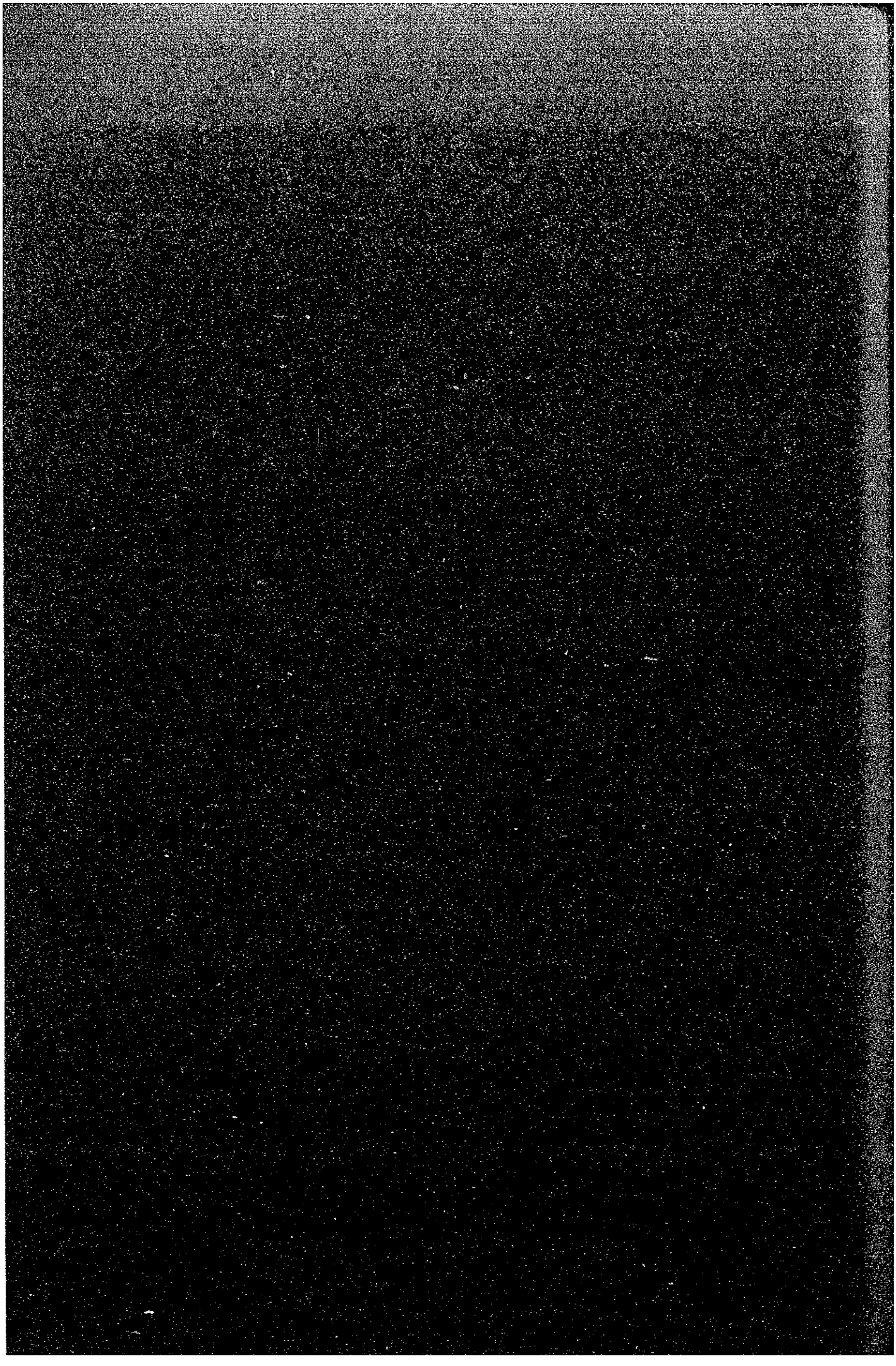
APPENDIXES FOR CHAPTER 5



APPENDIX TABLE 5.2–1 GROSS NATIONAL PRODUCT, NATIONAL INCOME AND GROSS DOMESTIC PRODUCT BY INDUSTRIAL ORIGIN, CY 1967–79
(In million pesos at constant 1972 prices)

Industry	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977r	1978r	1979a
1. AGRICULTURE, FISHERY AND FORESTRY	13,052	13,981	14,412	14,734	15,457	16,040	17,026	17,465	18,218	19,671	20,646	21,633	22,585
2. INDUSTRIAL SECTOR	12,766	13,397	14,117	15,048	16,222	17,442	19,586	20,710	22,690	24,904	26,815	28,577	30,491
a. Mining and Quarrying	664	802	926	1,093	1,282	1,346	1,400	1,403	1,445	1,491	1,742	1,810	2,129
b. Manufacturing	9,846	10,478	10,897	11,823	12,611	13,388	15,252	15,981	16,537	17,481	18,794	20,066	21,146
c. Construction	1,978	1,797	1,942	1,738	1,889	2,240	2,433	2,745	4,101	5,254	5,568	5,953	6,368
d. Electricity Gas & Water	278	320	352	394	440	468	501	581	607	678	711	748	848
3. SERVICE SECTOR	18,275	19,166	20,250	21,232	21,847	22,593	24,319	25,964	27,453	28,387	29,902	31,649	33,463
a. Transport, Communication and Storage	1,684	1,785	1,946	2,056	2,184	2,418	2,657	2,933	3,277	3,875	4,050	4,276	6,490
b. Commerce	10,858	11,246	11,828	12,295	12,484	12,688	13,589	14,351	15,056	14,999	15,838	16,858	17,523
c. Services	5,733	6,135	6,476	6,881	7,179	7,487	8,073	8,680	9,120	9,513	10,014	10,515	11,050
GROSS DOMESTIC PRODUCT at market prices	44,093	46,544	48,779	51,014	53,526	56,075	60,931	64,139	68,361	72,962	77,363	81,859	86,539
Net Factor Income from the Rest of the World	(869)	(1,004)	(812)	(979)	(605)	(549)	(50)	600	169	(244)	(201)	136	192
GROSS NATIONAL PRODUCT at market prices	43,224	45,540	47,967	50,035	52,921	55,526	60,881	64,739	68,530	72,718	77,162	81,995	86,731
Indirect taxes net of subsidies	2,987	3,117	3,400	3,666	4,225	4,382	5,482	6,627	7,143	6,674	6,973	8,740	8,527
Capital Consumption Allowance	3,584	3,853	4,162	4,712	5,019	5,353	5,535	5,849	6,324	6,910	7,480	7,960	8,330
NET NATIONAL PRODUCT OR NATIONAL INCOME	36,653	38,570	40,405	41,657	43,677	45,791	49,864	52,263	55,063	59,134	62,709	65,895	69,874

r Revised
a Advance estimates as of December 1979
Source: Statistical Coordination Office, National Economic and Development Authority Through 1980 Philippine Statistical Yearbook

APPENDIX TABLE 5.2–2 POPULATION OF THE PHILIPPINES

(in thousands)

	1960	'67	'68	'69	1970	'71	'72	'73	'74	'75	'76	'77	'78	'79	'80
Philippines	27088	33,496	34,528	35,592	36,684	37,704	38,752	39,829	40,937	42,071	43,182	44,322	45,492	46,693	47,914
Metro Manila	2462	3439	3607	3784	3967	4150	4341	4541	4751	4970	5148	5332	5523	5721	5925

Remarks: The figures for the years between the census years are estimated by using average growth rates as follows: '60-'70 PH 3.08% p.a. MM 4.89%, '70-'75 PH 2.78% p.a., MM 4.61% p.a. and '75-'80 2.64% p.a. and MM 3.58% p.a.

