

Table A-1 Estimated O.D Table by Mode in Case 5-A

Sedan

***** SEDAN-33 P.T. MODE 33 CASE-5A *****

	11 C	22 C	33 C	43 C	53 C	63 C	73 C	83 C	93 C	103 C	113 C	123 C	
11 C	155421												
22 C		27266											
33 C			89283										
43 C				68177									
53 C					47216								
63 C						67657							
73 C							66967						
83 C								15321					
93 C									65816				
103 C										26762			
113 C											23571		
123 C												38701	
TOTAL													2122771

Bus

***** BCC00-33 *****

	11 C	22 C	33 C	43 C	53 C	63 C	73 C	83 C	93 C	103 C	113 C	123 C	
11 C	50163												
22 C		11535											
33 C			45873										
43 C				35028									
53 C					26878								
63 C						87137							
73 C							10764						
83 C								7577					
93 C									4127				
103 C										2712			
113 C											1307		
123 C												9362	
TOTAL													232368

Railways

***** RRR00-33 (C-5423) *****

	11 C	22 C	33 C	43 C	53 C	63 C	73 C	83 C	93 C	103 C	113 C	123 C	
11 C	0												
22 C		1102											
33 C			1477										
43 C				818									
53 C					43								
63 C						6553							
73 C							9272						
83 C								2257					
93 C									11186				
103 C										5281			
113 C											3379		
123 C												53577	
TOTAL													241978

Motorcycle

***** PERMAN DB (45412) *****

	1)	2)	3)	4)	5)	6)	7)	8)	9)	10)	11)	12)	
(1)	96657	16130	62300	35538	22610	77174	14776	10252	40900	15225	15326	25942	507881
(2)		631	5106	3528	2227	3025	3202	258	4542	1535	1421	2031	65152
(3)			7554	12274	7181	2627	10110	2671	41177	4637	4757	7478	137383
(4)				4925	6531	7547	777	2317	7745	3073	3579	6433	115556
(5)					1772	444	4153	1716	4104	2021	2173	3579	76519
(6)						3615	2318	2761	10743	3555	1117	6520	191771
(7)							2657	227	13272	5653	3319	6249	107454
(8)									2108	874	705	955	26333
(9)									5111	4124	3751	4433	118738
(10)										554	2726	2128	44155
(11)											454	2705	63768
(12)												763	67869
TOTAL													1592543

Bicycle

***** PERMAN DB (47612) *****

	1)	2)	3)	4)	5)	6)	7)	8)	9)	10)	11)	12)	
(1)	34850	5347	17300	14332	13452	11652	12674	3715	15577	5552	5557	9672	144041
(2)		232	1259	1265	816	1379	1147	272	2455	555	514	713	16368
(3)			2743	6466	2510	3476	2691	745	4121	1732	1726	2483	52422
(4)				1245	2111	2775	3472	446	3278	1268	1330	2355	41922
(5)					447	1375	2607	650	2748	749	727	1245	27226
(6)						1513	2315	731	2192	1332	1152	1668	36580
(7)							1377	727	3726	1257	1418	2245	18339
(8)								42	756	231	355	361	7221
(9)									1745	1432	1555	1652	4312
(10)										711	715	758	16024
(11)											111	741	15863
(12)												245	24556
TOTAL													574654

Taxi

***** PERMAN DB (46412) *****

	1)	2)	3)	4)	5)	6)	7)	8)	9)	10)	11)	12)	
(1)	22476	3760	11133	5226	6767	3454	1121	2302	10037	3555	3555	6243	118324
(2)		146	1226	804	519	492	759	174	643	354	329	474	10519
(3)			1763	2328	1655	2129	2338	610	2619	1692	1117	1823	32404
(4)				1144	1537	1711	2376	532	2755	815	857	1519	26385
(5)					474	1252	1442	424	1458	494	577	819	17819
(6)						341	1671	474	2523	838	749	1373	23703
(7)							1220	537	2395	919	913	1455	25027
(8)								26	512	348	164	229	8249
(9)									1922	954	375	3041	27681
(10)										131	449	456	10293
(11)											92	453	10186
(12)												158	15816
TOTAL													324378

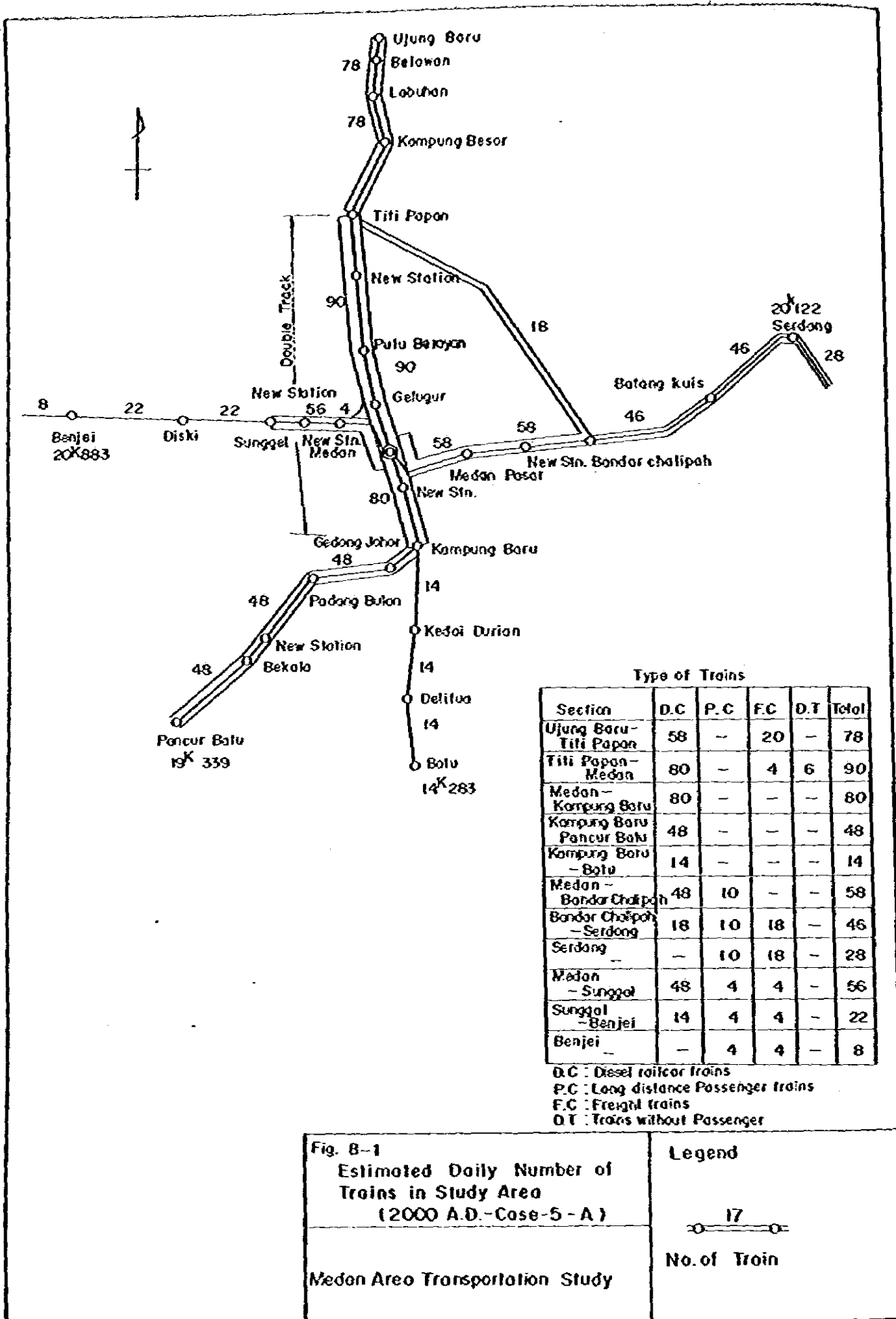
Table A-2 Estimated O.D Table by Mode in Case 1-C

Bus

***** 1666U-25 *****

	19	23	33	43	53	63	73	83	93	103	113	123
(19)	139550											
(23)		27897										
(33)		1143	32237									
(43)			8471	21657								
(53)			12392	4373	57274							
(63)				21659	4248	26371						
(73)				8170	18979	9722						
(83)					21355	56175	22377					
(93)					14186	17486	37635	27126				
(103)						17527	4444	24422	24422			
(113)							1767	2135	2756	14574	27522	743575
(123)								7551	2744	4075	2315	70669
TOTAL												

The other modes of O.D Table are just same as that of Case 5-B.



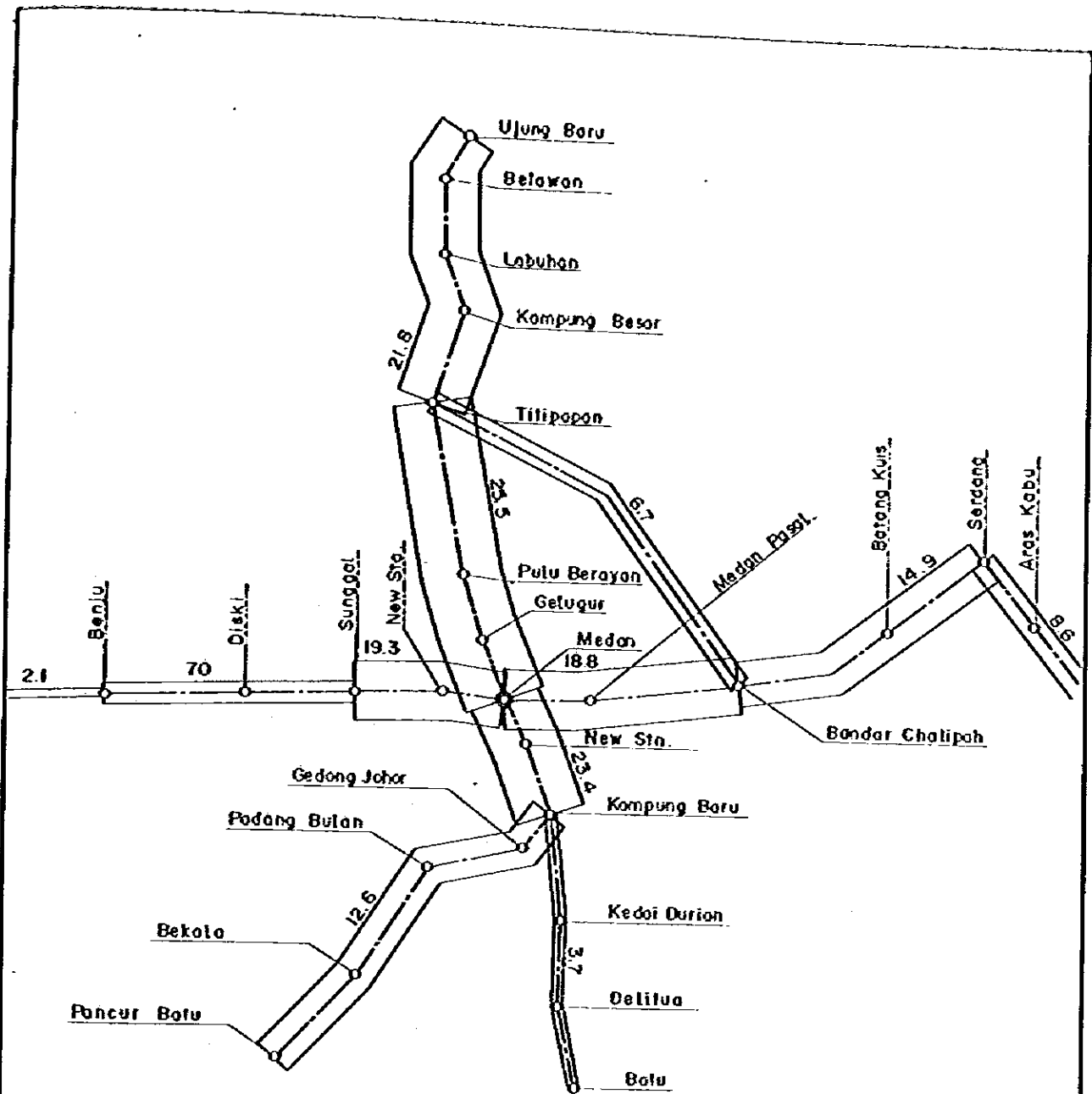


Fig. B-2
 Estimated Railway Passing
 Total Tonnage in Study Area
 (2000 A.D. - Case-5-B-2-2)

Legend
 (Unit : $\times 10^6$ Tons/yr)

Medon Area Transportation Study

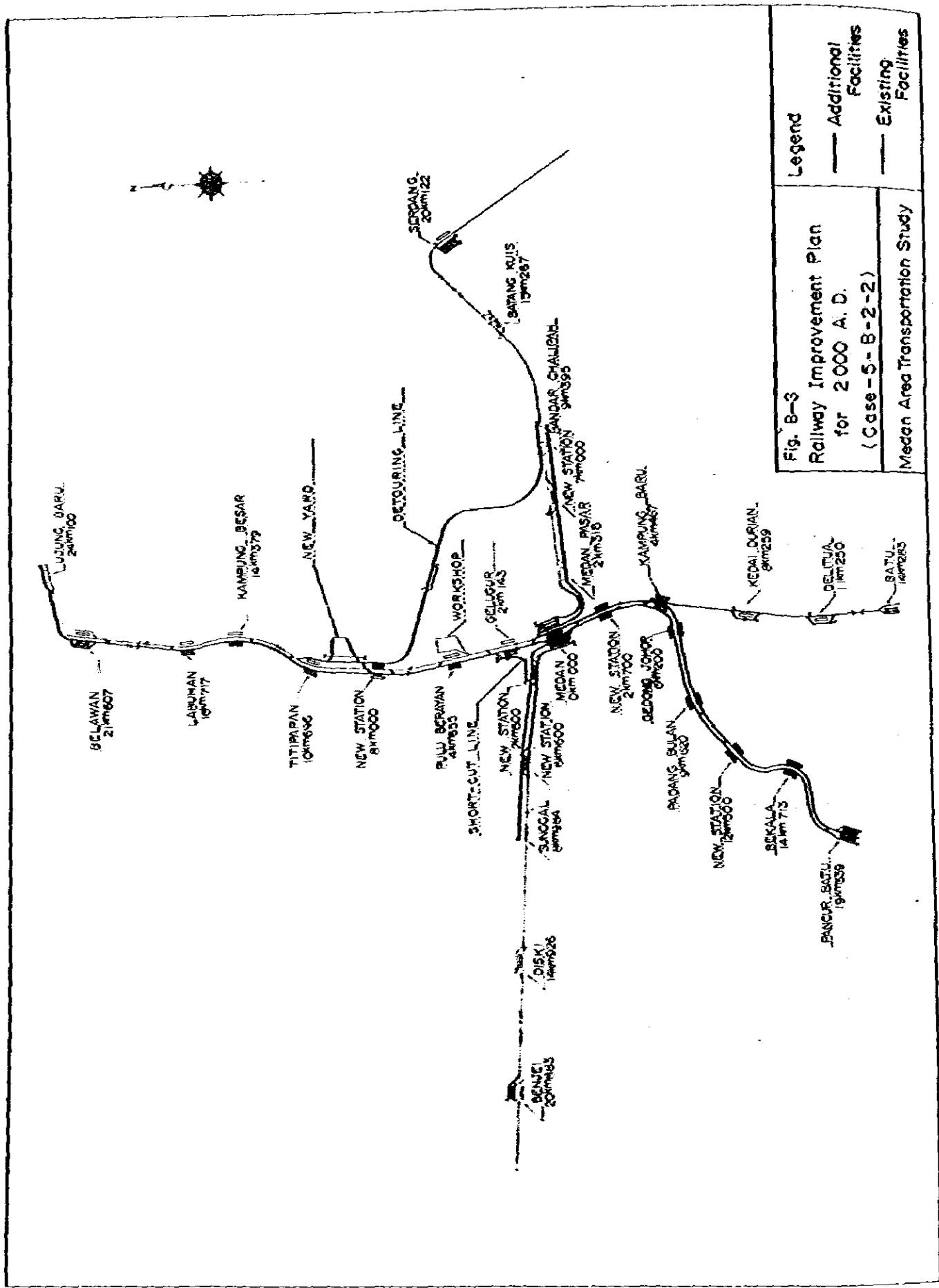
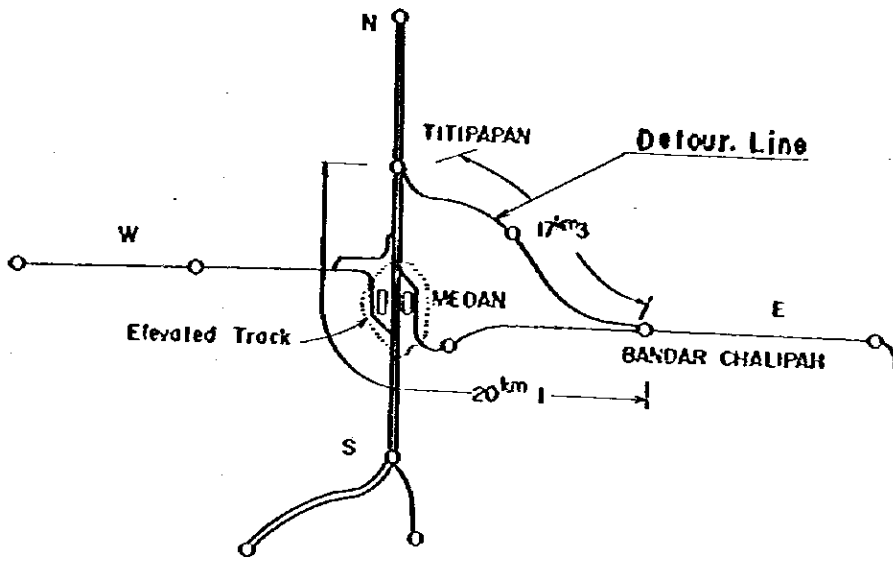
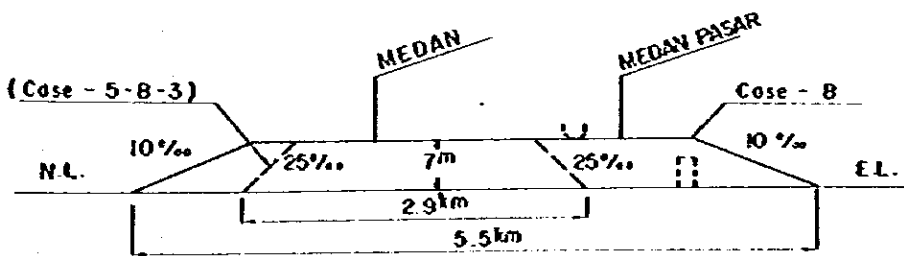
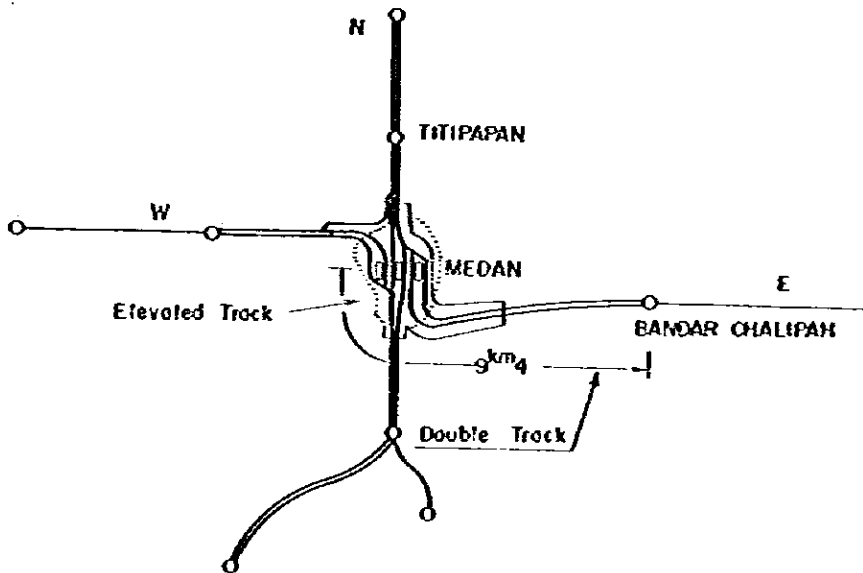


