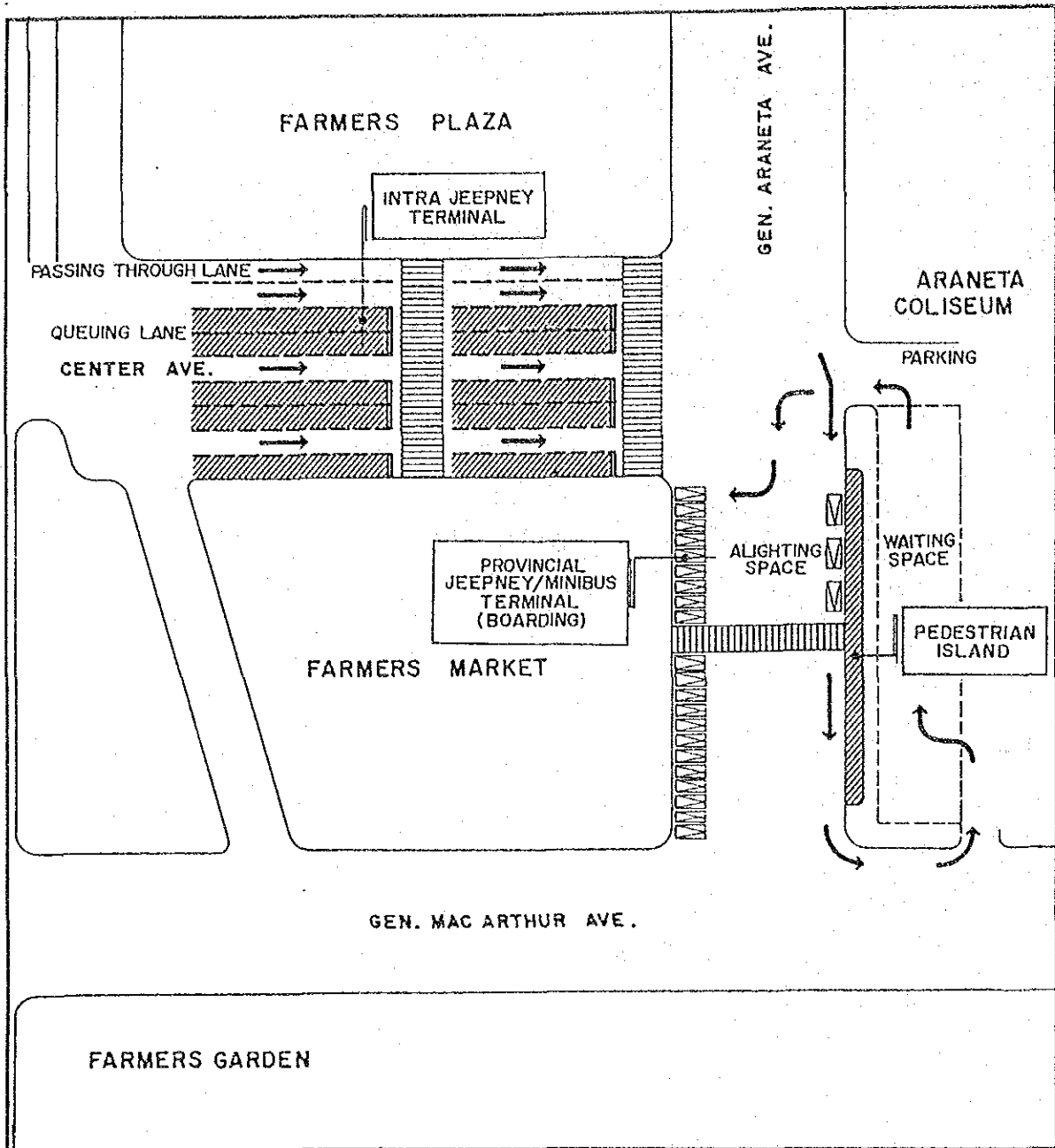


Figure 6.12
Proposed Plan on Utilization of
Center Avenue and G. Araneta
Avenue as Jeepney/Bus Terminal