Sources: NEDA 1980 Philippine Statistical Yearbook for the population of 1960, 1970 and 1975, respectively.
The population in 1980 are by the Preliminary Report, 1980 Census of Population, NCSO in NEDA.

APPENDIX TABLE 5.2–3 POPULATION, GDP, GDP PER CAPITA, AND RATIO OF INCREASE, 1970 – 1979

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
1) GDP in million pesos	51,014	53,526	56,075	60,931	64,139	68,361	72,962	77,363	81,859	86,539
2) Population in thousand	36,684	37,704	38,752	39,829	40,937	42,071	43,182	44,322	45,492	46,693
3) Per Capita GDP in pesos	1,391	1,420	1,447	1,530	1,567	1,625	1,690	1,745	1,799	1,853
4) Ratio of Increase of per capita GDP	1.00	1.02	1.04	1.10	1.13	1.17	1.21	1.25	1.29	1.33
							3.4% p.a.			
				3.2% p.a.						

Remarks: GDP and per capita GDP are in constant prices of 1972.

Source: NEDA, 1980 Philippine Statistical Yearbook & APPENDIX TABLES 5.2-1 and 5.2-2

APPENDIX TABLE 5.2–4 RESUME OF MMETROPLAN: DEMOGRAPHY AND TRAFFIC

	1971	1980	1990	2000 [1]	Sources in MMETROPLAN
A. POPULATION					
Study Area in '000	5,198	7,677	10,550	(13,700)	Table 4.3, Volume I
Growth Rate p.a. (%)	4.43%	3.28%	(2.6%)		
B. FAMILIES					
NCO (Non-car owners)	697,279	986,742	1,308,200	(1,675,000)	
Growth Rate p.a. (%)	82.5%	74.5%	62%	(55%)	Table 9 & 6, D18, 5.01 & Table 5, D19
CO (Car owners)	148,061	336,879	801,800	(1,370,000)	
Growth Rate p.a. (%)	17.5%	25.5%	38%	(45%)	
C. POPULATION by the two classifications					
Persons/Family	6.15	5.8	5.0	(4.5)	
NCO	4,288,300	5,723,200	6,541,000	(7,537,500)	Fig. 3 & 3.01, D18
CO	910,600	1,953,900	4,009,000	(6,165,000)	
Total	5,198,900	7,677,100	10,550,000	(13,702,500)	
D. TRIP RATE:					
Trips/Population					
NCO (Public Transport Users)	5500/4288.3 =1.282	7746/5723.2 =1.353	8572/6541 =1.311	(10929/7537.5) (=1.450)	Table 7, T22
CO (Private Vehicle Users)	1269/910.6 =1.394	2586/19539 =1.324	6553/4009 =1.635	(104805/6165) (=1.700)	
E. OVERALL TRAFFIC GROWTH in terms of persons ('000)					
NCO (PTU)	5,500	7,746	8,572	(10,929)	
		1.0% p.a.	2.5% p.a.		
CO (PVU)	1,269	2,586	6,553	(10,481)	
		9.7% p.a.	4.8% p.a.		
Total	6,769	10,332	15,125	(21,410)	
		3.9% p.a.	3.5% p.a.		

Notes: 1) Extrapolated by the Team.
Source: Gov. of PH & Freeman Fox and Ass., MMETROPLAN, July 1977

APPENDIX TABLE 5.3-1 ESTIMATE OF POPULATION BY ZONE

(Population in thousands)

Zone No.	1980	1990	2000	Annual Growth Rate (%)		
				1980-90	1990-2000	1980-2000
1	55	87	121	4.69	3.35	4.02
2	21	29	39	3.28	3.00	3.14
3	44	70	98	4.75	3.42	4.08
4	18	28	40	4.52	3.63	4.07
5	45	67	90	4.06	3.00	3.53
6	0	15	30	—	—	7.18
7	65	119	176	6.23	3.99	5.11
8	32	68	105	7.83	4.44	6.12
9	20	61	104	11.80	5.48	8.59
10	61	116	175	6.64	4.20	5.41
11	49	130	215	10.25	5.16	7.67
12	23	79	136	13.13	5.58	9.29
13	43	56	70	2.68	2.26	2.47
14	27	58	92	7.95	4.72	6.32
15	0	0	0	0	0	0
16	73	125	180	5.53	3.71	4.62
17	18	29	42	4.88	3.77	4.33
18	39	48	57	2.10	1.73	1.92
19	40	63	90	4.65	3.63	4.14
20	8	14	20	5.76	3.63	4.69
21	75	117	162	4.55	3.31	3.93
22	40	50	62	2.26	2.17	2.22
23	136	180	227	2.84	2.35	2.59
24	149	257	373	5.60	3.80	4.70
25	52	82	114	4.66	3.35	4.00
26	44	61	81	3.32	2.88	3.10
27	13	17	20	2.72	1.64	2.18
28	246	250	262	0.16	0.47	0.32
29	57	82	108	3.70	2.79	3.25
30	8	9	10	1.18	1.06	1.12
31	81	103	129	2.43	2.28	2.35
32	0	20	40	—	—	7.18
33	0	0	0	0	0	0
Sub-Total	1,582	2,490	3,468	4.64	3.37	4.00
134	665	795	925	1.80	1.53	1.66
135	85	106	127	2.23	1.82	2.03
136	134	198	261	3.98	2.80	3.39
137	266	551	736	7.55	2.94	5.22
138	126	208	290	5.14	3.38	4.26
139	840	941	1,042	1.14	1.02	1.08
140	667	783	898	1.62	1.38	1.50
141	899	1,056	1,113	1.62	0.53	1.07
142	314	525	635	5.27	1.92	3.58
143	134	227	320	5.41	3.49	4.45
144	127	131	134	0.31	0.23	0.27
145	958	1,094	1,150	1.34	0.50	0.92
146	28	35	42	2.26	1.84	2.05
Sub-Total	5,243	6,650	7,673	2.41	1.44	1.92
247	281	383	481	3.15	2.30	2.72
248	84	106	124	2.35	1.58	1.97
249	163	252	337	4.45	2.95	3.70
Sub-Total	528	741	942	3.45	2.43	2.94
Total	7,353	9,881	12,083	3.00	2.03	2.51

Source: Appendix Table 3.5-4 ∿ 3.5-6.