Fig. B-4 Track Elevation at Medan Station

(Case - 5 - B - 3)



Case-B



Elevated Track Length

Table B-1 Railway Construction Cost in Medan Area
(1986 - 1990, Case 5-B-2-2)

Item	Remarks	Construction Cost (x 10 ⁹ RP)			
		Foreign Currency	Dom. Currency		Total
			Const. Cost	Right of Way	
1) Medan St.	1 platform D.C. Base, 90 cars adjusted	1.5	0.6	-	2.1
2) East Line	1 new station added	0.2	0.08	0.02	0.3
3) West Line	2 new stations added Track reinforced 17.4 km	0.3	0.17	0.03	0.5
		2.6	1.1	-	3.7
4) South Line	Medan - Pancur Batu 19.3 km Kampung Baru - Batu 9.8 km 10 new stations added	7.2	3.16	0.04	10.4
5) North Line	Medan - Titipapan Track doubling 10.7 km partially Track reinforced 21.6 km partially	3.8	1.79	0.01	5.6
6) New Rolling Stock Base	Freight stn. 44 thsnd. ton Freight yard 300 cars D.L.base, accommodating 23 cars, newly constructed D.C.base, accommodating part of 100 cars	5.5	1.7	0.8	8.0
		1.0	0.4	-	1.4
7) Detour. Line	Track length 17.3 km Purchasing Right of Way	-	1.3	0.7	2.0
8) Short- Cut Line	-	-	-	-	-
9) Pulu Brayan Workshop	Building added 900 m ² Equipment reinforced (Diesel locomotives)	0.4	0.3	-	0.7
10) Housing for PJKA Staffs	-	-	-	-	-
Sub Total	-	22.5	10.6	1.6	34.7
11) D.C.	34 cars added	8.5	-	-	8.5
12) E.C.	-	-	-	-	-
Sub Total	-	8.5	-	-	8.5
Total	-	31.0	10.6	1.6	43.2

Table B-2 Railway Construction Cost in Medan Area
(1991 - 1995, Case-5-B-2-2)

Items	Remarks	Construction Cost (x 10 ⁹ RP)			
		Foreign Currency	Dom. Currency		Total
			Const. Cost	Right of Way	
1) Medan St.	Elevation (3 platforms, 6 tracks) partially	9.3	3.8	0.4	13.5
2) East.Line	Track reinforced 20.1 km Medan-Banda Chalipah 9.4 km track doubling	2.9	1.3	-	4.2
		2.6	1.1	-	3.7
3) West.Line	Track reinforced 20.9 km partially Medan-Sunggal 9 km track doubling	0.6	0.3	-	1.3
		0.9	0.4	-	1.3
4) South. Line	-	-	-	-	-
5) North. Line	Medan-Titipapan Track doubling, the remainder of 10.7 km Track reinforced, the remainder of 21.6 km	5.4	2.4	-	7.8
	Titipapan-Ujung Baru track doubling, the whole remainder	3.9	1.7	-	5.6
6) New Rolling Stock Base	Maintenance base, the remainder of 100 cars D.L. 8 additions; P.C. 56 additions	3.7	1.7	-	5.4
	Frght. yard, added accommodation for 100 cars D.C. part of 58-car additions Frght. yard, part of 200-car additions	1.7	0.7	-	2.4
7) Detour. Line		12.6	3.6	-	16.2
8) Short- Cut Line		1.5	0.5	0.2	2.2
9) Pulu Brayan Workshop	Equipment added (for use of diesel locomotives)	0.3	0.1	-	0.4
10) Housing for PJKA Staffs	Right of Way Purchased Readjustment	-	0.5	0.3	0.8
Sub Total		45.4	18.1	0.9	64.4
11) D.C.	59 cars added	14.8	-	-	14.8
12) E.C.		-	-	-	-
Sub Total		14.8	-	-	14.8
Total		60.2	18.1	0.9	79.2

Table B-3 Railway Construction Cost in Medan Area
(1996 - 2000, Case-5-B-2-2)

Items	Remarks	Construction Cost (x 10 ⁹ RP)			
		Foreign Currency	Dom. Currency		Total
			Const. Cost	Right of Way	
1) Medan St.	Elevation (3 platforms; 6 tracks), the remainder thereof	12.4	5.6	-	18.0
2) East. Line	Medan-Bandar Chalipah Track doubling 9.4 km, the remainder thereof	1.7	0.8	-	2.5
	Electrification work 20.1 km	4.7	2.0	-	6.7
3) West. Line	Medan-Sunggal 9 km Track doubling, the remainder thereof	0.3	0.1	-	0.4
	Electrification work 20.9 km	4.7	2.1	-	6.8
4) South. Line	Kampung Baru-Pancur Batu Track doubling 14.8 km	8.0	3.6	-	11.6
	Electrification work 29.2 km	7.6	3.4	-	11.0
5) North. Line	Titipapan-Ujung Baru Track doubling 14.8 km, the remainder thereof	3.9	1.7	-	5.6
	Electrification work 21.6 km	6.7	3.1	-	9.8
6) New Rolling Stock Base	D.C. 58 additions, Freight yard for 200 additions, the remainder thereof	3.3	1.4	-	4.7
	D.C. Base for 158 cars would be turned into E.C. Base for 158 cars with improvements	1.0	0.5	-	1.5
7) Detour. Line		-	-	-	-
8) Short- Cut Line		-	-	-	-
9) Pulu Brayan Workshop	Repairing facilities for electric cars.	0.1	-	-	0.1
10) Housing for PJKA Staffs	Quarters 600 houses	1.2	10.8	-	12.0
Sub Total		55.6	35.1	-	90.7
11) D.C.	45 cars	11.2	-	-	11.2
12) E.C.	182 cars	30.9	-	-	30.9
Sub Total		42.1	-	-	42.1
Total		97.7	35.1	-	132.8

Table B-4 Summarized Table of Construction Cost in Medan Area
(Case-5-B-2-2)

(Unit: 10⁹RP)

Item	1986 - 1990			1991 - 1995			1996 - 2000			Total		
	Frgn Curcy	Dom. Curcy	Total	Frgn Curcy	Dom. Curcy	Total	Frgn Curcy	Dom. Curcy	Total	Frgn Curcy	Dom. Curcy	Grand Total
1) Medan St.	1.5	0.6	2.1	9.3	4.2	13.5	12.4	5.6	18.0	23.2	10.4	33.6
2) East, Line	0.2	0.1	0.3	5.5	2.4	7.9	6.4	2.8	9.2	12.1	5.3	17.4
3) West, Line	2.9	1.3	4.2	1.5	0.7	2.2	5.0	2.2	7.2	9.4	4.2	13.6
4) South, Line	7.2	3.2	10.4	-	-	-	15.6	7.0	22.6	22.8	10.2	33.0
5) North, Line	3.8	1.8	5.6	9.3	4.1	13.4	10.6	4.8	15.4	23.7	10.7	34.4
6) New Rolling Stock Base	6.5	2.9	9.4	5.4	2.4	7.8	4.3	1.9	6.2	16.2	7.2	23.4
7) Detour, Line	-	2.0	2.0	12.6	3.6	16.2	-	-	-	12.6	5.6	18.2
8) Short-Cut Line	-	-	-	1.5	0.7	2.2	-	-	-	1.5	0.7	2.2
9) Pulu Brayan Workshop	0.4	0.3	0.7	0.3	0.1	0.4	0.1	-	0.1	0.8	0.4	1.2
10) Housing for PJKA Staffs	-	-	-	-	0.8	0.8	1.2	10.8	12.0	1.2	11.6	12.8
Sub Total	22.5	12.2	34.7	45.4	19.0	64.4	55.6	35.1	90.7	123.5	66.3	189.8
11) D.C.	8.5	-	8.5	14.8	-	14.8	11.2	-	11.2	34.5	-	34.5
12) E.C.	-	-	-	-	-	-	30.9	-	30.9	30.9	-	30.9
Sub Total	8.5	-	8.5	14.8	-	14.8	42.1	-	42.1	65.4	-	65.4
Total	31.0	12.2	43.2	60.2	19.0	79.2	97.7	35.1	132.8	188.9	66.3	255.2

Table B-5 A Comparison Summarized Table of Construction Costs of Railway Alternatives in Medan Area

Unit: 10⁹ RP

Item	5 - B - 2 - 2			5 - B - 3			5 - A		
	Frgn Curcy	Dom Curcy	Total	Frgn Curcy	Dom Curcy	Total	Frgn Curcy	Dom Curcy	Total
1) Medan St.	23.2	10.4	33.6	17.4	7.9	25.3	17.4	7.9	25.3
2) East, Line	12.1	5.3	17.4	6.2	2.8	9.0	6.2	2.8	9.0
3) West, Line	9.4	4.2	13.6	6.8	3.0	9.8	6.8	3.0	9.8
4) South, Line	22.8	10.2	33.0	22.8	10.2	33.0	12.4	5.6	18.0
5) North, Line	23.7	10.7	34.4	23.7	10.7	34.4	13.7	6.1	19.8
6) New rolling Stock Base	16.2	7.2	23.4	16.2	7.2	23.4	14.3	7.5	21.8
7) Detour Line	12.6	5.6	18.2	12.6	5.6	18.2	12.6	5.6	18.2
8) Short-Cut Line	1.5	0.7	2.2	1.5	0.7	2.2	1.5	0.7	2.2
9) Pulu Brayan Workshop	0.8	0.4	1.2	0.8	0.4	1.2	0.6	0.3	0.9
10) Housing for PJKA Staffs	1.2	11.6	12.8	1.2	11.6	12.8	1.0	9.7	10.7
Sub total	123.5	66.3	189.8	109.2	60.1	169.3	86.5	49.2	135.7
11) D.C.	34.5	-	34.5	34.5	-	34.5	16.0	-	16.0
12) E.C.	30.9	-	30.9	26.9	-	26.9	17.0	-	17.0
Sub total	65.4	-	65.4	61.4	-	61.4	33.0	-	33.0
Total	188.9	66.3	255.2	170.6	60.1	230.7	119.5	49.5	168.7
Remarks	Medan St.	3 platforms		2 platforms		2 platforms			
	E. & W. Line	Double track		Single-track		Single-track			
	N. & S. Line	Double track		Double track		Partial double-track			
	Housing for PJKA Staffs	600 houses		600 houses		500 houses			
	D.C.	138 cars		138 cars		64 cars			
	E.C.	182 cars		158 cars		100 cars			

Table B-6 Administrative Cost of Commutation Transport (Case-5-B-3)

Item	Unit Cost	1985		1990		1995		2000 A.D.	
		Q'ty	Amount	Q'ty	Amount	Q'ty	Amount	Q'ty	Amount
1. Personnel Cost	10 ³ Rp	prsns	x10 ⁶ Rp	prsns	x10 ⁶ Rp	prsns	x10 ⁶ Rp	prsns	x10 ⁶ Rp
Station staff-members	469	56	26.3	194	91.0	194	91.0	194	91.0
Operation personnel									
Clerk	700	2	1.4	8	5.6	14	9.8	14	9.8
Driver	566	18	10.2	31	17.5	68	38.5	80	45.3
Maintenance personal	450	17	7.7	63	28.4	105	47.3	111	49.9
Guard	371	18	6.7	31	11.5	68	25.2	80	29.7
Sub Total			26.0		63.0		120.8		134.7
Workshop	450	11	5.0	41	18.5	69	31.1	73	32.9
Civil eng.	500	5	2.5	54	27.0	82	41.0	134	67.0
Electric power	500	0	-	0	-	0	-	51	25.5
Signal	500	0	-	0	-	0	-	42	21.0
Sub total			2.5		27.0		41.0		113.5
Regional office	930	13	12.1	42	39.1	60	55.8	78	72.5
Total			71.9		238.6		339.7		444.6 (12.91)
2. Motive power cost	Rp/Car-Kn	Car. Kn		Car. Kn		Car. Kn		Car. Kn	
Kerosene	21	3,035 x 365	23.3	11,382 x 365	87.2	38,265 x 365	293.3	-	-
Electric power	54		-		-		-	54,041 x 365	1,065.2 (30.91)
3. Maintenance cost (Rolling stock)	10 ³ Rp	Cars		Cars		Cars		Cars	
D.C.	9,000	12	108.0	45	405.0	75	675.0		-
E.C.	4,000		-		-		-	79	316.0 (9.21)
4. Facility maintenance cost	10 ⁶ Rp			10 ⁶ Rp		10 ⁶ Rp		10 ⁶ Rp	
Civil eng.	1.0	700	7.0	20,600	206.0	57,760	577.6	85,700	857.0
Electric eng.	2.0	100	2.0	2,050	41.0	5,780	115.6	5,900 31,700	752.0
Structural eng.	1.0		-		-	1,100	11.0	1,100	11.0
Sub total			9.0		247.0		704.2		1,620.0 (47.01)
Grand Total			212.2		977.8		2,012.2		3,445.8 (1061)
Remarks	Unit Kn								
Train Kn					2,845.4		6,377.6		7,409.8
Number of passengers	10 ³ prsns				145.0		325.0		377.6
Rolling stock	cars		D.C: 24		D.C: 90		D.C: 150		E.C: 158
Additional track Kn					29.1		44.3		72.5
Electrified track Kn					-		-		137.6
Passenger service Kn			65.1		94.2		94.2		94.2
Car-Kn/day			11,382 x $\frac{24}{30}$ = 3,035		11,382 (4 cars)		38,265 (6 cars)		54,042.8 (7.3 cars)