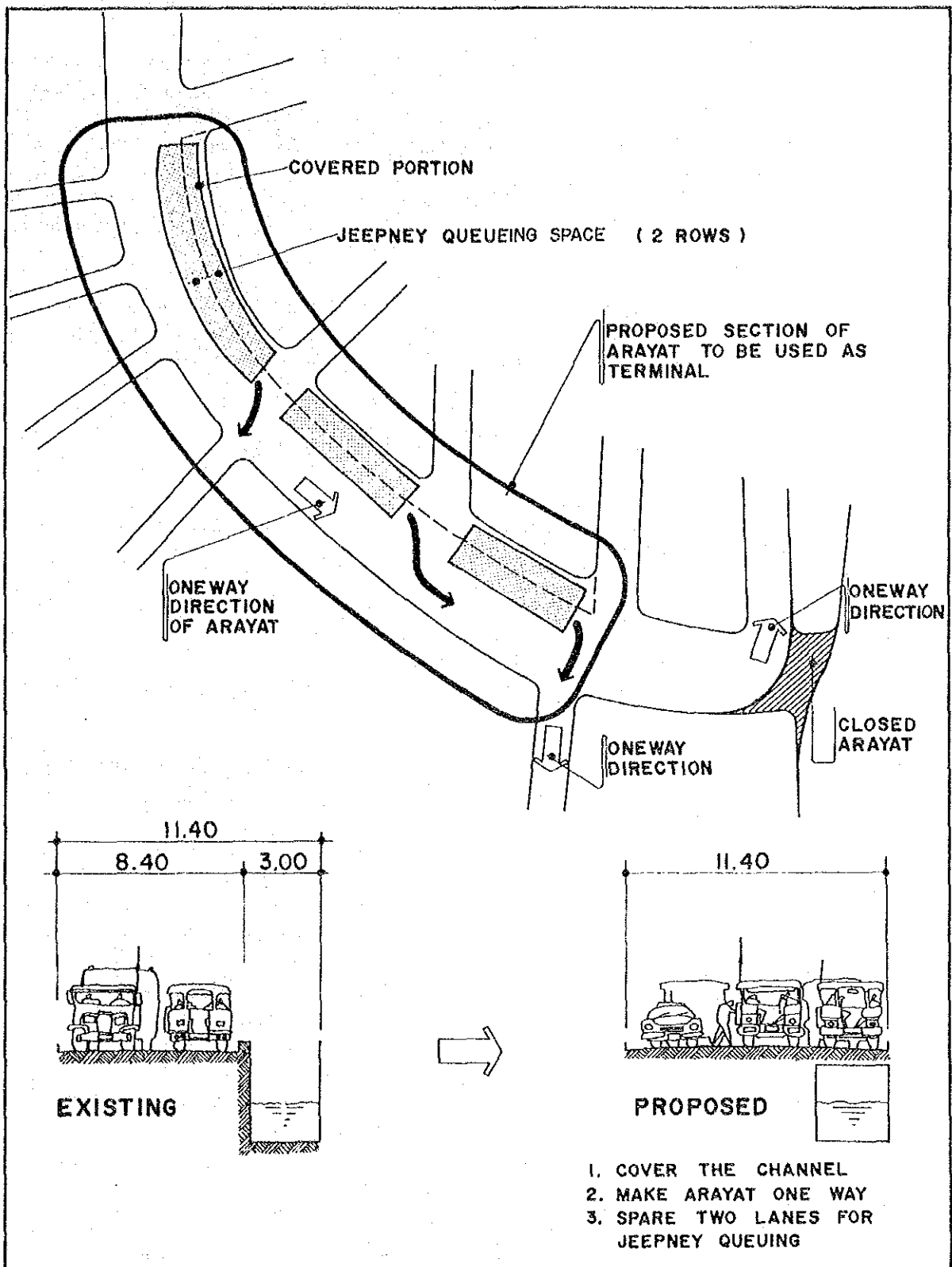


Figure 6.13
Proposed Plan for Arayat Jeepney Terminal