APPENDIX TABLE 5.3–2 ESTIMATED EMPLOYMENT BY ZONE: 1980, 1990 AND 2000

Zone No.	Employed Persons by Workplace			Annual Growth Rate (%)		
	1980	1990	2000	1980–1990	1990–2000	1980–2000
1	6,500	7,250	8,650	1.10	1.78	1.44
2	2,860	4,140	5,540	3.77	2.96	3.36
3	12,880	15,330	18,330	1.76	1.80	1.78
4	5,230	5,820	7,120	1.07	2.04	1.55
5	18,150	19,730	24,130	0.84	2.03	1.43
6	0	3,000	6,000	–	–	7.18
7	19,530	20,400	26,000	0.44	2.46	1.44
8	1,840	7,220	10,720	14.65	4.03	9.21
9	8,000	13,300	17,600	5.21	2.84	4.02
10	25,000	30,900	37,300	2.14	1.90	2.02
11	20,000	26,000	31,700	2.66	2.00	2.33
12	1,430	7,020	15,720	17.25	8.40	12.73
13	2,860	6,030	12,930	7.74	7.93	7.84
14	7,650	10,420	14,720	3.14	3.52	3.33
15	0	0	0	0	0	0
16	8,650	11,580	16,480	2.96	3.59	3.28
17	2,510	4,300	9,600	5.53	8.36	6.94
18	8,670	9,000	13,300	0.37	3.98	2.16
19	5,970	8,150	13,050	3.16	4.82	3.99
20	1,960	3,050	6,750	4.52	8.27	6.38
21	12,700	17,800	22,500	3.43	2.37	2.90
22	3,940	4,950	11,250	2.31	8.56	5.39
23	12,760	18,000	23,100	3.50	2.53	3.01
24	33,970	54,210	90,810	4.78	5.29	5.04
25	7,820	11,200	19,200	3.66	5.54	4.59
26	10,970	12,830	18,230	1.58	3.58	2.57
27	3,990	6,010	10,910	4.18	6.14	5.16
28	92,320	124,000	155,700	2.99	2.30	2.64
29	8,010	10,710	28,410	2.95	10.25	6.53
30	4,410	10,700	13,200	9.27	2.12	5.63
31	31,630	51,800	66,000	5.06	2.45	3.75
32	0	31,000	40,400	–	–	2.68
33	18,000	103,100	135,500	19.07	2.77	10.62
Sub-Total	400,210	669,950	928,850	5.29	3.32	4.30
134	249,700	393,300	503,100	4.65	2.49	3.56
135	13,000	14,500	19,400	1.10	2.95	2.02
136	42,160	68,220	88,120	4.93	2.59	3.75
137	81,750	105,900	129,700	2.62	2.05	2.33
138	111,360	136,240	175,240	2.04	2.55	2.29
139	274,020	388,650	492,750	3.56	2.40	2.98
140	418,200	504,200	646,400	1.89	2.52	2.20
141	253,400	319,350	403,650	2.34	2.37	2.36
142	146,010	198,500	250,300	3.12	2.35	2.73
143	34,500	44,500	56,900	2.58	2.49	2.53
144	17,330	42,020	46,420	9.26	1.00	5.05
145	262,480	311,220	335,920	1.72	0.77	1.24
146	15,700	22,700	28,400	3.76	2.27	3.01
Sub-Total	1,919,610	2,549,300	3,176,300	2.88	2.22	2.55
247	53,520	58,050	81,650	0.82	3.47	2.13
248	17,670	21,580	33,280	2.02	4.43	3.22
249	43,680	51,120	71,920	1.59	3.47	2.52
Sub-Total	114,870	130,750	186,850	1.30	3.63	2.46
Grand-Total	2,434,690	3,350,000	4,292,000	3.24	2.51	2.88

Remarks: Zoning map and zone coding table is shown in Fig. 4.3–1 and Appendix Table 4.3–1, respectively.
Source: Appendix Tables 3.5–4 ∿3.5–6.

APPENDIX TABLE 5.3-3 TRIP GENERATION MODEL FORMULAS

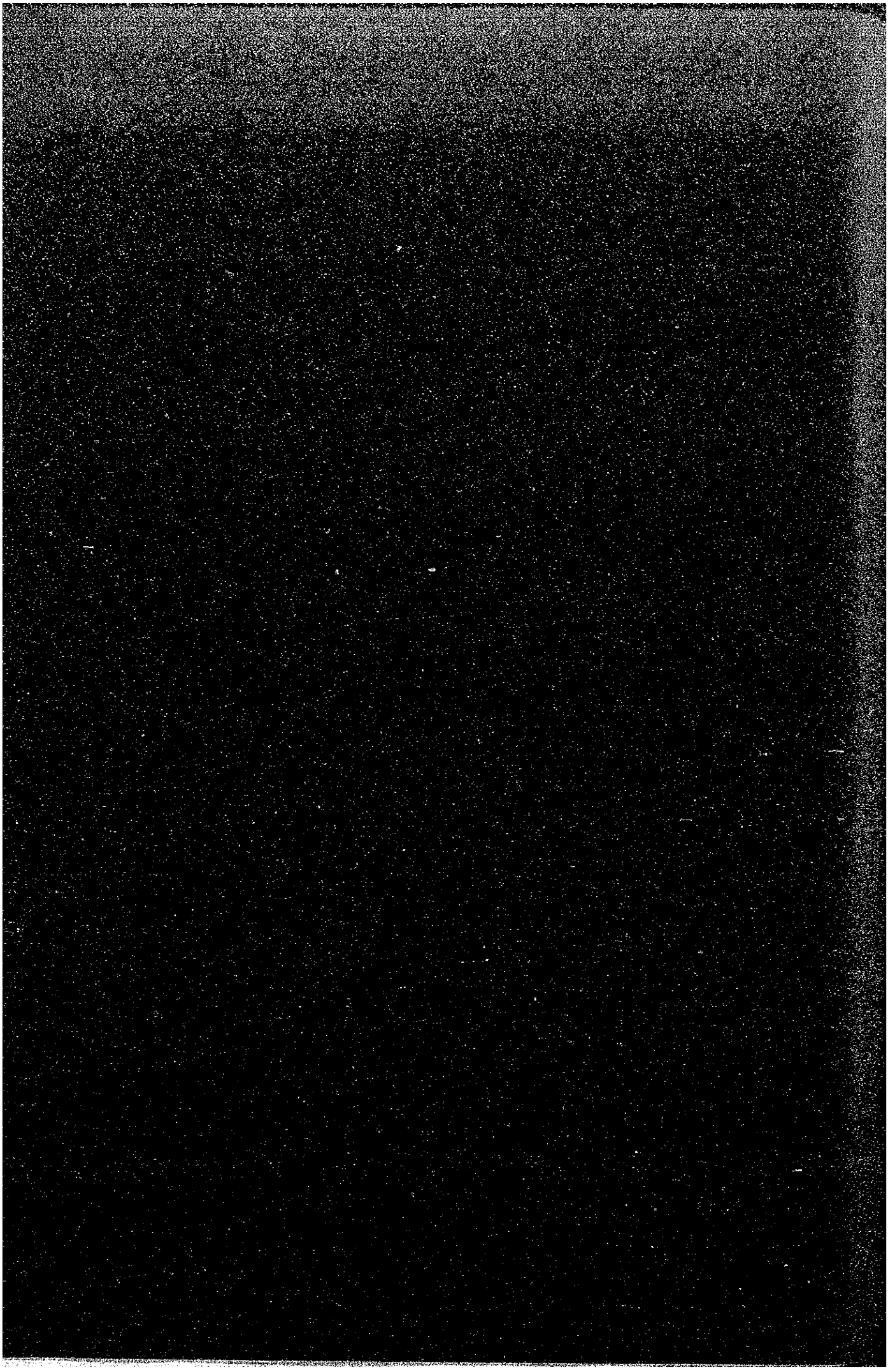
	D I Z (Zone 1 - 33)			North Area (Zone 34-46) 1)			South Area (Zone 47-49) 2)	
	a	b	(r)	a	b	(r)		
Sm V.	0.0785	0.6951	0.916	-	0.8291	0.973	6.7% and 4.9% p.a.	
Buses	0.0065	0.0578	0.913	-	0.0620	0.975	3.0% and 1.9% p.a.	
Jeepneys	0.0174	0.2473	0.861	-	0.2367	0.973	3.0% and 1.9% p.a.	
Trucks	-	0.0774	0.9600	-	0.0801	0.955	6.0% and 4.2% p.a.	

Notes: 1) The north area covers the center of MMA. Each covers large area having both residences and workplaces. The parameter "a" had a negative value when two variables were included in the regression model formula. Accordingly, one variable formula was adopted.

2) The average annual growth rate of the Study Area as determined in 5.2-4 was adapted.

Remarks: Two variable formula is T90/T81 = a (P90/P81) + b (W90/W81)and one variable formula is T90/T81 = b (W90/W81), where T is the total trips in zone i, P is the population in zone i and W is the employed persons at workplace in zone i, each at its respective year. No tii trips were enumerated in Ti.