Table B-7 Operational & Managerial Costs Relative to EC, PC, FC,
in Medan Areas (Case-5-B-3)

Item	Unit Price (10 ⁶ RP)	Q'ty (Persons)	Amount (10 ⁶ RP)	Remarks
1. Personnel Cost		1392	725.6	(16.6%)
(1) Station staff-members	0.469	429	201.2	
(2) Operation personnel				
Clerks	0.700	16	11.2	Pulling Loc. + Shunting Loc. 86 + 23 = 109 persons
Drivers	0.566	109	61.7	
Inspectors	0.450	122	54.9	
Guards	0.371	86	31.9	
Shunters	0.469	29	13.6	
(3) Workshop	0.450	80	36.0	
(4) Civil & architectural engineering	0.500	291	145.5	
(5) Electric engineering	0.500	51	25.5	
(6) Communications	0.500	52	26.0	
(7) Regional Office	0.930	127	118.1	
2. Motive Power Cost			1144.8	(26.2%)
E.C. Electric power	54 RP/car-km	19.726x10 ⁶ car-km	1065.2	3 kWh/car-km
D.C. Gasoline P.C.	277 RP/10 ³ ton-km	0.045x10 ⁹ ton-km	12.5	7.9l/10 ³ km-ton x 35 RP/l
F.C.	277 RP/10 ³ ton-km	0.197x10 ⁹ ton-km	54.6	
Shunting locomotive	Do.	0.045x10 ⁹ ton-km	12.5	
3. Rolling Stock Repair Cost			373.9	(8.6%)
E.C.	4 x 10 ⁶ rp	79	316.0	
D.L.	16	1.6	25.6	Annually estimated number 1/10 of 16 cars
P.C.	2.5	1.3	3.3	Do. Do. of 13 cars
F.C.	1.3	22.3	29.0	Do. Do. of 223 cars
4. Facility Maintenance Cost			2124.0	(48.6%)
Civil engineering	14	113,720	1137.2	
Electric engineering	24	43,100	862	
Housing for PJKA staffs	11	12,480	124.8	
Total			4368.3	(100%)

- Note: 1. Revenue in 2000 A.D. Managerial cost is worked out in accordance with (Service kilometres for passengers and goods in Medan Area) x tariff.
2. Managerial costs for E.C. operation herein comprise all those relative to personnel, repair and fuel.
3. As to F.C. and P.C., estimations are made based on the assumption that operation. Kilometres are 200 km, with 20 km operation in Medan Area and one-tenth expenses for drivers, guards, clerks, inspectors and rolling stock repair. Fuel expenses are assumed to be 20 km for passengers and 41.4 km for goods.

Table B-8 Track Elevation at Medan Station and Detouring Line for Freight Train

1. Object for track elevation is as follows:

- (1) Through the redevelopment of Medan urban areas, the railway facilities at the central part thereof would be curtailed as hard as possible, thereby turning the old site into account for the purpose of the urban redevelopment.
- (2) Through elimination of level crossing between railways and highways, which is the cause of the current congestion, thereby relieving traffic jam.

2. Elevating program

(1) Number of train operation (2,000 A.D.) and track capacity

Medan St.	E.C. Consist	Train Operation Number				E. Line	Detouring Line for Freight Train
		E.C.	P.C.	F.C.	Total		
2 platforms 4 tracks	8 cars	72	10	-	82	Single track	Necessary
3 platforms 6 tracks	6 cars	96	10	-	106	Double track	
				20	126		

Note: Since the track capacity of East Line would be about 90 trains, in case of 3 platforms with 6 tracks, double tracking would be necessary.

(2) Track elevation at Medan Station and Detouring Line

Freight Train	Medan St.	Grade installed	Detouring Line	Freight Train OP. KM	E. Line
Operation	3 platforms 6 tracks	10/1000	None	20.1 km	Double track 9.4 km
None	2 platforms 4 tracks	25/1000	18.2 km	17.3 km	Single track

(3) Investment Cost and Right of way

Unit: 10⁹RP

Case	itea	Medan Elevation	E. Line Track Doubling	Detouring Line	Electrification	Total	R-O-Way provided
A	3 platforms, 6 tracks (Case-5-B-2-2)	(1) 31.5	6.2	18.2	4.2	60.1	0
B	3 platforms, 6 tracks East. L: 9.4 km track doubling	(2) 42.3	2.8	-	4.2	49.3	0
C	2 platforms, 4 tracks (Case-5-B-3)	(1) 23.2	-	18.2	2.1	43.5	11,000 m ²

Note: (1) Grade installed 25/1000 (2) 10/1000

3. Judgement

	Construction Cost	Freight Train Operating km	Medan St. Hindrance Ratio	Maintenance Cost	R-O-Way provided	Counter-measures against unexpected increasing passengers	Integrated Judgement
A	△	⊙	⊙	△	⊙	⊙	⊙
B	○	○	○	○	○	○	△
C	○	⊙	⊙	⊙	⊙	△	⊙

⊙ Superior ○ Medium △ Inferior

Table B-9 Line Grading and Track

J.N.R.

Grade	Passing Tonnage (10 ⁶ ton)	Speed		Rail Weight (kg/m)	Sleeper per 25 m (Wooden) (pcs)
		DC. EC (km/h)	Others (km/h)		
1	more than 20	95	95	50	48
2	20 ~ 10	90	85	50	41
3	10 ~ 5	75	70	40	39
4	under 5	65	60	40	37

PJKA

Grade	Speed (km/h)	Rail Weight (kg/m)	Rail Weight (m)	Axle Weight (ton)
I-1	100 ~ 120	41.52	0.25 ~ 0.30	13.4
I-2	60 ~ 100	41.52	0.2	13.4
II-1	45 ~ 59	25.75	0.15 ~ 0.2	12
II-2	20 ~ 30	25.75	0.15	12
II-3	0 ~ 30	25.75	0.15	12

UIC

Grade	Axle Weight (ton)	Rail Weight (kg/m)
A	16	°England UIC 54: BC 110A 54.4
B ₁	18	°Germany UIC 60: 60.3
B ₂	18	S54 : 54.5
C ₂	20	°France U.36 : 50.6 U.80 : 60.3
C ₃	20	
C ₄	20	

ORE Recommendations (UIC Research Institute France)

Annual Passing tonnage (x10 ⁶ ton)	Rail Weight (kg/m)
Over 22	Over 60
11 ~ 22	50 ~ 60
Under 11	46 ~ 50

C-1 Configuration of Construction Cost Estimate

No.	I t e m	
010	Direct construction cost	011 Cost by work item 012 mobilization and others (011) x 0.15
020	Land acquisition and compensation cost	
030	Contingency	(010 + 020) x 0.15
040	Engineering services, Administration, and others	(010) x 0.10
000	Total construction cost	(010 + 020 + 030+ 040)

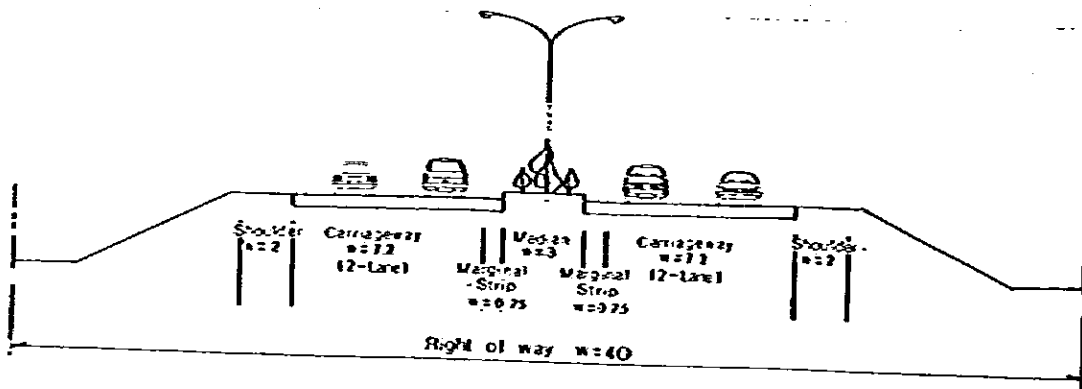
C-2 Direct Unit Costs related to Road Construction