APPENDIXES FOR CHAPTER 6



APPENDIX TABLE 6.3-1 ROADS AND Q-V CURVES

Classified Number	Lanes	Quantity/day in veh.	V1	V2	V3	Remarks
1	6	18,000 x 6 = 108,000	80	80	20	Expressway, North & South
2	4	18,000 x 4 = 72,000	80	80	20	Expressway, Manila-Cavite Road
5	8	14,000 x 8 = 112,000	60	60	12	C-4, C-5, etc.
6	6	14,000 x 6 = 84,000	60	60	12	" "
7	4	14,000 x 4 = 56,000	60	60	12	" "
8	6	12,000 x 6 = 72,000	50	50	10	Project Roads after improvement
9	4	12,000 x 4 = 48,000	50	50	10	" "
10	8	10,000 x 8 = 80,000	50	50	10	Major Roads in Rural area
11	6	10,000 x 6 = 60,000	50	50	10	" "
12	4	10,000 x 4 = 40,000	50	50	10	" "
13	8	9,000 x 8 = 72,000	40	40	8	Major Roads in urban area
14	6	9,000 x 6 = 54,000	40	40	8	" "
15	4	9,000 x 4 = 36,000	40	40	8	" "
16	2	14,000	60	60	12	Other Roads in rural area
17	2	12,000	50	50	10	" " "
18	2	11,000	40	40	8	" " "
19	2	10,000	30	30	5	" " "
20	2	9,000	40	40	8	" " in urban area
21	2	8,000	30	30	5	" " "
22	2	10,000	40	40	8	Approach link to Zone center
23	4	18,000	40	40	8	Service Roads outside the South Expressway (2 roads x 2 lanes)
24	4	28,000	40	40	8	" "

APPENDIX TABLE 6.3-2 CAPACITY ANALYSIS FOR TRAFFIC SIMULATION

Road Classification	Lane Width (m)	Lateral Clearance	Heavy Veh.Comp in %	Roadside	Design Level	1) Design Capacity Veh/H	2) Maximum Daily Vol. (Veh./day)	Others
1.2	3.5	1.75	10%	Entry Controlled	2	2,100		Expressway
(3)(4)	1,000	1,000	0.933	1.0	0.9	0.840	18,000 (K=10 D=60)	
5.6.7	3.5	1.75	10%	Partly Urbanized	2	1,760	14,600	Project Roads & C-4, C-5, etc.
	1,000	0.95	0.910	0.9	0.9	0.704	(K=10 D=60)	
8.9	3.25	0.75	10%	Urbanized	2	1,550	12,900	Project Road A-2
	0.94	0.90	0.91	0.9	0.9	0.62	(K=10 D=60)	
10.11.12	3.5	1.0	15%	Partly Urbanized	2	1,500	10,000	Major roads in rural ar
	1,000	0.96	0.89	0.8	0.9	0,608	(K=12 D=60)	
13.14.15	3.0	0.0	10%	Urbanized	2	1121	9,000	Major road i urban area
	0.85	0.9	0.933	0.7	0.9	0,448	(K=10 D=60)	
16	3.5	1.75	15%	Urbanized	2	1,400	14,000 2 lanes	Other road i rural area
	1.0	1.0	0.89	0.7	0.9	0,567	(K=10)	
17	3.25	1.25	15%	Urbanized	2	1,213	12,000 2 lanes	"
	0.94	0.92	0.89	0.7	0.9	0,485	(K=10)	
18	3.25	1.25	15%	Partly Urbanized	2	1,385	11,000 2 lanes	"
	0.94	0.92	0.89	0.8	0.9	0,554	(K=12)	
19	3.0	1.00	15%	Partly Urbanized	2	1,170	10,000 2 lanes	"
	0.85	0.86	0.89	0.8	0.9	0.468	(K=12)	
20	3.0	0.0	10%	Urbanized	2	935	9,000 2 lanes	Other road in urban ar
	0.85	0.75	0.93	0.7	0.9	0.374	(K=10)	
21	2.75	0.0	10%	Urbanized	2	845	8,000 2 lanes	
	0.77	0.75	0.93	0.7	0.9	0.338	(K=10)	"
22							10,000 2 lanes	Approach road to zon center
23							2 x 9,000 2 lanes	Service roa outside the South Expres way (2 roads x 2 lanes)
24							2 x 14,000 4 lanes	"

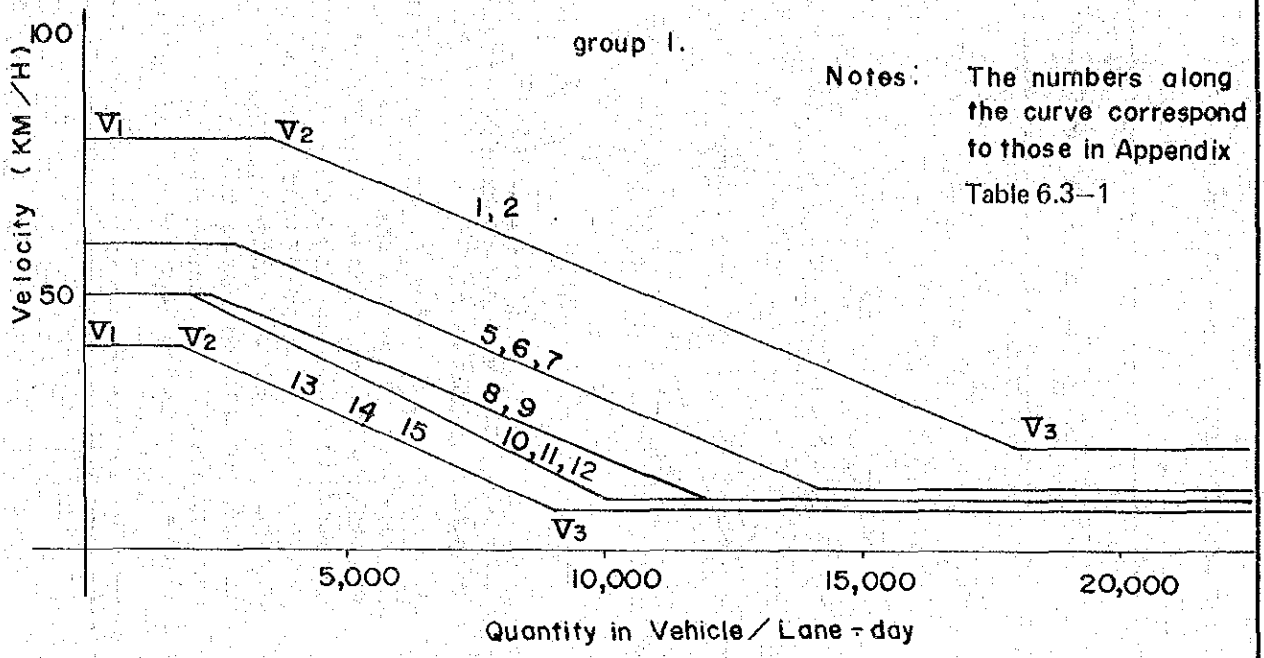
Source: Highway Capacity Manual 1965 (Bureau of Public Roads, USA)and Japan Road Design Standard (Japan Roads Association, 1970)