1) Direct Unit Costs of Road Construction

a) Tollway Direct Unit Cost $1,003.9 \times 10^6$ RP/km

Typical Cross Section

Unit: m

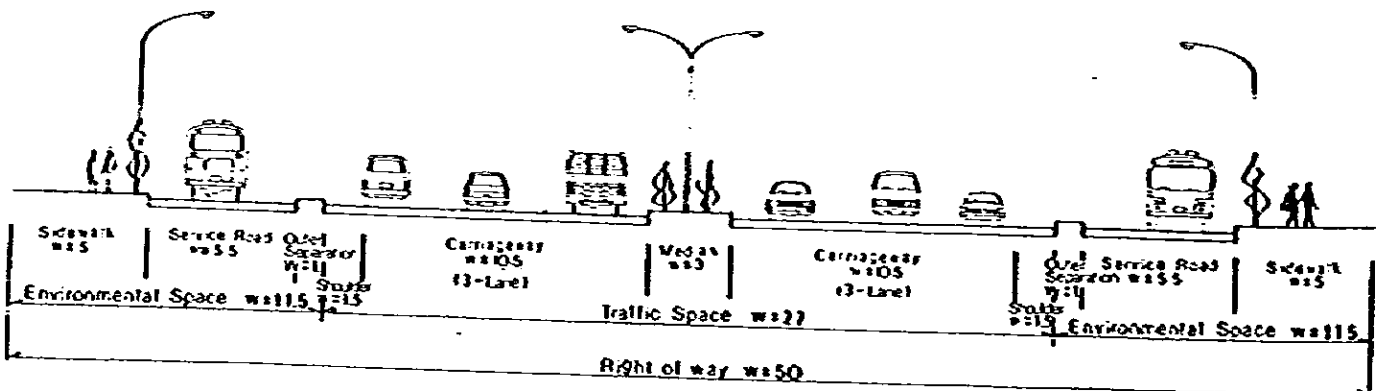


b) Major Arterial Road

i) A-Area, 6-lane Direct Unit Cost 711.1×10^6 RP/km

Typical Cross Section

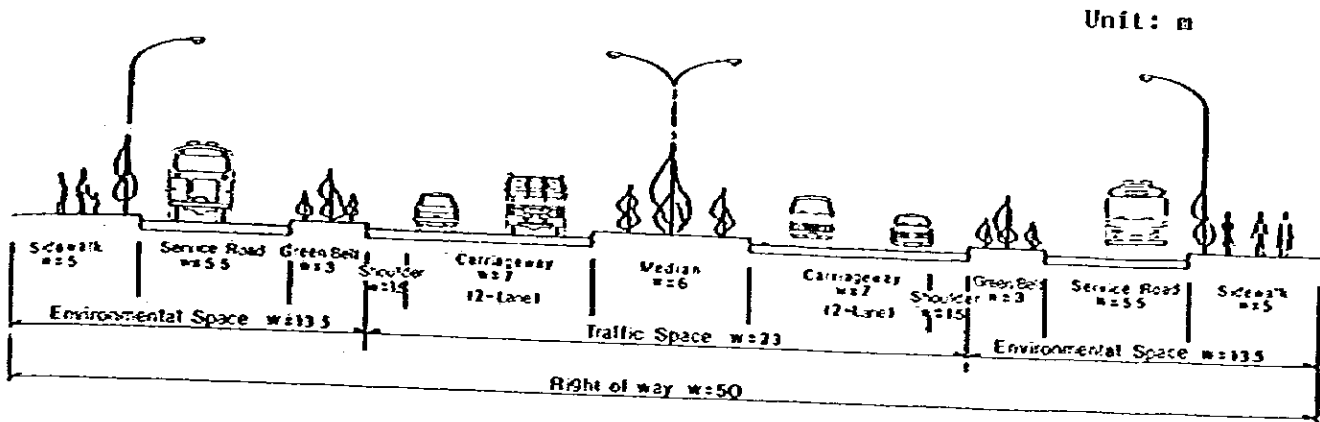
Unit: m



ii) A-Area, 4-lane

Direct Unit Cost 649.4×10^6 RP/km

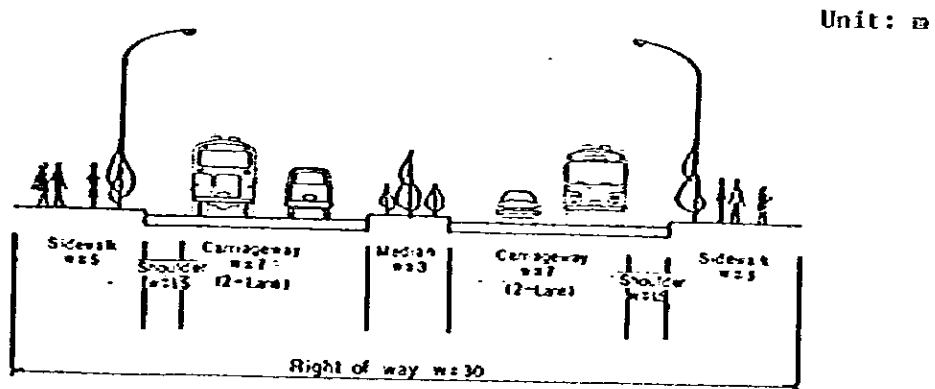
Typical Cross Section



iii) B-Area, 4-lane

Direct Unit Cost 406.4×10^6 RP/km

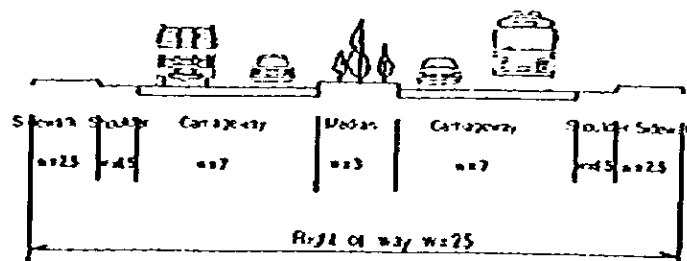
Typical Cross Section



iv) C-Area, 4-lane

Direct Unit Cost 282.3×10^6 RP/km

Typical Cross Section

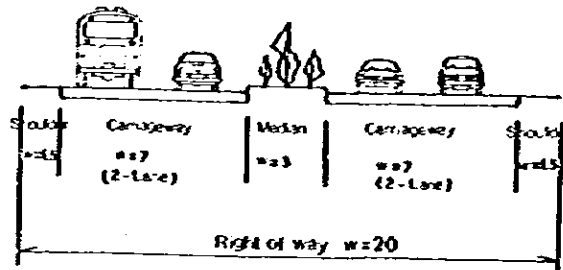


v) D-Area, 4-lane

Direct Unit Cost 151.9×10^6 RP/km

Typical Cross Section

Unit: m



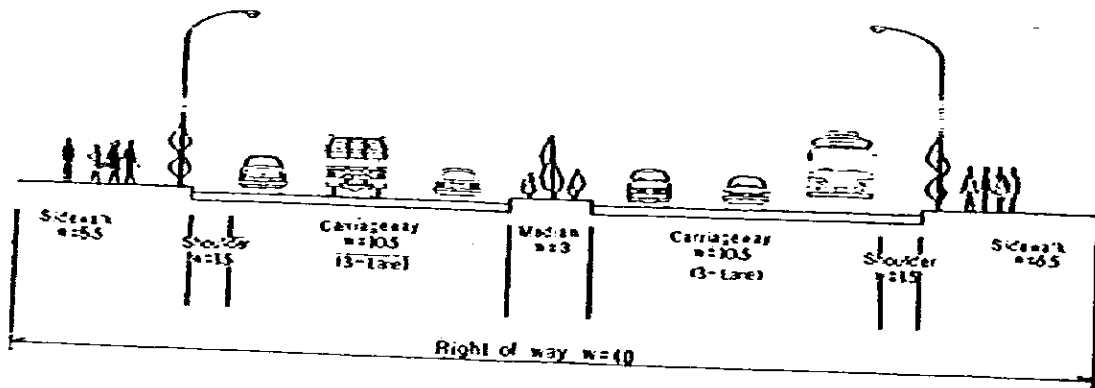
C) Arterial Road

i) A & B-Area, 6-lane

Direct Unit Cost 480.6×10^6 RP/km

Typical Cross Section

Unit: m

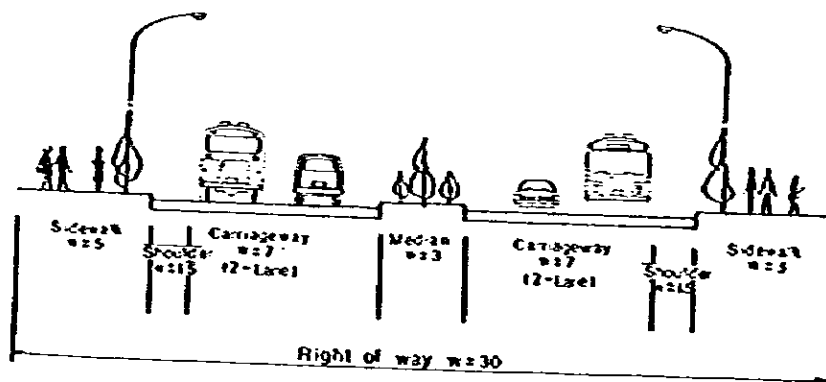


ii) A & B-Area, 4-lane

Direct Unit Cost 406.4×10^6 RP/km

Typical Cross Section

Unit: m

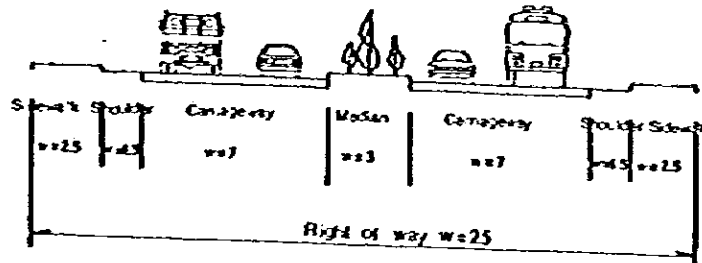


iii) C-Area, 4-lane

Direct Unit Cost 282.3×10^6 RP/km

Typical Cross Section

Unit: m

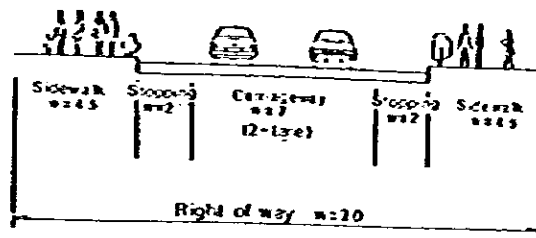


iv) A & B-Area, 2-lane

Direct Unit Cost 224.7×10^6 RP/km

Typical Cross Section

Unit: m

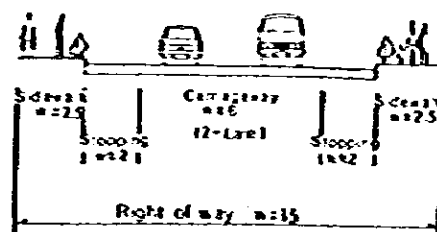


d) Supplementary Arterial Road

Direct Unit Cost 199.2×10^6 RP/km

Typical Cross Section

Unit: m



2) Direct Unit Costs of Flyover Construction

a) 250m Flyover 4-lane Direct Unit Cost $2,570.3 \times 10^6$ RP
 (Refer Fig. C-1)

Conditions:

Design Speed	$V_D = 60$ km/h
Maximum Gradient	$i_{max} = 5\%$
Bridge Section	$L = 250$ m
Retaining Wall Section	$L = 200$ m
Road Width	$W = 20$ m
Total Length	$L = 450$ m

b) 250m Flyover 6-lane Direct Unit Cost $3,339.4 \times 10^6$ RP

Conditions:

Design Speed	$V_D = 60$ km/h
Maximum Gradient	$i_{max} = 5\%$
Bridge Section	$L = 250$ m
Retaining Wall Section	$L = 200$ m
Road Width	$W = 27$ m
Total Length	$L = 450$ m

c) 600m Flyover 4-lane Direct Unit Cost $5,334.5 \times 10^6$ RP

Conditions:

Design Speed	$V_D = 60$ km/h
Maximum Gradient	$i_{max} = 5\%$
Bridge Section	$L = 600$ m
Retaining Wall Section	$L = 200$ m
Road Width	$W = 20$ m
Total Length	$L = 800$ m

d) 600m Flyover 6-lane Direct Unit Cost $7,010.3 \times 10^6$ RP

Conditions:

Design Speed	$V_D = 60$ km/h
Maximum Gradient	$i_{max} = 5\%$
Bridge Section	$L = 600$ m
Retaining Wall Section	$L = 200$ m
Road Width	$W = 27$ m
Total Length	$L = 800$ m

e) 30m Flyover 4-lane Direct Unit Cost 516.2×10^6 RP

Conditions:

Design Speed	$V_D = 60$ km/h
Maximum Gradient	$i_{max} = 5\%$
Bridge Section	$L = 30$ m
Road Width	$W = 20$ m
Total Length	$L = 430$ m

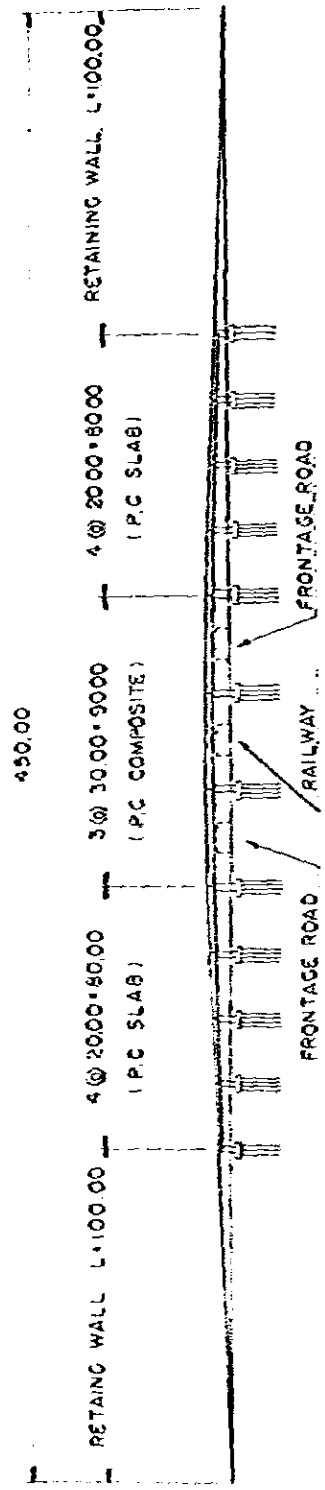
g) Direct Unit Cost of Intersection Construction

Direct Unit Cost 79.6×10^6 RP

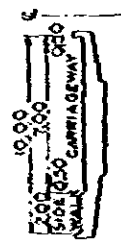
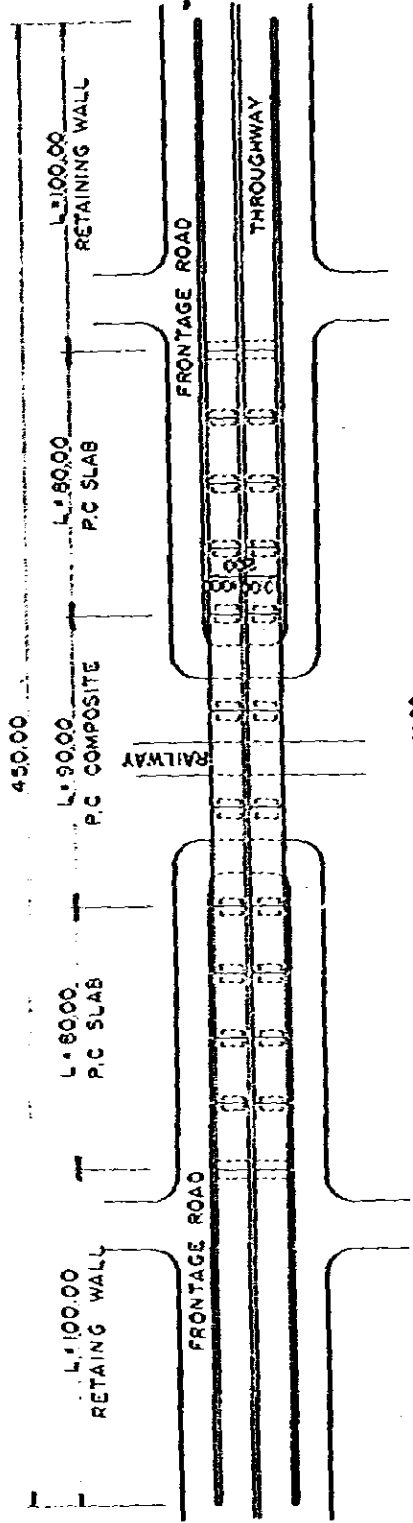
Conditions: Signalized 4-leg intersection with
auxiliary lanes
(Refer Fig. C-2)

UNIT: METER

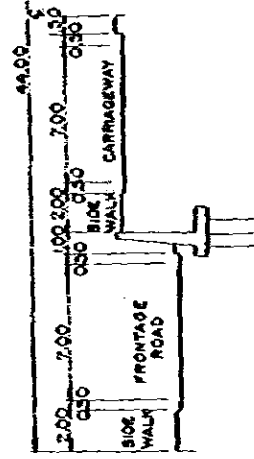
ELEVATION



PLAN



BRIDGE SECTION



RETAINING WALL SECTION

Fig. C-1
 General View of Typical Flyover
 Medan Area Transportation Study

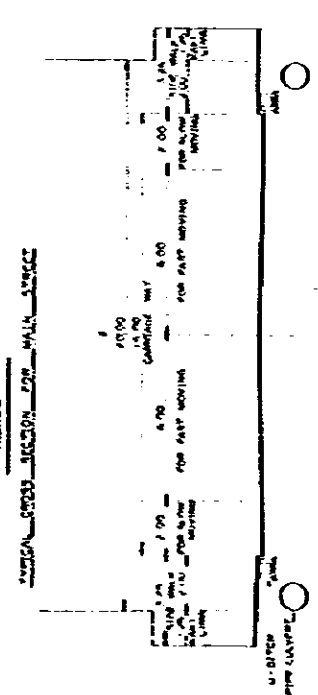
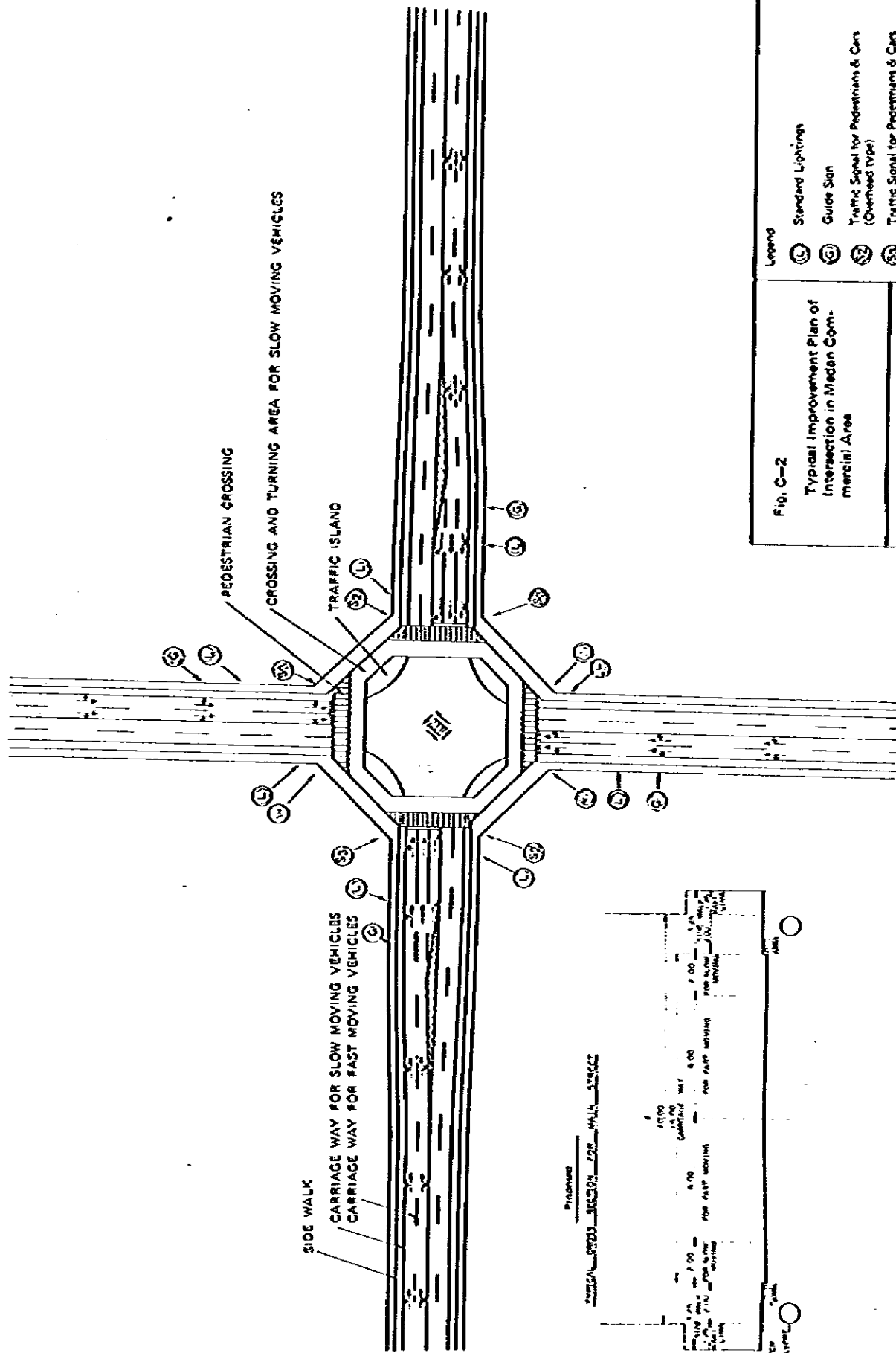


Fig. C-2
 Typical Improvement Plan of
 Intersection in Median Com-
 mercial Area

Median Area Transportation Study

Legend

- (L) Standard Lightings
- (G) Guide Sign
- (S2) Traffic Signal for Pedestrians & Cars (Overhead type)
- (S3) Traffic Signal for Pedestrians & Cars (Roadside type)

C-3 Required Number of Lane According to Traffic Volume

(traffic capacity: 1710 veh./hour/lane)

Station No.	Street Name	Peak factor (t)	Rate of Direction (t)	Daily traffic volume		Hourly traffic volume at peak hour			
				Case-5-A	Case-5-B	Case-5-A		Case-5-B	
							No. of line		No. of line
1	Jl. Gelugur Bypass	11.9	55	83,600	63,600	5,472	8	4,163	6
2	Jl. Parang Berah	9.3	55	57,900	43,800	2,962	4	2,240	4
3	Jl. Sutoro	9.8	55	28,800	24,100	1,552	2	1,299	2
4	Jl. Mesjid Raya	15.8	55	59,200	46,200	5,144	6	4,015	6
5	Jl. Gajah Hada	9.5	55	28,900	26,100	1,510	2	1,364	2
6	Jl. Sudirman	15.4	55	35,200	14,800	2,931	4	1,254	2
7	Jl. Zainul Arifin	7.4	55	42,600	37,000	1,734	4	1,506	2
8	Jl. Suprpto	9.7	55	36,800	22,000	1,963	4	1,174	2
9	Jl. Kataruso	12.2	55	87,500	64,100	5,871	8	4,301	6
10	Jl. Singanangaraja	15.9	55	68,800	65,400	6,017	8	5,719	8
11	Jl. Yanin	18.7	55	37,700	26,800	3,877	6	2,756	4
12	Jl. Baryono	9.4	55	36,400	30,400	1,882	4	1,572	2
13	Jl. Sutoro	10.9	55	35,500	30,700	2,128	4	1,840	4
14	Jl. Sudarso	10.3	65	52,500	43,400	3,515	6	2,906	4
15	Jl. Singanangaraja	13.2	65	46,900	40,600	4,024	6	3,493	4
16	Jl. Kataruso	14.2	65	52,300	27,500	4,827	6	2,538	4
17	Jl. Patimura	10.8	65	39,300	23,300	2,759	4	1,636	2
18	Jl. Gatot Subroto	14.4	65	49,400	21,800	4,624	6	2,040	4
19	Jl. Patirpus	10.5	55	54,600	48,200	3,153	4	2,784	4
20	Jl. Patimura	10.8	65	50,800	47,400	3,566	6	3,327	4

Note: 1) Each stations coincide with the stations of traffic survey conducted by Bina Marga and the Study Team. The locations of each stations are shown in the following Fig. C-3.

2) These peak factors are based on the traffic survey result.

3) Rates of direction are assumed as follows, referring the traffic survey.

Within Intermediate Ring Road; 55%

Out of Intermediate Ring Road; 65%

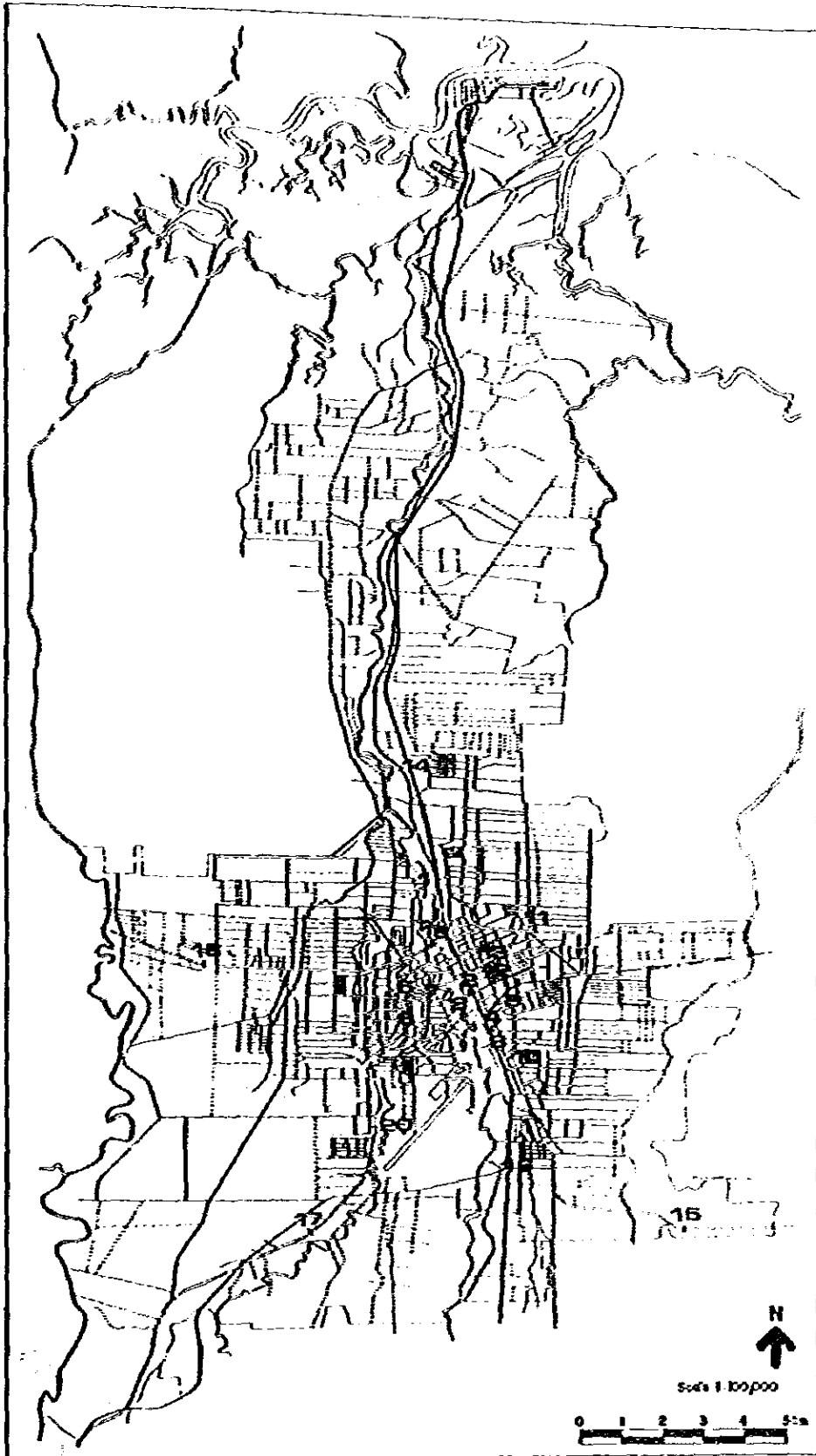


Fig. C-3

Location Map of the Stations Where Required
Lane Numbers are Examined

Legend

Medon Area Transportation Study

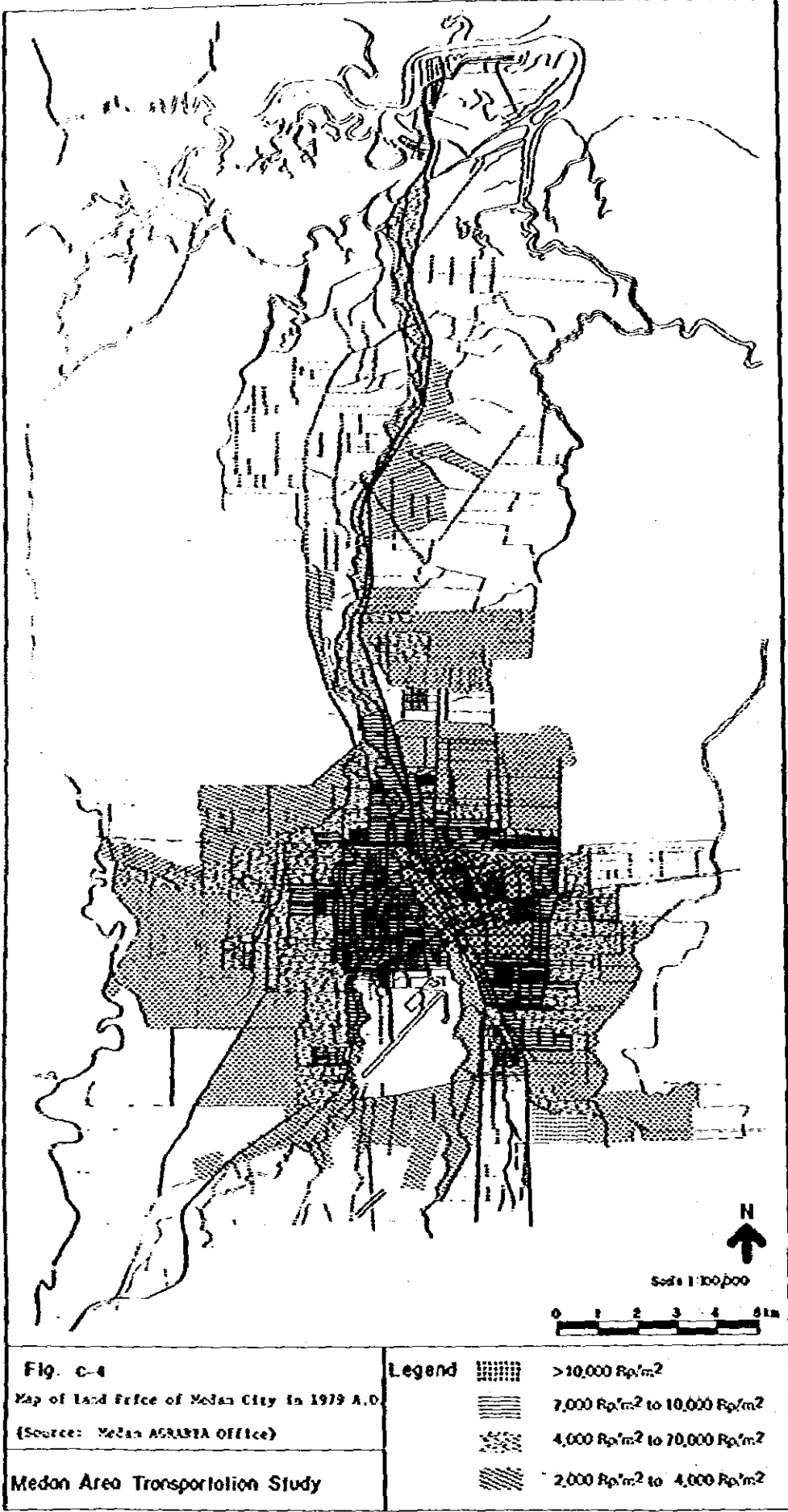






Fig. C-4
 Map of Land Price of Medan City In 1979 A.D.
 (Source: Medan AGRARIA Office)

Legend	Price Range (Rp/m ²)
	>10,000 Rp/m ²
	7,000 Rp/m ² to 10,000 Rp/m ²
	4,000 Rp/m ² to 7,000 Rp/m ²
	2,000 Rp/m ² to 4,000 Rp/m ²

Medan Area Transportation Study

Table D-1 Railway Repayment Program (Case 3-1)

(Unit: $\times 10^6$ RP)

Year	Cost Disbursement for Loans (including interest)			Revenue	Profit	
	Foreign	Local	Total		Annual	Accumulated
1986	5565	2356	7921	127	-7794	-7794
1987	5565	2356	7921	294	-7627	-16356
1988	5565	2356	7921	541	-7380	-25698
1989	7315	2356	9671	856	-8815	-37596
1990	7315	2356	9671	1205	-8466	-50573
1991	8087	3421	11508	1551	-9957	-66598
1992	8087	3421	11508	1876	-9632	-84221
1993	8087	3421	11508	2160	-9348	-103675
1994	8087	3421	11508	2398	-9110	-125226
1995	9087	3421	12508	2593	-9915	-150168
1996	21092	8750	29842	2747	-27095	-195283
1997	9842	8750	18592	2871	-15721	-234437
1998	9842	8750	18592	2963	-15629	-278198
1999	23942	8750	32692	3033	-29659	-341240
2000	22642	8750	31392	3090	-28302	-410490
2001	221	3225	3446	3176	-270	-460018
2002	221	3225	3446	3265	-181	-515401
2003	221	3225	3446	3356	-90	-577339
2004	221	3225	3446	3450	4	-646615
2005	221	3225	3446	3546	100	-724108
2006	221	3225	3446	3645	199	-810801
2007	221	3225	3446	3746	300	-907797
2008	221	3225	3446	3851	405	-1016327
2009	221	3225	3446	3958	512	-1137774
2010	221	3225	3446	4069	623	-1273683
Total	162330	104885	267215	64367	—	—

Table D-2 Railway Repayment Program (Case 1-2)

(Unit: $\times 10^6$ RP)

Year	Cost Disbursement for Loans (including interest)			Revenue	Profit	
	Foreign	Local	Total		Annual	Accumulated
2001	221	3225	3446	3176	-270	-270
2002	221	3225	3446	3264	-182	-484
2003	221	3225	3446	3356	-90	-632
2004	221	3225	3446	3450	4	-703
2005	221	3225	3446	3546	100	-687
2006	221	3225	3446	3645	199	-570
2007	221	3225	3446	3746	300	-338
2008	221	3225	3446	3851	405	26
2009	221	3225	3446	3958	512	538
2010	221	3225	3446	4069	623	1161
2011	221	3225	3446	4182	736	1897
2012	221	3225	3446	4299	853	2750
2013	221	3225	3446	4419	973	3723
2014	221	3225	3446	4542	1096	4819
2015	221	3225	3446	4669	1223	6042
2016	221	3225	3446	4799	1353	7395
2017	221	3225	3446	4933	1487	8882
2018	221	3225	3446	5070	1624	10506
2019	221	3225	3446	5211	1765	12271
2020	221	3225	3446	5356	1910	14181
2021	221	3225	3446	5504	2058	16239
2022	221	3225	3446	5657	2211	18450
2023	221	3225	3446	5815	2369	20819
2024	221	3225	3446	5976	2530	23349
2025	221	3225	3446	6143	2697	26046
Total	5525	80625	86150	112636	—	—

Table D-3 Railway Repayment Program (Case 2-2)

(Unit: $\times 10^6$ RP)

Year	Cost Disbursement for Loans (including interest)			Revenue	Profit	
	Foreign	Local	Total		Annual	Accumulated
2001	221	3225	3446	3176	-270	-270
2002	221	3225	3446	3264	-182	-484
2003	221	3225	3446	3356	-90	-632
2004	221	3225	3446	3450	4	-703
2005	221	3225	3446	3546	100	-687
2006	221	3225	3446	3645	199	-570
2007	221	3225	3446	3746	300	-338
2008	221	3225	3446	3851	405	26
2009	221	3225	3446	3958	512	538
2010	221	3225	3446	4069	623	1161
2011	221	3225	3446	4182	736	1897
2012	14321	3225	17546	4299	-13247	-11350
2013	13021	3225	16246	4419	-11827	-24539
2014	221	3225	3446	4542	1096	-26387
2015	221	3225	3446	4669	1223	-28330
2016	221	3225	3446	4799	1353	-30376
2017	221	3225	3446	4933	1487	-32534
2018	221	3225	3446	5070	1624	-34814
2019	221	3225	3446	5211	1765	-37226
2020	221	3225	3446	5356	1910	-39783
2021	221	3225	3446	5504	2058	-42498
2022	221	3225	3446	5657	2211	-45386
2023	221	3225	3446	5815	2369	-48463
2024	221	3225	3446	5976	2530	-51748
2025	221	3225	3446	6143	2697	-55260
Total	32425	80625	113050	112636		

Table D-4 Repayment Program of
Belawan-Medan-Tg.Morawa Tollway (Case 2)

(Unit: x10⁶Rp)

Year	1) Cost Disbursement for Loans (including interest)		2) Operation & Maintenance Cost	1) + 2) Total Cost	Revenue	Profit	
	Foreign	Local				Annual	Accumulated
1983	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0
1986	0	0	790	790	3647	2857	2857
1987	0	0	790	790	3857	3067	5924
1988	0	3802	790	4592	4080	-512	5412
1989	0	3802	790	4592	4315	-277	5135
1990	1119	3802	790	5711	4563	-1148	3987
1991	1119	3802	790	5711	4827	-884	3103
1992	1119	3802	790	5711	5104	-607	2496
1993	1119	3802	790	5711	5399	-312	2184
1994	1119	3802	790	5711	5711	0	2184
1995	1119	3802	790	5711	6039	328	2512
1996	1119	3802	790	5711	6387	676	3188
1997	1119	3802	790	5711	6754	1043	4231
1998	1119	3802	790	5711	7148	1437	5668
1999	1119	3802	790	5711	7554	1843	7511
2000	1119	3802	790	5711	7991	2280	9791
2001	1119	3802	790	5711	8453	2742	12533
2002	1119	3802	790	5711	8942	3231	15764
2003	1119	0	790	1909	9458	7549	23313
2004	1119	0	790	1909	10005	8096	31409
2005	1119	0	790	1909	10583	8674	40083
2006	1119	0	790	1909	11195	9286	49369
2007	1119	0	790	1909	11842	9933	59302
2008	1119	0	790	1909	12527	10618	69920
2009	1119	0	790	1909	13251	11342	81262
2010	1119	0	790	1909	14017	12108	93370
2011	1119	0	790	1909	14827	12918	106288
2012	1119	0	790	1909	15684	13775	120063
2013	1119	0	790	1909	16590	14681	134744
2014	1119	0	790	1909	17549	15640	150384
2015	1119	0	790	1909	18564	16655	167039
Total	29094	57030	23700	109824	276863		

Table D-5 Repayment Program of
Belawan-Medan-Tg. Morawa Highway (Case 3)

(Unit: x10⁶RP)

Year	1) Cost Disbursement for Loans (including Interest)		2) Operation & Maintenance Cost	1) + 2) Total Cost	Revenue	Profit	
	Foreign	Local				Annual	Accumulated
1983	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0
1986	0	0	790	790	4559	3769	3769
1987	0	0	790	790	4821	4031	7800
1988	0	3802	790	4592	5100	508	8308
1989	0	3802	790	4592	5394	802	9110
1990	1119	3802	790	5711	5704	-7	9103
1991	1119	3802	790	5711	6034	323	9426
1992	1119	3802	790	5711	6380	669	10095
1993	1119	3802	790	5711	6749	1038	11133
1994	1119	3802	790	5711	7139	1428	12561
1995	1119	3802	790	5711	7549	1838	14399
1996	1119	3802	790	5711	7984	2273	16672
1997	1119	3802	790	5711	8443	2732	19404
1998	1119	3802	790	5711	8935	3224	22628
1999	1119	3802	790	5711	9443	3732	26360
2000	1119	3802	790	5711	9989	4278	30638
2001	1119	3802	790	5711	10566	4855	35493
2002	1119	3802	790	5711	11178	5467	40960
2003	1119	0	790	1909	11824	9915	50875
2004	1119	0	790	1909	12507	10598	61473
2005	1119	0	790	1909	13230	11321	72794
2006	1119	0	790	1909	13995	12086	84880
2007	1119	0	790	1909	14804	12895	97775
2008	1119	0	790	1909	15660	13751	111526
2009	1119	0	790	1909	16565	14656	126182
2010	1119	0	790	1909	17522	15613	141795
2011	1119	0	790	1909	18535	16626	158421
2012	1119	0	790	1909	19606	17697	176118
2013	1119	0	790	1909	20740	18831	194949
2014	1119	0	790	1909	21938	20029	214978
2015	1119	0	790	1909	23206	21297	236275
Total	29094	57030	23700	109824	346099		