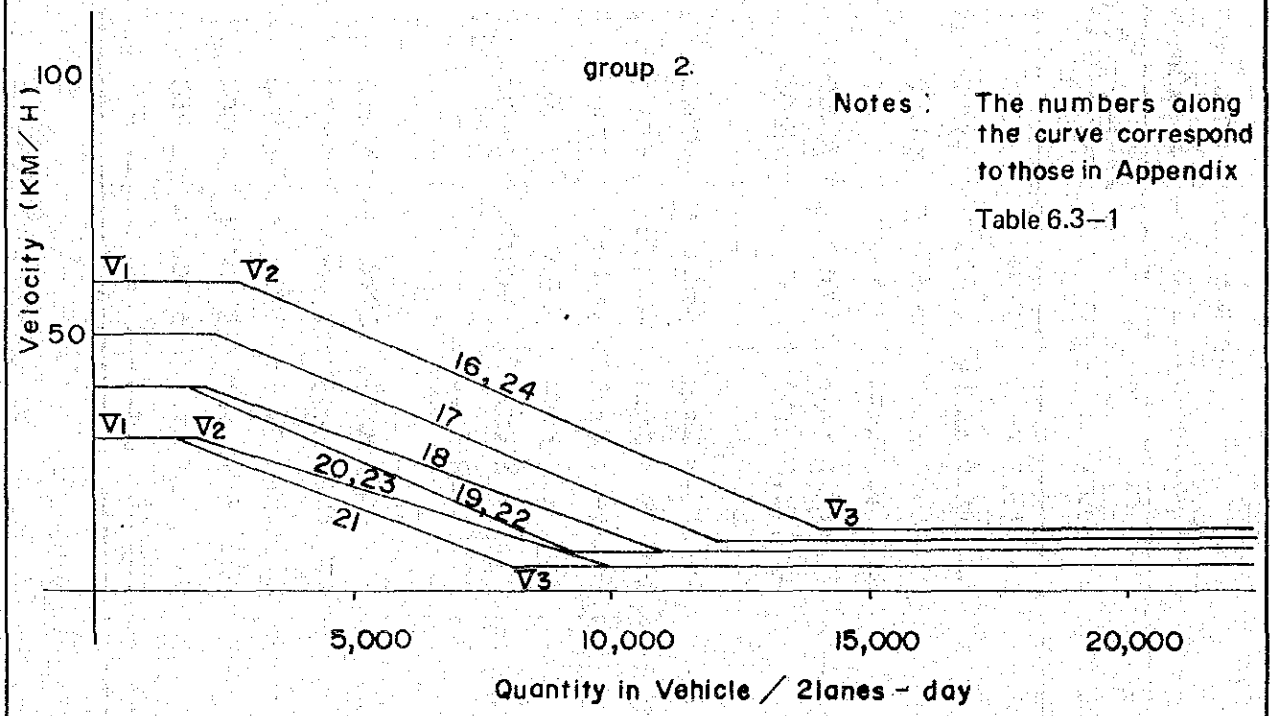
Notes : 1) Basic capacity is assumed at 2500 PCU/H per lane

2) K means the peak hour ratio in percent and D means the rate of direction in percent. Max. Daily Vol, is shown by V3 in Appendix Fig. 6.3-1.

Remarks: The lower line in each road classification indicates the coefficient of adjustment due to the factor shown in the column.

APPENDIX FIG. 6.3–1 VELOCITY–QUANTITY CURVES

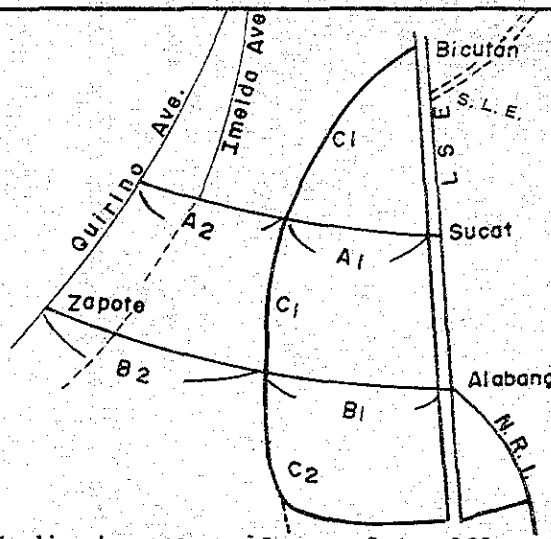




APPENDIX TABLE 6.3-3 AVERAGE TRAFFIC VOLUME BY ROUTE; 1987, 1991, 1995

(vehicles/km per day)

Plan	Route	Average Daily Traffic			Remarks
		1987	1991	1995	
1	A1 (3.5 Km.)	33000 *	34000	45500	
	A2 (4.0 Km.)	43900 *	44300	66300 *	
	B1 (4.4 Km.)	39800 *	50200	48200	
	B2 (5.9 Km.)	37100 *	45400	52400	
	C1 (7.8 Km.)	18300 *	37000 *	41700	
	C2 (13.0 Km.)	-	12800 *	25200 *	
2	A1 (3.5 Km.)	38800 *	40600	42800	
	A2 (4.0 Km.)	48400 *	52000	63000 *	
	B1 (4.4 Km.)	32100	37400	43100 *	
	B2 (5.9 Km.)	29900	35300	52800 *	
	C1 (7.8 Km.)	17300 *	22300	44900 *	
	C2 (13.0 Km.)	-	-	19600 *	
3	A1 (3.5 Km.)	27400 *	35200	42800	
	A2 (4.0 Km.)	43100 *	51800	63000 *	
	B1 (4.4 Km.)	37000 *	40500	43100	
	B2 (5.9 Km.)	34000 *	40500	52800	
	C1 (7.8 Km.)	31200 *	38700	44900	
	C2 (13.0 Km.)	-	-	19600 *	



* indicates the volume of traffic after the proposed improvement.

As stated in Chapter 4, the traffic volume in terms of trips in the O-D Table of 1981 was likely to be higher by 2-21% than the counted traffic at the cordon screens lines. These discrepancies become larger in the future, because of uncertainties involved in the assumed economic forecasts. Accordingly, it is to be noted that these figures always contain the possibility of variation.