Table D-6 Repayment Program of
Belawan-Medan-Tg.Morawa Tollway (Case 4)

(Unit: x 10⁶Rp)

Year	1) Cost Disbursement for Loans (including interest)		2) Operation & Maintenance Cost	1) + 2) Total Cost	Revenue	Profit	
	Foreign	Local				Annual	Accumulated
1983	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0
1986	0	0	790	790	5471	0	0
1987	0	0	790	790	5785	4681	4681
1988	0	3802	790	4592	6120	4995	9676
1989	0	3802	790	4592	6473	1528	11204
1990	1119	3802	790	5711	6845	1881	13085
1991	1119	3802	790	5711	7241	1134	14219
1992	1119	3802	790	5711	7656	1530	15749
1993	1119	3802	790	5711	8436	1945	17694
1994	1119	3802	790	5711	8924	2725	20419
1995	1119	3802	790	5711	9436	3213	23632
1996	1119	3802	790	5711	9980	3725	27357
1997	1119	3802	790	5711	10554	4269	31626
1998	1119	3802	790	5711	11169	4843	36469
1999	1119	3802	790	5711	11804	5458	41927
2000	1119	3802	790	5711	12486	6093	48020
2001	1119	3802	790	5711	13208	6775	54795
2002	1119	3802	790	5711	13971	7497	62292
2003	1119	0	790	1909	14779	8260	70552
2004	1119	0	790	1909	15633	12870	83422
2005	1119	0	790	1909	16536	13724	97146
2006	1119	0	790	1909	17492	14627	111773
2007	1119	0	790	1909	18503	15583	127356
2008	1119	0	790	1909	19573	16594	143950
2009	1119	0	790	1909	20704	17664	161614
2010	1119	0	790	1909	21901	18795	180409
2011	1119	0	790	1909	23167	19992	200401
2012	1119	0	790	1909	24506	21258	221659
2013	1119	0	790	1909	25922	22597	244256
2014	1119	0	790	1909	27420	24013	268269
2015	1119	0	790	1909	29005	25511	293780
Total	29094	57030	23700	109824	430700		320876

Table D-7 Repayment Program of Binjei Bypass (Case 2)

(Unit: $\times 10^6$ Rp)

Year	1) Cost Disbursement for Loans (including interest)		2) Operation & Maintenance Cost	1) + 2) Total Cost	Revenue	Profit	
	Foreign	Local				Annual	Accumulated
1990	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0
1993	0	0	609	609	2213	1604	1604
1994	0	0	609	609	2341	1732	3336
1995	0	2698	609	3307	2477	-830	2506
1996	0	2698	609	3307	2620	-687	1819
1997	785	2698	609	4092	2771	-1321	498
1998	785	2698	609	4092	2931	-1161	-663
1999	785	2698	609	4092	3099	-993	-1735
2000	785	2698	609	4092	3277	-815	-2758
2001	785	2698	609	4092	3467	-625	-3713
2002	785	2698	609	4092	3668	-424	-4582
2003	785	2698	609	4092	3881	-211	-5342
2004	785	2698	609	4092	4107	15	-5968
2005	785	2698	609	4092	4344	252	-6432
2006	785	2698	609	4092	4596	504	-6699
2007	785	2698	609	4092	4863	771	-6731
2008	785	2698	609	4092	5145	1053	-6485
2009	785	2698	609	4092	5444	1352	-5911
2010	785	0	609	1394	5760	4366	-2254
2011	785	0	609	1394	6093	4699	2174
2012	785	0	609	1394	6447	5053	7227
2013	785	0	609	1394	6821	5427	12654
2014	785	0	609	1394	7216	5822	18476
2015	785	0	609	1394	7634	6240	24716
2016	785	0	609	1394	8077	6683	31399
2017	785	0	609	1394	8546	7152	38551
2018	785	0	609	1394	9041	7647	46198
2019	785	0	609	1394	9566	8172	54370
2020	785	0	609	1394	10121	8727	63097
2021	785	0	609	1394	10708	9314	72411
2022	785	0	609	1394	11329	9935	82346
Total	20410	40470	18270	79150	168603		

Table D-8 Repayment Program of Binjei Bypass (Case 3)

(Unit: $\times 10^6$ Rp)

Year	1) Cost Disbursement for Loans (including interest)		2) Operation & Maintenance Cost	1) + 2) Total Cost	Revenue	Profit	
	Foreign	Local				Annual	Accumulated
1990	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0
1993	0	0	609	609	2766	2157	2157
1994	0	0	609	609	2926	2317	4474
1995	0	2698	609	3307	3095	-212	4262
1996	0	2698	609	3307	3274	-33	4229
1997	785	2698	609	4092	3463	-629	3600
1998	785	2698	609	4092	3663	-429	3171
1999	785	2698	609	4092	3875	-217	2954
2000	785	2698	609	4092	4096	4	2958
2001	785	2698	609	4092	4333	241	3199
2002	785	2698	609	4092	4583	491	3690
2003	785	2698	609	4092	4848	756	4446
2004	785	2698	609	4092	5128	1036	5482
2005	785	2698	609	4092	5425	1333	6815
2006	785	2698	609	4092	5738	1646	8461
2007	785	2698	609	4092	6070	1978	10439
2008	785	2698	609	4092	6421	2329	12768
2009	785	2698	609	4092	6792	2700	15468
2010	785	0	609	1394	7184	5790	21258
2011	785	0	609	1394	7600	6206	27464
2012	785	0	609	1394	8039	6645	34109
2013	785	0	609	1394	8504	7110	41219
2014	785	0	609	1394	8995	7601	48820
2015	785	0	609	1394	9515	8121	56941
2016	785	0	609	1394	10065	8671	65612
2017	785	0	609	1394	10647	9253	74865
2018	785	0	609	1394	11262	9868	84733
2019	785	0	609	1394	11913	10519	95252
2020	785	0	609	1394	12602	11208	106460
2021	785	0	609	1394	13330	11936	118396
2022	785	0	609	1394	14101	12707	131103
Total	20410	40470	18270	79150	210253		

Table D-9 Repayment Program of Binjei Bypass (Case 4)

(Unit: x10⁶RP)

Year	1) Cost Disbursement for Loans (including interest)		2) Operation & Maintenance Cost	1) + 2) Total Cost	Revenue	Profit	
	Foreign	Local				Annual	Accumulated
1990	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0
1993	0	0	609	609	3322	2713	2713
1994	0	0	609	609	3511	2902	5615
1995	0	2698	609	3307	3714	407	6022
1996	0	2698	609	3307	3929	622	6644
1997	785	2698	609	4092	4156	64	6708
1998	785	2698	609	4092	4396	304	7012
1999	785	2698	609	4092	4650	558	7570
2000	785	2698	609	4092	4915	823	8393
2001	785	2698	609	4092	5199	1107	9500
2002	785	2698	609	4092	5500	1408	10908
2003	785	2698	609	4092	5817	1725	12633
2004	785	2698	609	4092	6154	2062	14695
2005	785	2698	609	4092	6509	2417	17112
2006	785	2698	609	4092	6886	2794	19906
2007	785	2698	609	4092	7284	3192	23098
2008	785	2698	609	4092	7705	3613	26711
2009	785	2698	609	4092	8150	4058	30769
2010	785	0	609	1394	8621	7227	37996
2011	785	0	609	1394	9119	7725	45721
2012	785	0	609	1394	9646	8252	53973
2013	785	0	609	1394	10204	8810	62783
2014	785	0	609	1394	10794	9400	72183
2015	785	0	609	1394	11418	10024	82207
2016	785	0	609	1394	12076	10682	92889
2017	785	0	609	1394	12776	11382	104271
2018	785	0	609	1394	13514	12120	116391
2019	785	0	609	1394	14295	12901	129292
2020	785	0	609	1394	15121	13727	143019
2021	785	0	609	1394	15996	14602	157621
2022	785	0	609	1394	16920	15526	173147
Total	20410	40470	18270	79150	252297		

Table D-10 Repayment Program of Outer Ring Road (Case 2)

(Unit: x10⁶RP)

Year	1) Cost Disbursement for Loans (including interest)		2) Operation & Maintenance Cost	1) + 2) Total Cost	Revenue	Profit	
	Foreign	Local				Annual	Accumulated
1995	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0
1998	0	0	617	617	895	278	278
1999	0	0	617	617	948	331	609
2000	0	2391	617	3008	1001	-2007	-1398
2001	0	2391	617	3008	1059	-1949	-3514
2002	601	2391	617	3609	1120	-2489	-6424
2003	601	2391	617	3609	1185	-2424	-9618
2004	601	2391	617	3609	1253	-2356	-13128
2005	601	2391	617	3609	1326	-2283	-16986
2006	601	2391	617	3609	1402	-2207	-21231
2007	601	2391	617	3609	1483	-2126	-25904
2008	601	2391	617	3609	1569	-2040	-31052
2009	601	2391	617	3609	1660	-1949	-36727
2010	601	2391	617	3609	1756	-1853	-42987
2011	601	2391	617	3609	1857	-1752	-49897
2012	601	2391	617	3609	1965	-1644	-57528
2013	601	2391	617	3609	2078	-1531	-65962
2014	601	2391	617	3609	2198	-1411	-75288
2015	601	0	617	1218	2325	1107	-83215
2016	601	0	617	1218	2460	1242	-91958
2017	601	0	617	1218	2602	1384	-101608
2018	601	0	617	1218	2752	1534	-112266
2019	601	0	617	1218	2911	1693	-124044
2020	601	0	617	1218	3080	1862	-137067
2021	601	0	617	1218	3258	2040	-151475
2022	601	0	617	1218	3446	2228	-167424
2023	601	0	617	1218	3645	2427	-185087
2024	601	0	617	1218	3856	2638	-204659
2025	601	0	617	1218	4079	2861	-226357
2026	601	0	617	1218	4314	3096	-250423
2027	601	0	617	1218	4564	3346	-277127
Total	15626	35865	18510	70001	68047		

Table D-11 Repayment Program of Outer Ring Road (Case 3)

(Unit: $\times 10^6$ RP)

Year	1) Cost Disbursement for Loans (including interest)		2) Operation & Maintenance Cost	1) + 2) Total Cost	Revenue	Profit	
	Foreign	Local				Annual	Accumulated
1995	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0
1998	0	0	617	617	1119	502	502
1999	0	0	617	617	1185	568	1070
2000	0	2391	617	3008	1251	-1757	-687
2001	0	2391	617	3008	1323	-1685	-2454
2002	601	2391	617	3609	1400	-2209	-4957
2003	601	2391	617	3609	1481	-2128	-7679
2004	601	2391	617	3609	1566	-2043	-10643
2005	601	2391	617	3609	1657	-1952	-13872
2006	601	2391	617	3609	1753	-1856	-17392
2007	601	2391	617	3609	1854	-1755	-21234
2008	601	2391	617	3609	1961	-1648	-25430
2009	601	2391	617	3609	2074	-1535	-30016
2010	601	2391	617	3609	2194	-1415	-35032
2011	601	2391	617	3609	2321	-1288	-40523
2012	601	2391	617	3609	2455	-1154	-46539
2013	601	2391	617	3609	2597	-1012	-53135
2014	601	2391	617	3609	2747	-862	-60373
2015	601	0	617	1218	2906	1688	-65929
2016	601	0	617	1218	3074	1856	-71984
2017	601	0	617	1218	3252	2034	-78588
2018	601	0	617	1218	3440	2222	-85796
2019	601	0	617	1218	3639	2421	-93670
2020	601	0	617	1218	3849	2631	-102279
2021	601	0	617	1218	4072	2854	-111698
2022	601	0	617	1218	4307	3089	-122012
2023	601	0	617	1218	4556	3338	-133315
2024	601	0	617	1218	4819	3601	-145711
2025	601	0	617	1218	5098	3880	-159316
2026	601	0	617	1218	5393	4175	-174258
2027	601	0	617	1218	5704	4486	-190682
Total	15626	35865	18510	70001	85047		

Table D-12 Repayment Program of Outer Ring Road (Case 4)

(Unit: x10⁶RP)

Year	1) Cost Disbursement for Loans (including interest)		2) Operation & Maintenance Cost	1) + 2) Total Cost	Revenue	Profit	
	Foreign	Local				Annual	Accumulated
1995	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0
1998	0	0	617	617	1343	726	726
1999	0	0	617	617	1422	805	1531
2000	0	2391	617	3008	1501	-1507	24
2001	0	2391	617	3008	1588	-1420	-1396
2002	601	2391	617	3609	1680	-1929	-3492
2003	601	2391	617	3609	1777	-1832	-5743
2004	601	2391	617	3609	1879	-1730	-8162
2005	601	2391	617	3609	1988	-1621	-10762
2006	601	2391	617	3609	2103	-1506	-13559
2007	601	2391	617	3609	2224	-1385	-16571
2008	601	2391	617	3609	2353	-1256	-19815
2009	601	2391	617	3609	2489	-1120	-23312
2010	601	2391	617	3609	2633	-976	-27085
2011	601	2391	617	3609	2785	-824	-31159
2012	601	2391	617	3609	2946	-663	-35561
2013	601	2391	617	3609	3116	-493	-40321
2014	601	2391	617	3609	3296	-313	-45472
2015	601	0	617	1218	3487	2269	-48659
2016	601	0	617	1218	3688	2470	-52028
2017	601	0	617	1218	3902	2684	-55587
2018	601	0	617	1218	4127	2909	-59348
2019	601	0	617	1218	4366	3148	-63321
2020	601	0	617	1218	4618	3400	-67519
2021	601	0	617	1218	4885	3667	-71954
2022	601	0	617	1218	5167	3949	-76639
2023	601	0	617	1218	5466	4248	-81587
2024	601	0	617	1218	5782	4564	-86813
2025	601	0	617	1218	6116	4898	-92332
2026	601	0	617	1218	6470	5252	-98159
2027	601	0	617	1218	6843	5625	-104313
Total	15626	35865	18510	70001	102040		

Table D-13 Bus Repayment Program (Case 2)

(Unit: $\times 10^6$ RP)

Year	Cost Disbursement for Loans (including interest)			Revenue	Profit	
	Foreign	Local	Total		Annual	Accumulated
2001	3853	4709	8562	15942	7380	7380
2002	3853	4709	8562	15942	7380	14760
2003	3853	4709	8562	15942	7380	22140
2004	3853	4709	8562	15942	7380	29520
2005	37632	4709	42341	15942	-26399	3121
2006	3853	4709	8562	15942	7380	10501
2007	3853	4709	8562	15942	7380	17881
2008	3853	4709	8562	15942	7380	25261
2009	3853	4709	8562	15942	7380	32641
2010	37632	4709	42341	15942	-26399	6242
2011	3853	4709	8562	15942	7380	13622
2012	3853	4709	8562	15942	7380	21002
2013	3853	4709	8562	15942	7380	28382
2014	3853	4709	8562	15942	7380	35762
2015	37632	4709	42341	15942	-26399	9363
2016	3853	4709	8562	15942	7380	16743
2017	3853	4709	8562	15942	7380	24123
2018	3853	4709	8562	15942	7380	31503
2019	3853	4709	8562	15942	7380	38883
2020	37632	4709	42341	15942	-26399	12484
2021	3853	4709	8562	15942	7380	19864
2022	3853	4709	8562	15942	7380	27244
2023	3853	4709	8562	15942	7380	34624
2024	3853	4709	8562	15942	7380	42004
2025	37632	4709	42341	15942	-26399	15605
Total	265220	117725	382945	398550	---	---

Table D-14 Bus Repayment Program (Case 4)

(Unit: $\times 10^6$ RP)

Year	Cost Disbursement for Loans (including interest)			Revenue	Profit	
	Foreign	Local	Total		Annual	Accumulated
2001	4739	5793	10532	15942	5410	5410
2002	4739	5793	10532	15942	5410	10820
2003	4739	5793	10532	15942	5410	16230
2004	4739	5793	10532	15942	5410	21640
2005	38518	5793	44311	15942	-28369	-6729
2006	4739	5793	10532	15942	5410	-2126
2007	4739	5793	10532	15942	5410	3028
2008	4739	5793	10532	15942	5410	8438
2009	4739	5793	10532	15942	5410	13848
2010	38518	5793	44311	15942	-28369	-14521
2011	4739	5793	10532	15942	5410	-10853
2012	4739	5793	10532	15942	5410	-6745
2013	4739	5793	10532	15942	5410	-2144
2014	4739	5793	10532	15942	5410	3008
2015	38518	5793	44311	15942	-28369	-25361
2016	4739	5793	10532	15942	5410	-22994
2017	4739	5793	10532	15942	5410	-20343
2018	4739	5793	10532	15942	5410	-17374
2019	4739	5793	10532	15942	5410	-14048
2020	38518	5793	44311	15942	-28369	-44102
2021	4739	5793	10532	15942	5410	-43984
2022	4739	5793	10532	15942	5410	-43852
2023	4739	5793	10532	15942	5410	-43704
2024	4739	5793	10532	15942	5410	-43538
2025	38518	5793	44311	15942	-28369	-77131
Total	287370	144825	432195	398550	—	—

Table D-15 Bus Repayment Program (Case 5)

(Unit: x10⁶Rp)

Year	Cost Disbursement for Loans (including interest)			Revenue	Profit	
	Foreign	Local	Total		Annual	Accumulated
1986	1122	1359	2471			
1987	1112	1359	2471	8463	5992	5992
1988	1112	1359	2471	9184	6713	12705
1989	1112	1359	2471	9912	7441	20146
1990	23381	3098	26479	10633	8162	28308
1991	2535	3098	5633	11361	-15118	13190
1992	2535	3098	5633	12082	6449	19639
1993	2535	3098	5633	12810	7177	26816
1994	2535	3098	5633	13531	7898	34714
1995	30710	4020	34730	14259	8626	43340
1996	3289	4020	7309	14980	-19750	23590
1997	3289	4020	7309	15701	8392	31982
1998	3289	4020	7309	16429	9120	41102
1999	3289	4020	7309	17150	9841	50943
2000	37632	4709	42341	17878	10569	61512
2001	3853	4709	8562	18599	-23742	37770
2002	3853	4709	8562	18599	10037	47807
2003	3853	4709	8562	18599	10037	57844
2004	3853	4709	8562	18599	10037	67881
2005	37632	4709	42341	18599	10037	77918
2006	3853	4709	8562	18599	-23742	54176
2007	3853	4709	8562	18599	10037	64213
2008	3853	4709	8562	18599	10037	74250
2009	3853	4709	8562	18599	10037	84287
2010	37632	4709	42341	18599	10037	94324
					-23742	70582
Total	225555	92825	318380	388962	---	---

Table D-16 Bus Repayment Program (Case 6)

(Unit: x 10⁶RP)

Year	Cost Disbursement for Loans (including interest)			Revenue	Profit	
	Foreign	Local	Total		Annual	Accumulated
2001	3853	4709	8562	18599	10037	10037
2002	3853	4709	8562	18599	10037	20074
2003	3853	4709	8562	18599	10037	30111
2004	3853	4709	8562	18599	10037	40148
2005	37632	4709	42341	18599	-23742	16406
2006	3853	4709	8562	18599	10037	26443
2007	3853	4709	8562	18599	10037	36480
2008	3853	4709	8562	18599	10037	46517
2009	3853	4709	8562	18599	10037	56554
2010	37632	4709	42341	18599	-23742	32812
2011	3853	4709	8562	18599	10037	42849
2012	3853	4709	8562	18599	10037	52886
2013	3853	4709	8562	18599	10037	62923
2014	3853	4709	8562	18599	10037	72960
2015	37632	4709	42341	18599	-23742	49218
2016	3853	4709	8562	18599	10037	59255
2017	3853	4709	8562	18599	10037	69292
2018	3853	4709	8562	18599	10037	79329
2019	3853	4709	8562	18599	10037	89366
2020	37632	4709	42341	18599	-23742	65624
2021	3853	4709	8562	18599	10037	75661
2022	3853	4709	8562	18599	10037	85698
2023	3853	4709	8562	18599	10037	95735
2024	3853	4709	8562	18599	10037	105772
2025	37632	4709	42341	18599	-23742	82030
Total	265220	117725	382945	464975	—	—

Table D-17 Bus Repayment Program (Case 7)

(Unit: $\times 10^6$ RP)

Year	Cost Disbursement for Loans (including interest)			Revenue	Profit	
	Foreign	Local	Total		Annual	Accumulated
1987	1007	1231	2238	6410	4172	8218
1988	1007	1231	2238	6535	4297	12515
1989	1007	1231	2238	6661	4423	16938
1990	12345	1375	13720	6787	-6933	10005
1991	1125	1375	2500	6808	4308	14313
1992	1125	1375	2500	6827	4327	18640
1993	1125	1375	2500	6848	4348	22988
1994	1125	1375	2500	6868	4368	27356
1995	12797	1425	14222	6888	-7334	20022
1996	1166	1425	2591	6977	4386	24408
1997	1166	1425	2591	7066	4475	28883
1998	1166	1425	2591	7155	4564	33447
1999	1166	1425	2591	7244	4653	38100
2000	13785	1535	15320	7333	-7987	30113
2001	1256	1535	2791	7333	4542	34655
2002	1256	1535	2791	7333	4542	39197
2003	1256	1535	2791	7333	4542	43739
2004	1256	1535	2791	7333	4542	48281
2005	13785	1535	15320	7333	-7987	40294
2006	1256	1535	2791	7333	4542	44836
2007	1256	1535	2791	7333	4542	49378
2008	1256	1535	2791	7333	4542	53920
2009	1256	1535	2791	7333	4542	58462
2010	13785	1535	15320	7333	-7987	50475
Total	89737	35809	125546	176021		

Table D-18 Bus Repayment Program (Case 8)

(Unit: x 10⁶Rp)

Year	Cost Disbursement for Loans (including interest)			Revenue	Profit	
	Foreign	Local	Total		Annual	Accumulated
2001	1256	1535	2791	7333	4542	4542
2002	1256	1535	2791	7333	4542	9084
2003	1256	1535	2791	7333	4542	13626
2004	1256	1535	2791	7333	4542	18168
2005	13785	1535	15320	7333	-7987	10181
2006	1256	1535	2791	7333	4542	14723
2007	1256	1535	2791	7333	4542	19265
2008	1256	1535	2791	7333	4542	23807
2009	1256	1535	2791	7333	4542	28349
2010	13785	1535	15320	7333	-7987	20362
2011	1256	1535	2791	7333	4542	24904
2012	1256	1535	2791	7333	4542	29446
2013	1256	1535	2791	7333	4542	33988
2014	1256	1535	2791	7333	4542	38530
2015	13785	1535	15320	7333	-7987	30543
2016	1256	1535	2791	7333	4542	35085
2017	1256	1535	2791	7333	4542	39627
2018	1256	1535	2791	7333	4542	44169
2019	1256	1535	2791	7333	4542	48711
2020	13785	1535	15320	7333	-7987	40724
2021	1256	1535	2791	7333	4542	45266
2022	1256	1535	2791	7333	4542	49808
2023	1256	1535	2791	7333	4542	54350
2024	1256	1535	2791	7333	4542	58892
2025	13785	1535	15320	7333	-7987	50905
Total	94045	38375	132420	183325	—	—

Table D-19 Bus Repayment Program (Case 9)

(Unit: $\times 10^6$ RP)

Year	Cost Disbursement for Loans (including interest)			Revenue	Profit	
	Foreign	Local	Total		Annual	Accumulated
1986	1238	1514	2752	6284	3532	3532
1987	1238	1514	2752	6410	3658	7190
1988	1238	1514	2752	6535	3783	10973
1989	1238	1514	2752	6661	3909	14882
1990	12604	1691	14295	6787	-7508	7374
1991	1384	1691	3075	6808	3733	11107
1992	1384	1691	3075	6827	3752	14859
1993	1384	1691	3075	6848	3773	18632
1994	1384	1691	3075	6868	3793	22425
1995	13065	1753	14818	6888	-7930	14495
1996	1434	1753	3187	6977	3790	18284
1997	1434	1753	3187	7066	3879	22164
1998	1434	1753	3187	7155	3968	26132
1999	1434	1753	3187	7244	4057	30189
2000	14074	1889	15963	7333	-8630	21559
2001	1545	1889	3434	7333	3899	25458
2002	1545	1889	3434	7333	3899	29357
2003	1545	1889	3434	7333	3899	33256
2004	1545	1889	3434	7333	3899	37155
2005	14074	1889	15963	7333	-8630	28525
2006	1545	1889	3434	7333	3899	32424
2007	1545	1889	3434	7333	3899	36323
2008	1545	1889	3434	7333	3899	40222
2009	1545	1889	3434	7333	3899	44121
2010	14074	1889	15963	7333	-8630	35491
Total	96475	44055	140530	176021		

Table D-20 Bus Repayment Program (Case 10)

(Unit: x10⁶RP)

Year	Cost Disbursement for Loans (including interest)			Revenue	Profit	
	Foreign	Local	Total		Annual	Accumulated
2001	1545	1889	3434	7333	3899	3899
2002	1545	1889	3434	7333	3899	7798
2003	1545	1889	3434	7333	3899	11697
2004	1545	1889	3434	7333	3899	15596
2005	14074	1889	15963	7333	-8630	6966
2006	1545	1889	3434	7333	3899	10865
2007	1545	1889	3434	7333	3899	14764
2008	1545	1889	3434	7333	3899	18663
2009	1545	1889	3434	7333	3899	22562
2010	14074	1889	15963	7333	-8630	13932
2011	1545	1889	3434	7333	3899	17831
2012	1545	1889	3434	7333	3899	21730
2013	1545	1889	3434	7333	3899	25629
2014	1545	1889	3434	7333	3899	29528
2015	14074	1889	15963	7333	-8630	20898
2016	1545	1889	3434	7333	3899	24797
2017	1545	1889	3434	7333	3899	28696
2018	1545	1889	3434	7333	3899	32595
2019	1545	1889	3434	7333	3899	36494
2020	14074	1889	15963	7333	-8630	27864
2021	1545	1889	3434	7333	3899	31763
2022	1545	1889	3434	7333	3899	35662
2023	1545	1889	3434	7333	3899	39561
2024	1545	1889	3434	7333	3899	43460
2025	14074	1889	15963	7333	-8630	34830
Total	101270	47225	148495	183325		

Fig. E-1 Traffic Accident Statistics Form in United Nations

INSTRUCTIONS FOR USE

The information in this form is required for research purposes and it must be given accurately. Information will be given by means of a "x" in the appropriate box.

"Designated road"

means any road classified in accordance with the Roads and Road Traffic Ordinance.

"Class of accident"

Accidents will be classified according to the worst personal injury sustained:

"serious injury" - fractures, concussions, internal injuries, crushings, severe cuts and lacerations, severe general shock requiring medical treatment and any other injury involving removal to and detention in hospital as an "in-patient."

"slight injury" - sprains, bruises, minor cuts and lacerations, mild shock if casualty exhibits clear symptoms or appears to need medical attention.

"damage only" - includes damage to vehicles involved and damage to property or injury to animals as defined in the Roads and Road Traffic Ordinance.

"Speed limit"

means the maximum permissible speed on the road and must not refer to the class of vehicle involved.

"Dusk"

means periods half an hour before sunrise and half an hour after sunset.

"Vehicle classification"

where a vehicle is not located after an accident it should be classified as "unknown" and no licence, drive etc. details need be given "type of casualty"

See injury classifications under "Class of accident" instructions.

"Pedestrians"

include children on scooters or roller skates or riding toy cycles on footpaths, persons pushing bicycles or hand-propelled vehicles, persons driving or leading animals, occupants of hand-propelled vehicles (e.g. rams etc.), vehicle drivers or passengers not actually in their vehicle at time, persons other than cyclists holding on to backs of vehicles.

"Pedal cyclists"

include children riding toy cycles on road or persons injured by falling from bicycles or who, having so fallen, are injured by passing vehicle.

Source: Manual on Traffic Surveys, United Nations 1971

TRAFFIC ACCIDENT STATISTICS FORM

DIVISION

STATION OR TRAFFIC SECTION

Formation Code No.

1	2
---	---

Register of Traffic Accidents
Serial No.

3	4	5	6	19
---	---	---	---	----

Date of Accident

day month year

7	8	9
---	---	---

Location of Accident

ALL ROADS

Location of Accident (Describe exactly quoting house/plot number in the case of urban roads and, in the case of rural roads, the mileage from a stated measuring point, e.g. the official mileage measuring point (marked HMP on the Roads Department's map) in the centre of a town, the town boundary or the junction of two designated roads, Quote milestone mileages wherever they exist).

.....

.....

.....

.....

DESIGNATED ROAD ONLY--In addition to the above give:--(See Instruction for Use on back of form).

Road Number (e.g. D166)

.....

Map Reference (Sheet and square No., e.g. 48/A1, using Roads Department map EMR 68/2 provided for the purpose).

.....

Position (Where the road extends on either side of the mileage measuring point, e.g. of a road junction, town boundary, etc., state whether the accident took place to the North, South, East, or West of it.)

.....

Road Section, Province and Road Class Code.

10	11	12	13	14
----	----	----	----	----

NOTES--(A brief report must be given of all accidents in which children under the age of 16 were killed or injured. Otherwise, report briefly on any unusual circumstances, and elaborate, where required, on statistical information.)

.....

.....

.....

For Force Headquarters Use Only REQUEST.

Checked Held at on

Roads Department Verdict

Carded

Primary Cause of Accident

15	16
----	----

Driver/Rider at fault
Indicate 1st, 2nd 3rd,
4th driver/rider.

17			
1st	2nd	3rd	4th

(continued)

COLLISION DETAILS

VEHICLE DAMAGE

Slight
 Serious

	18	19	20	21
	1st	2nd	3rd	4th
Y				
X				

MANOEUVRE OF VEHICLES PRIOR TO ACCIDENT

Going ahead NOT overtaking or passing
 Overtaking
 Passing
 Turning right
 Turning left
 Pulling out from side road
 Reversing
 Stationary--held up in traffic
 Stopping (not emergency)
 Parked

	18	19	20	21
0				
1				
2				
3				
4				
5				
6				
7				
8				
9				

VEHICLES, ETC., INVOLVED

Motor vehicle/motor vehicle
 Motor vehicle/cyclist
 Motor vehicle/animal
 Cyclist fell from machine
 Motor vehicle overturned in road
 Motor vehicle left road collided with tree, etc
 Motor vehicle/pedestrian

	22
1	
2	
3	
4	
5	
6	
7	

HIT AND RUN ACCIDENT

Vehicle located
 Vehicle not located
 Not applicable

	23
Y	
X	
0	

TYPE OF COLLISION

Front/rear
 Head-on collision
 Front/side collision
 Sideswipe collision
 Other (specify in notes)

1	
2	
3	
4	
5	

DAY, TIME AND LOCALITY

DAY OF WEEK

Public Holiday
 Sunday
 Monday
 Tuesday
 Wednesday
 Thursday
 Friday
 Saturday

	24
X	
1	
2	
3	
4	
5	
6	
7	

TIME

24 hour clock

25	26	27	28

NATURE OF LOCALITY

Residential
 Commercial/Industrial/Business area
 Open Road (urban area)
 Open Road (rural area)

	29
1	
2	
3	
4	

WEATHER AND ROAD CONDITIONS

LIGHT

Daylight
 Dusk
 Dark

	30
Y	
X	
0	

VISIBILITY

Clear
 Rain
 Fog--mist
 Affected by dust
 Affected by sun
 Affected by dazzle

1	
2	
3	
4	
5	
6	

AT OR WITHIN 20 YARDS OF A ROAD JUNCTION

Cross roads
 "T" junction
 "Y" junction
 Roundabout
 Junction private road
 Railway crossing
 Other (specify in notes)
 NOT at or within 20 yards of road junction

	31
1	
2	
3	
4	
5	
6	
7	
8	

CONDITION OF ROAD

Good repair
 Bad repair

	32
Y	
X	

TYPE OF ROAD

Dual carriageway
 2 lane tarmac
 1 lane tarmac
 Gravel/earth
 One way street
 Deviation
 Lay-by, service road, parking area, open space

1	
2	
3	
4	
5	
6	
7	

WEATHER AND ROAD CONDITIONS (CONT'D)

STATE OF ROAD SURFACE		33	
Dry	Y		
Wet	X		

CHARACTER OF ROAD			
Straight	1		
Curved	2		
Blind rise	3		

FOOTPATH, BUS-STOP		34	
No footpath	1		
Footpath both sides	2		
Footpath one side	3		
At authorised bus stop	4		
NOT at bus stop	5		

SPEED LIMIT (SEE INSTRUCTIONS)		35	
Derestricted	1		
60	2		
50	3		
40	4		
30	5		
Other (specify in notes).	6		