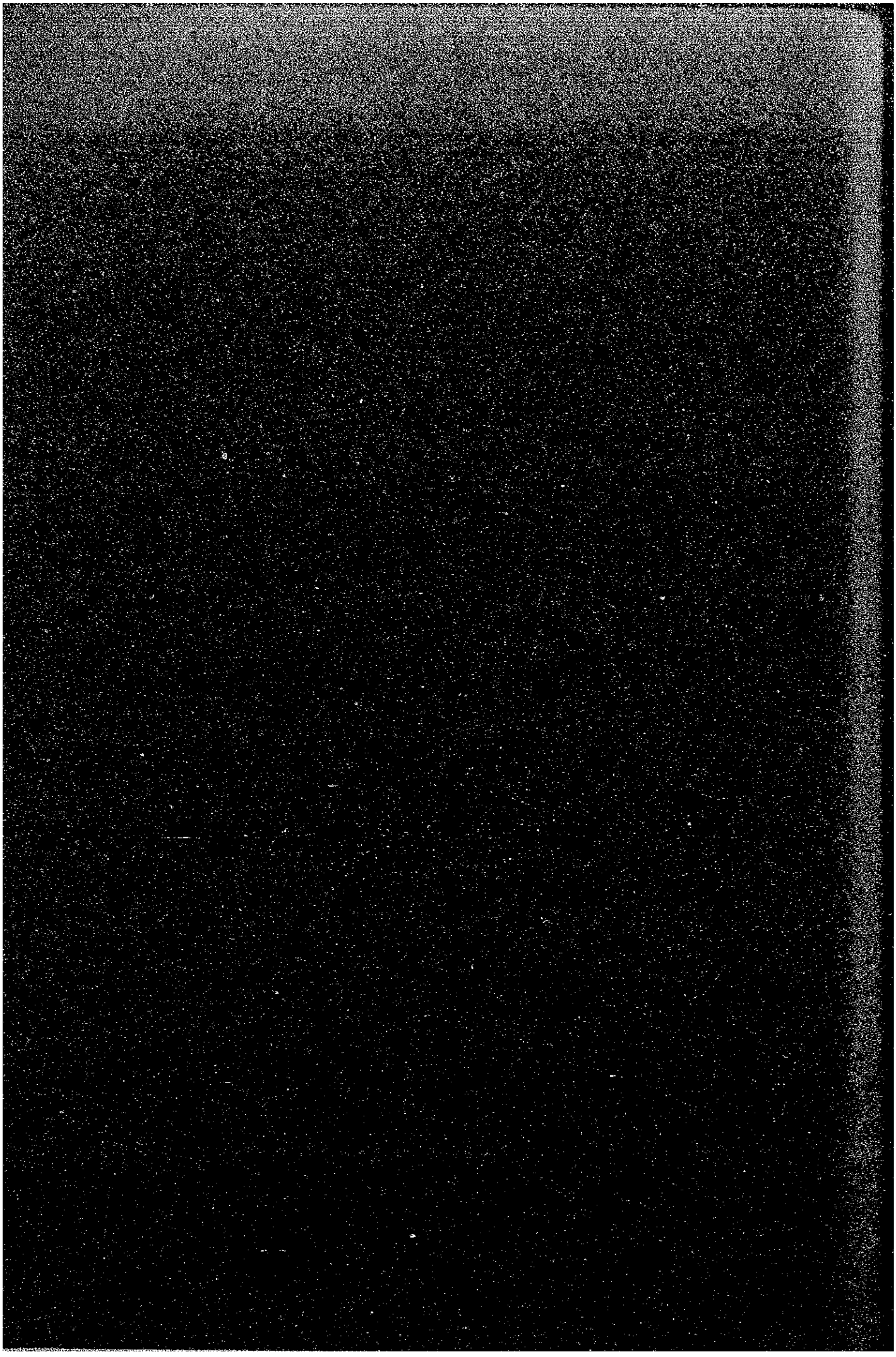
APPENDIX TABLE 6.3-4 AVERAGE TRAFFIC VOLUME BY VEHICLE TYPE: 1987 AND 1995

(per day)

Plan	Route	Small Vehicles	Jeepneys	Buses	Trucks	Total
1 in 1987	A1	25200	1300	2500	4000	33000
		(76.4)	(3.9)	(7.6)	(12.1)	(100.0)
	A2	34200	1800	4400	3500	43900
		(77.9)	(4.1)	(10.0)	(8.0)	(100.0)
	B1	24900	3100	7900	3900	39800
		(62.6)	(7.8)	(19.8)	(9.8)	(100.0)
	B2	25600	2700	5700	3100	37100
		(69.0)	(7.3)	(15.4)	(8.4)	(100.0)
	C1	12800	900	3200	1400	18300
		(70.0)	(4.9)	(17.5)	(7.6)	(100.0)
	C2	–	–	–	–	–
2 in 1987	A1	29400	1900	3700	3800	38800
		(75.8)	(4.9)	(9.5)	(9.8)	(100.0)
	A2	37600	2500	4400	3900	48400
		(77.7)	(5.2)	(9.0)	(8.1)	(100.0)
	B1	18800	2400	7500	3400	32100
		(58.6)	(7.5)	(23.3)	(10.6)	100.0)
	B2	19100	2100	6200	2500	29900
		(63.8)	(7.0)	(20.7)	(8.5)	(100.0)
	C1	11400	1100	3700	1100	17300
		(65.5)	(6.6)	(21.3)	(6.6)	(100.0)
	C2	–	–	–	–	–
3 in 1987	A1	20500	1300	2300	3300	27400
		(74.9)	(4.7)	(8.4)	(12.0)	(100.0)
	A2	32700	2200	4300	3900	43100
		(76.0)	(5.0)	(10.0)	(9.0)	(100.0)
	B1	22600	2800	8000	3600	37000
		(61.1)	(7.6)	(21.6)	(9.7)	(100.0)
	B2	22100	2400	6800	2700	34000
		(65.0)	(7.1)	(20.0)	(7.9)	(100.0)
	C1	20200	1900	6900	2200	31200
		(64.7)	(6.1)	(22.1)	(7.1)	(100.0)
	C2	–	–	–	–	–
1 in 1995	A1	35300	1400	3100	5800	45500
		(77.4)	(3.1)	(6.8)	(12.7)	(100.0)
	A2	53100	2600	4600	6000	66300
		(80.1)	(3.9)	(6.9)	(9.1)	(100.0)
	B1	31200	3200	9200	4600	48200
		(64.8)	(6.6)	(19.1)	(9.5)	(100.0)
	B2	35600	3700	8900	4200	52400
		(68.0)	(7.0)	(17.0)	(8.0)	(100.0)
	C1	28200	2400	8000	3100	41700
		(67.6)	(5.8)	(19.2)	(7.4)	(100.0)
	C2	19000	1300	2700	2200	25200
		(75.4)	(5.2)	(10.7)	(8.7)	(100.0)
2 in 1995	A1	31100	1400	5400	4900	42800
		(72.7)	(3.3)	(12.6)	(11.4)	(100.0)
	A2	51700	1900	4400	5000	63000
		(82.1)	(3.0)	(7.0)	(7.9)	(100.0)
	B1	30100	2300	6000	4700	43100
		(69.9)	(5.3)	(13.9)	(10.9)	(100.0)
	B2	36400	3200	8700	4500	52800
		(68.9)	(6.1)	(16.5)	(8.5)	(100.0)
	C1	30700	2300	8700	3200	44900
		(68.4)	(5.1)	(19.4)	(7.1)	(100.0)
	C2	14600	1000	2300	1700	19600
		(74.5)	(5.1)	(11.7)	(8.7)	(100.0)
3 in 1995	A1	31100	1400	5400	4900	42800
		(72.7)	(3.3)	(12.6)	(11.4)	(100.0)
	A2	51700	1900	4400	5000	63000
		(82.1)	(3.0)	(7.0)	(7.9)	(100.0)
	B1	30100	2300	6000	4700	43100
		(69.9)	(5.3)	(13.9)	(10.9)	(100.0)
	B2	36400	3200	8700	4500	52800
		(68.9)	(6.1)	(16.5)	(8.5)	(100.0)
	C1	30700	2300	8700	3200	44900
		(68.4)	(5.1)	(19.4)	(7.1)	(100.0)
	C2	14600	1000	2300	1700	19600
		(74.5)	(5.1)	(11.7)	(8.7)	(100.0)

Remarks: ( ) indicates the percent share of vehicle-type in the total.

APPENDIXES FOR CHAPTER 7



APPENDIX NOTE 7.2 ALTERNATIVE ROUTES

7.2.1 A-Route (Parañaque-Sucat Road)

The alignment of A-Route is located on and along the existing Parañaque-Sucat except for the western segment of about 1.8 kilometer long, the connection with the proposed Manila-Cavite Coastal Road (See Appendix Fig. 7.2-1). The alignment of the existing section is to be improved which would also involve acquisition of right-of-way.

For the 1.8-kilometer section, only one alignment was considered in view of the present development in the area. The selected alignment has the maximum use of open space, shortest route and the least number of river crossings.

7.2.2 B-Route (Zapote-Alabang Road)

B-Route alignment follows the existing Zapote-Alabang Road except for the western segment, which diverts from the existing narrow winding road with permanent structures on both sides. (See Appendix Fig. 7.2-1).

The following three alternative routes were studied for the diversion, starting near the Gonzales Subdivision along B-Route in Zapote, then runs on the southern side of the existing road to connect with the proposed Manila-Cavite Coastal Road (R-1 Extension).

1) Alternative B-1

This route provides the shortes connection to R-1 Extension, traversing relatively sparsely built-up areas.

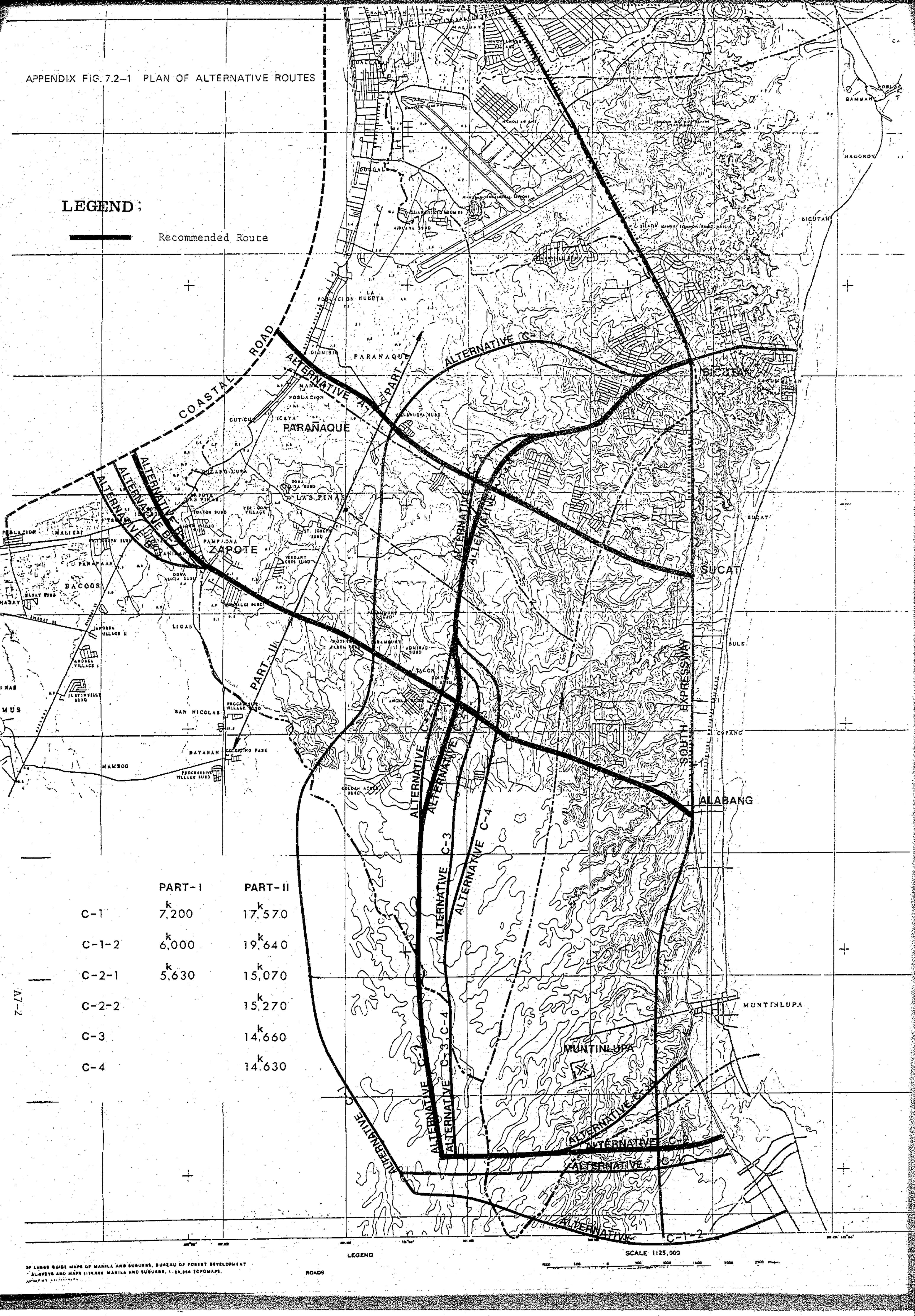
2) Alternative B-2

This route follows existing narrow local roads which would require improvement and widening. The widening of the road, especially at major intersections, would not, however, be practical as it would affect expensive land and properties.

3) Alternative B-3

Among the alternatives considered, this route traverses the most sparsely populated areas, by-passing existing developments, hence making it the longest to reach R-1. Furthermore, its intersection with National Road No. 17 is in an open area suitable for the provision of adequate improvement of the intersection.

APPENDIX FIG. 7.2-1 PLAN OF ALTERNATIVE ROUTES



LEGEND;

Recommended Route

	PART-I	PART-II
C-1	7,200 k	17,570 k
C-1-2	6,000 k	19,640 k
C-2-1	5,630 k	15,070 k
C-2-2		15,270 k
C-3		14,660 k
C-4		14,630 k

7.2.3 C-Route (Loop Road)

This route starts from Bicutan Interchange along South Luzon Expressway, then runs in a southwestern direction, and veers and generally southwards corssing A- and B-Routes approximately at its midpoint. Upon reaching the western section of Muntinlupa, it turns left until it intersects National Road No. 1 between Muntinlupa and San Pedro.

The entire length of C-Route involves new construction traversing a fast urbanizing area. Six (6) alternative routes were studied for C-Route as shown in Appendix Fig. 7.2-1. A brief description of each alternative is as follows:

1) Alternative C-1

The northern section of this alternative route generally runs westward weaving around existing residential areas to reach a wide open space where it turns left following a southward direction, crossing A- and B-Routes, closer to Manila Bay than Laguna Lake. Then it turns left in an eastward direction north of the urbanized area of San Pedro to connect with National Road No. 1. Among the alternatives, this route runs the westernmost traversing open and undeveloped areas. However, this route does not function effectively with the the other major roads in the area as it runs closer to the western part of the DIZ where road density is more than that in the eastern part of the DIZ.

2) Alternative C-1-2

This alternative has the same alignment as C-1 above, except for its Southern portion where it runs left towards the east farther south of the urbanized area of San Pedro. This route is the longest among the alternatives.

3) Alternative C-2, C-2-1

This alternative route runs in a southwest direction from Bicutan Interchange traversing open areas of a subdivision, then follows an existing road one kilometer long just north of A-Route in a southward direction. Still running the southern direction in open spaces among the residential areas, it again follows the alignment of an existing road for about 1.50 kilometers just after crossing B-Route. Upon reaching the area west of Muntinlupa, the route veers to the left eastward parallel and north of Route C-1.

4) Alternative C-2, C-2-2

This alternative route is the same as Alternative C-2, C-2-1, except for its intersection with B-Route, where it is shifted to be located on an open area about 500 meters to the east for easy construction of a channelized intersection or grade

separation when the need arises.

5) Alternative C-3

From Bicutan Interchange, this route follows the same alignment as Alternative C-2, except in the area where the intersection with A-Route is shifted a little farther to the east avoiding the existing residential area and the section from where Alternative C-2, C-2-2 differs from Alternative C-2 up to its connection with National Road No. 1. The southern section of this route is generally located on the eastern side of C-2 running through a virtually unpopulated area. From the western part of Muntinlupa, the route turns eastward following the first section of Alternative C-2, then veers northeastward towards the entrance of the Susana Heights Subdivision to utilize the structure which has been constructed as part of the proposed interchange with South Luzon Expressway. From here, the route still runs northeastward until it intersects National Road No. 1.

6) Alternative C-4

This alternative route practically follows the alignment of Alternative C-3, except for the portion where it crosses B-Route. This route runs further east of Alternative C-3 traversing open areas near the boundary of industrial and residential areas.

This route is the easternmost among the alternatives but it functions more effectively with the existing and the proposed road network in the area than Alternative C-1, which is located in the westernmost part of the corridor.

APPENDIX TABLE 7.3–1 ALTERNATIVE ROUTE STUDY
Route "B"

Check Point \ Alternatives	Alternative B-1	Ranking	Alternative B-2	Ranking	Alternative B-3	Ranking
1. Length of Route	11.60 Km.	A	11.65 Km.	B	11.90 Km.	C
2. Horizontal and Vertical Alignment	Desirable alignment can satisfy design standards.	B	Desirable alignment can satisfy design standards.	B	About the same as Alternative B-2	B
3. Land Use (Eastern part 2.56 Km. long only)	Approximate 1/2 of the length crosses residential and commercial areas. Problem of separation of community.	C	Approximate 2/3 of the length crosses residential and commercial areas. Separation of community.	B	Approximate 1/4 of the length crosses residential and agricultural areas.	A
4. Location of Interchange and Intersection (Eastern part only)	It is difficult to provide intersection with existing road.	C	About the same as Alternative B-1. However, existing intersection will be improved.	B	This route is suitable for locating intersection.	A
5. Number of Houses which are affected by Proposed Route	103 + 44 = 147	B	103 + 100 = 203	D	103 + 28 = 131	A
6. Land Acquisition and Compensation Cost	70,400 m^2 + 112,800 m^2 = 183,200 m^2 ₱70,280,000 (₱30,800,000)	A	72,000 m^2 + 112,800 m^2 = 184,800 m^2 ₱72,480,000 (₱33,000,000)	C	80,000 m^2 + 112,800 m^2 = 192,800 m^2 ₱71,980,000 (₱32,500,000)	B
7. Construction Cost	₱243 x 10^6	A	₱268 x 10^6	C	₱245 x 10^6	B
8. Balance with Other Trunk Road Network	This alignment is just the same alignment which has been selected by CDCP for the Manila-Cavite Coastal Road.	A	Some adjustment will be needed to connect CDCP network plan.	B	Adjustments will be needed to connect CDCP network plan.	C
9. Recommendation	This alternative has more advantages compared with other alternatives except for location of interchange. The Study Team regards this as the best route.		This alternative has no specific advantages. Conversely, Check Point No. 5 is ranked as "Inferior".		This alternative has advantages like Alternative B-1. However, to connect CDCP's network plan, difficult adjustments will be needed.	

Ranking:

A = Excellent B = Good C = Normal D = Inferior

NOTE: The figures in parenthesis indicate compensation cost.

APPENDIX TABLE 7.3-2 ALTERNATIVE ROUTE STUDY
ROUTE "C" – NORTHERN PART

Check Point \ Alternatives	Alternative C-1	Ranking	Alternative C-2	Ranking	Alternative C-3,C-4	Ranking
1. Length of Route	7.20 Km	D	6.00 Km.	B	5.63 Km.	A
2. Horizontal and Vertical Alignment	Desirable alignment can satisfy design standards.	A	Desirable alignment can satisfy design standards. A sharp radius is used near Sta. 3+200.	B	Design alignment can satisfy design standards.	A
3. Land Use	Approximately 1/2 of whole length crosses residential area and the remaining crosses agricultural area. Separation of community is a little.	A	Almost the whole length crosses residential area. Separation of community is a little.	B	About the same as Alternative C-2.	B
4. Location of Interchange and Intersection	This route is suitable for locating interchange or intersection.	A	This route is inferior in locating interchange or intersection to Alternative C-1.	C	About the same as Alternative C-2.	C
5. Number of Houses which are affected by Proposed Route	11 + 34 = 45	A	11 + 19 + 35 = 65	C	11 + 19 + 22 = 52	B
6. Land Acquisition and Compensation Cost	360,000 m^2 ₱123,120,000	A	300,000 m^2 ₱131,250,000	C	281,500 m^2 ₱129,020,875	B
7. Construction Cost	₱151 x 10^6	D	₱132 x 10^6	B	₱128 x 10^6	A
8. Balance with Other Trunk Road Network	This route is too close to the western trunk road. Thus, balance with other trunk road network is inferior.	D	This route is arranged in consideration of balance with other trunk road network.	A	About the same as Alternative C-2.	A
9. Recommendation	This alternative has many advantages, and simultaneously "Inferior" points.		This alternative has neither advantages nor inferior points with no remarkable points.		This alternative has many advantages except for location of interchange. The Study Team regards this as the best route.	

Ranking:
A = Excellent B = Good C = Normal D = Inferior

APPENDIX TABLE 7.3-3 ALTERNATIVE ROUTE STUDY
ROUTE "C" – SOUTHERN PART

Check Point \ Alternatives	Alternative C-1	Ranking	Alternative C-2-1	Ranking	Alternative C-2-2	Ranking	Alternative C-3	Ranking	Alternative C-4	Ranking	Alternative C-1-2	Ranking
1. Length of Route	17.570 Km.	D	15.070 Km.	B	15.270 Km.	B	14.660 Km.	A	14.630 Km.	A	19.640 Km.	D
2. Horizontal and Vertical Alignment	Desirable alignment can satisfy design standards.	A	Desirable alignment can satisfy design standards.	A	Desirable alignment can satisfy design standards.	A	Desirable alignment can satisfy design standards. A sharp radius is used near Sta. 8+500.	B	Desirable alignment can satisfy design standards.	A	Desirable alignment can satisfy design standards.	A
3. Land Use	Almost the whole length crosses agricultural area. Separation of community is a little.	A	Approximately 1/3 of whole length crosses residential and commercial areas. Some problem of separation of community	C	Approximately 1/4 of whole length crosses reseidential area. Separation of community is a little.	A	About the same as Alternative C-2-1.	C	Approximately 1/4 of whole length crosses residential and industrial areas. Separation of community is a little.	A	Almost the whole length crosses agricultural area. Separation of community is little.	A
4. Location of Interchange and Intersection	This route is suitable for locating interchange or intersection except terminating point.	B	This route is suitable for locating interchange or intersection except connecting point with Route B.	B	This route is suitable for locating interchange or intersection.	A	About the same as Alternative C-2-1.	B	About the same as Alternative C-2-1.	B	This route is suitable for locating interchange or intersection.	A
5. Number of Houses which are affected by Proposed Route	20	A	37 + 2 = 39	C	23 + 2 = 25	A	32	B	25	A	18	A
6. Land Acquisition and Compensation Cost	990,330 m^2 ₱131 x 10^6	C	852,300 m^2 ₱121 x 10^6	B	862,300 m^2 ₱111 x 10^6	A	826,200 m^2 ₱139 x 10^6	D	824,700 m^2 ₱143 x 10^6	D	₱140 x 10^6	D
7. Construction Cost	₱314 x 10^6	C	₱293 x 10^6	B	₱293 x 10^6	B	₱272 x 10^6	A	₱273 x 10^6	A	₱348 x 10^6	D
8. Balance with Other Trunk Road Network	This route is too close to the western trunk road. Thus, balance with other trunk road network is inferior.	D	This route is arranged in consideration of balance with other trunk road network.	A	This road is arranged in consideration of balance with other trunk road network.	A	About the same as Alternative C-2-2.	A	This route is close to the eastern trunk road.	C	This road is too close to the western and the southern trunk road. Thus, balance with other trunk road network is inferior.	D
9. Recommendation	Almost the same as Alternative C-1 of Northern Part.		This alternative has two advantages mentioned above, but there are no remarkable points about other points.		This alternative has many advantages compared with other alternatives. And there are no disadvantages. The Study Team regards this as the best route.		Almost the same as Alternative C-2-1 of Southern Part. Since this route crosses residential areas, land acquisition and compensation costs are relatively high.		This alternative has many advantages. However, since route crosses residential and industrial areas, land acquisition and compensation costs are relatively high.		This alternative has advantages and simultaneously "Inferior" points.	

Ranking:

A = Excellent B = Good C = Normal D = Inferior