CASUALTY DETAILS

CLASS OF CASUALTY	36 37 38 39 40 41					
	1st	2nd	3rd	4th	5th	6th
Killed	Y					
Seriously injured	X					
Slightly injured	0					

CLASS OF ROAD USER							
Pedestrian	1						
Pedal cyclist	2						
Pedal cycle passenger	3						
Motor scooter/cycle driver	4						
Motor scooter/cycle passenger	5						
Motor vehicle driver	6						
Motor vehicle passenger	7						
Other (specify in notes)	8						

SEX OF CASUALTY		42 43 44 45 46 47					
Male	Y						
Female	X						

AGE OF CASUALTY							
Under 5 years	0						
5-9	1						
10-15	2						
16-20	3						
21-25	4						
26-30	5						
31-35	6						
36-40	7						
41-50	8						
Over 50	9						

ACTIONS OF PEDESTRIAN CASUALTIES

		48 49 50 51 52 53					
On footpath	0						
On refuge or centre island	1						
Crossing road	2						
Otherwise crossing	3						
Walking in road facing traffic	4						
Walking in road back to traffic	5						
Other or not known	6						

ACTIONS OF PASSENGER CASUALTIES

Travelling inside vehicle	7				
Travelling on vehicle	8				
Boarding vehicle	9				

SAFETY BELTS		54 55 56 57 58 59					
Worn	X						

VEHICLE OCCUPANCY OF CASUALTIES

1st vehicle	1				
2nd vehicle	2				
3rd vehicle	3				
4th vehicle	4				
Subsequent	5				

(Continued)

VEHICLE DETAILS

VEHICLE CLASSIFICATION

	60 61 62 63			
	1st	2nd	3rd	4th
Unknown vehicle	Y			
Towing trailer	X			
Private car/station wagon, vanette, land rover, etc.	0			
Motor scooter/motor cycle	1			
Goods vehicle under 8,000 lbs.	2			
Goods vehicle over 8,000 lbs.	3			
Motor omnibus	4			
Taxi-contract car	5			
Tractor/agricultural vehicle	6			
Pedal cycle	7			
Other vehicle, cart, carriage	8			
Railway engine, carriage	9			

CERTIFICATE OF FITNESS

No valid certificate

	64	65	66	67
X				

AGE OF VEHICLE

0-4

	64	65	66	67
1				
2				
3				
4				

5-8

Over 8

Not known

DRIVER'S DETAILS

Male

Female

	68	69	70	71
Y				
X				

AGE OF DRIVER

Under 16

16-20

21-25

26-30

31-35

36-40

41-50

Over 50

	68	69	70	71
1				
2				
3				
4				
5				
6				
7				
8				

DRIVER'S LICENCE DETAILS

Holds driving licence

Unlicensed

Holds prov. licence (accompanied)

Holds prov. licence (un-accompanied)

	72	73	74	75
1				
2				
3				
4				

PROSECUTIONS/ACQUITTALS

Acquitted of any offence below

Causing death by dangerous driving

Reckless/dangerous driving

Careless driving

Driving under influence

Disobeying traffic sign

Vehicle dangerous condition, defective brakes, etc.

Licensing/insurance offences

Failing to stop or report accident

Any other offence

	76	77	78	79
X				
1				
2				
3				
4				
5				
6				
7				
8				
9				

Fig. E-1 Traffic Accident Statistics Form

Fig. E-2 Traffic Accident Statistics Form in Japan

交通事故統計原票(本票)

070101 (0000000000)

02

01										02										03										04										05										06										07										08										09										10										11										12										13										14										15										16										17										18										19										20										21										22										23										24										25										26										27										28										29										30										31										32										33										34										35										36										37										38										39										40										41										42										43										44										45										46										47										48										49										50									
[Detailed grid of accident statistics data]																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			

- A. Basic information : Number of killed and/or wounded.
Place, type of accidents, etc.
- B. Conditions : Climate, topography, type of road, etc.
- C. Type of accidents : Type of vehicles, situation, etc.
- D. Characteristics of damages

Source: Traffic Survey Manual,
Takada and Kido, Kijima Shupan, 1976

Table F-1 Railway Improvement Cost in Medan Area
Case-5-B-3 (1986 - March 1989)

Item	Contents of Improvements, Construction & Procurement	Construction Cost (x10 ⁹ RD)			Total
		Foreign Currency	Local Currency		
			Const. Cost	Right of Way	
1) Medan Station	1 temporary platform; A part of D.C. Base of 90 cars in capacity	0.3	0.1	-	0.4
2) Eastern Line	1 new station	0.2	0.08	0.02	0.3
3) Western Line	2 new stations; Track reinforcement of a part of 20.9 km	0.3	0.17	0.03	0.5
		0.5	0.2	-	0.7
4) Southern Line	A part of Medan-Pancur Batu (19.3 km) and a part of Kampung Baru-Batu (9.8 km); 10 new stations	4.3	1.86	0.04	6.2
5) Northern Line	Partial double tracking (10.7 km) between Medan- Titipapan; Partial track reinforcement of 21.6 km	0.8	0.39	0.01	1.2
6) New Rolling Stock Base	Freight station; Freight yard of daily handling capacity of 300 cars; D.L. Base of 23 locos. in capacity	5.5	1.7	0.8	8.0
7) Detour Line	-	-	-	-	-
8) Short-Cut Line	-	-	-	-	-
9) Pulu Brayan Workshop	Workshop (900 m ²); Equipment for diesel rail- cars	0.4	0.2	-	0.6
10) Housing for PJKA Staff	-	-	-	-	-
Sub Total		12.3	4.7	0.9	17.9
11) Diesel Railcars	12 units	3.0	-	-	3.0
12) Electric Railcars	-	-	-	-	-
Sub Total		3.0	-	-	3.0
Total		15.3	4.7	0.9	20.9

Note: D.C.: Diesel Railcars; D.L.: Diesel Locomotives; E.C.: Electric Railcars

Table F-2

Railway Improvement Cost in Medan Area
Case-5-B-3 (April 1989 - March 1994)

Item	Contents of Improvements, Construction & Procurement	Construction Cost (x10 ⁹ Rp)			
		Foreign Currency	Local Currency Const. Cost	Right of Way	Total
1) Medan Station	Rest of D.C. Base of 90 cars in capacity	1.2	0.5	-	1.7
2) Eastern Line	Track reinforcement of a part of 20.1 km	2.4	1.1	-	3.5
3) Western Line	Partial Track reinforcement of remaining of 20.9 km	2.7	1.1	-	3.8
4) Southern Line	Rest of Medan-Pancur Batu (19.3 km) and rest of Kampung Baru-Batu (9.8 km)	2.9	1.3	-	4.2
5) Northern Line	Rest of double tracking of Medan-Titipapan (10.7 km);	4.4	2.0	-	6.4
	Rest of track reinforcement of 21.6 km	3.2	1.4	-	4.6
6) New Rolling Stock Base	D.C. Base of 100 cars in capacity; Expansion of D.L. Base for additional 8 locos; Expansion of freight yard for additional 100 cars in capacity.	3.7	1.7	-	5.4
7) Detour Line	Part of freight detour line of 17.3 km	9.8	3.7	0.7	14.2
8) Short-Cut Line	A part of short-cut line of 2.4 km	0.7	0.2	0.2	1.1
9) Pulu Brayan Workshop	Additional equipment for diesel railcars	0.3	0.2	-	0.5
10) PJKA Housing	-	-	-	-	-
Sub Total		31.3	13.2	0.9	45.4
11) Diesel Railcars	55 units	13.8	-	-	13.8
12) Electric Railcars	-	-	-	-	-
Sub Total		13.8	-	-	13.8
Total		45.1	13.2	0.9	59.2

Note: D.C.: Diesel Railcars; D.L.: Diesel Locomotives; E.C.: Electric Railcars

Table F-3 Railway Improvement Cost in Medan Area
Case-5-B-3 (April 1994 - March 1999)

Item	Contents of improvements, Construction & Procurement	Construction Cost (x10 ⁹ Rp)			Total
		Foreign Currency	Local Currency Const. Cost	Right of Way	
1) Medan Station	Track elevation including 4 tracks and 2 platforms	15.9	7.0	0.3	23.2
2) Eastern Line	Track reinforcement of remaining part of 20.1 km	0.4	0.2	-	0.6
3) Western Line	-	-	-	-	-
4) Southern Line	Double tracking of 14.8 km (Kampung Baru-Pancur Batu)	6.7	3.0	-	9.7
5) Northern Line	Double tracking of 14.8 km (Titipapan-Ujung Baru);	8.5	3.9	-	12.4
	Electrification of 21.6 km	6.8	3.0	-	9.8
6) New Rolling Stock Base	Rest of freight yard expansion of 100 cars in capacity;	6.0	2.5	-	8.5
	Expansion of freight yard for 200 cars in capacity; Expansion of D.C. Base for additional 58 cars; Partial remodelling of D.C. Base into E.C. Base.	0.3	0.2	-	0.5
7) Detour Line	Rest of 17.3 km	2.8	1.2	-	4.0
8) Short-Cut Line	Rest of 2.4 km	0.8	0.3	-	1.1
9) Pulu Brayan Workshop	Replacement of D.C. equipment with E.C. equipment	0.1	-	-	0.1
10) PJKA Housing	Procurement of land; Part of 600 units of Housing	0.9	8.6	0.3	9.8
Sub Total		49.2	29.9	0.6	79.7
11) Diesel Railcars	71 units	17.7	-	-	17.7
12) Electric Railcars	-	-	-	-	-
Sub Total		17.7	-	-	17.7
Total		66.9	29.9	0.6	97.4

Note: D.C.: Diesel Railcars; D.L.: Diesel Locomotives; E.C.: Electric Railcars

Table F-4 Railway Improvement Cost in Medan Area
Case-5-B-3 (April 1999 - 2000)

Item	Contents of Improvements, Construction & Procurement	Construction Cost (x10 ⁹ Rp)			Total
		Foreign Currency	Local Currency Const. Cost	Right of Way	
1) Medan Station	-	-	-	-	-
2) Eastern Line	Electrification of 20.1 km of line	3.2	1.4	-	4.6
3) Western Line	Electrification of 20.9 km of line	3.3	1.5	-	4.8
4) Southern Line	Double tracking of 14.8 km (Kampung Baru-Pancur Batu);	1.3	0.6	-	1.9
	Electrification of 29.2 km	7.6	3.4	-	11.0
5) Northern Line	-	-	-	-	-
6) New Rolling Stock Base	Remodelling of D.C. Base of 158 cars in capacity into E.C. Base of same capacity	0.7	0.3	-	1.0
7) Detour Line	-	-	-	-	-
8) Short-Cut Line	-	-	-	-	-
9) Pulu Brayan Workshop	-	-	-	-	-
10) PJKA Housing	Rest of 600 units housing	0.3	2.7	-	3.0
Sub Total		16.4	9.9	-	26.3
11) Diesel Railcars	-	-	-	-	-
12) Electric Railcars	158 units	26.9	-	-	26.9
Sub Total		26.9	-	-	26.9
Total		43.3	9.9	-	53.2

Note: D.C.: Diesel Railcars; D.L.: Diesel Locomotives; E.C. Electric Railcars

Table 6.1.6. Summary of Table of Construction Cost in Medan Area Case 5-8-3

Unit: 10⁹ Rp.

Item	1986 - Mar. 1989			Apr. 1989 - Mar. 1994			Apr. 1994 - Mar. 1999			Apr. 1999 - 2000			Total		
	Prgr. Cury.	Local Cury.	Total	Prgr. Cury.	Local Cury.	Total	Prgr. Cury.	Local Cury.	Total	Prgr. Cury.	Local Cury.	Total	Prgr. Cury.	Local Cury.	All Total
1) Medan Sta.	0.3	0.1	0.4	1.2	0.5	1.7	15.9	7.3	23.2	-	-	-	17.4	7.9	25.3
2) East. Line	0.2	0.1	0.3	2.4	1.1	3.5	0.4	0.2	0.6	3.2	1.4	4.6	6.2	2.8	9.0
3) West. Line	0.8	0.4	1.2	2.7	1.1	3.8	-	-	-	3.3	1.5	4.8	6.8	3.0	9.8
4) South. Line	4.3	1.9	6.2	2.9	1.3	4.2	6.7	3.0	9.7	8.9	4.0	12.9	22.8	10.2	33.0
5) North. Line	0.8	0.4	1.2	7.6	3.4	11.0	15.3	6.9	22.2	-	-	-	23.7	10.7	34.4
6) New Rolling Stock Base	5.5	2.5	8.0	3.7	1.7	5.4	6.3	2.7	9.0	0.7	0.3	1.0	16.2	7.2	23.4
7) Detour Line	-	-	-	9.8	4.4	14.2	2.8	1.2	4.0	-	-	-	12.6	5.6	18.2
8) Short-Cut Line	-	-	-	0.7	0.4	1.1	0.8	0.3	1.1	-	-	-	1.5	0.7	2.2
9) Pulu Brayan Workshop	0.4	0.2	0.6	0.3	0.2	0.5	0.1	-	0.1	-	-	-	0.8	0.4	1.2
10) Housing for PUSA Staff	-	-	-	-	-	-	0.9	8.9	9.8	0.3	2.7	3.0	-	-	12.8
Sub-Total	12.3	5.6	17.9	31.3	14.1	45.4	49.2	30.5	79.7	16.4	9.9	26.3	109.2	60.1	169.3
11) D.C.	3.0	-	3.0	13.8	-	13.8	17.7	-	17.7	-	-	-	34.5	-	34.5
12) E.C.	-	-	-	-	-	-	-	-	-	26.9	-	26.9	-	-	26.9
Sub-Total	3.0	-	3.0	13.8	-	13.8	17.7	-	17.7	26.9	-	26.9	61.4	-	61.4
Total	15.3	5.6	20.9	45.1	14.1	59.2	66.9	30.5	97.4	43.3	9.9	53.2	170.6	60.1	230.7
Main Construction	1 Temporary Platform N.L. Track Reinforced Rehabilitation of S.L. New Rolling Stock Base			E.L. and W.L. Track Reinforced N.L. Track Reinforced and Track Doubling Rehabilitation of S.L. New Rolling Stock Base Detour Line Short-Cut Line			Elevation of Medan Sta. S.L. and N.L. Track Doubling N.L. Electrification New Rolling Stock Base Detour Line E.C. Repairing Facilities			E.L., W.L. and S.L. Electrification Housing					

Table P-6

Summary of Road Improvement Plan in 1986 - March 1989 within Pelita IV

		Improvement Contents	Investment Cost Rpx10 ⁶
Tollway		Sub Total	0
Arterial Road	1) Railway Flyover 7 locs.	1) North line 1 loc. Intermediate Ring Road 1 2) South line 4 locs. Intermediate Ring Road 1 Jl.Pancur Batu 3 3) West line 2 locs. Intermediate Ring Road 1 Jl.Sudarso 1	
	1) Improvement Road Length km 28.1 6-lane 5.7 km 4-lane 22.4 km 2) Road Flyover 1 loc.	1) Intermediate Ring Road Northern Part 4.7 km 4-lane/6-lane 2) Intermediate Ring Road Southern Part 4.9 km 4-lane 3) Jl. Pancur Batu 12.6 km 4-lane 4) Intermediate Ring Road Western Part 1.7 km 4-lane 5) Jl. Katamso - Jl. Sudarso 4.2 km 6-lane	18,052 15,399 12,217 3,273 11,511
		Sub Total	60,452
Road Related Facilities		1) Truck Terminal & Warehouse (Ta 15 ha) (Tb 1.8 ha) 2) Public Parking 63,600 m ² 3) Bus Terminal 9,600 m ²	6,904 1,455 440
		Sub Total	8,799
		Total	69,251

Table F-7

Summary of Road Improvement Plan in April 1989 - March 1994 (Pelita V)

		Improvement Contents		Investment Cost Rpx10 ⁶
Tollway		1) Binjei Bypass 24 km 4-lane		32,808
		Sub Total		32,808
Arterial Road	1) Railway Flyover 2 locs. Jl. Deli Tua 1 Intermediate Ring Road 1	1) Jl. Belawan 8.4 km 4-lane	6,181	
		2) Jl. Percut 3.9 km 4-lane	1,740	
		3) Jl. Denai 3.5 km 4-lane	3,149	
		4) Jl. Tg. Morawa 9.0 km 4-lane	7,039	
	2) Improvement Road Length 81.1 km 4-lane 68.6 km 2-lane 12.5 km	5) Jl. Deli Tua 6.2 km 4-lane	4,942	
		6) Jl. Binjei 6.7 km 4-lane	5,717	
		7) Jl. Pembalagian 4.0 km 4-lane	1,085	
		8) Jl. Yamin 1.7 km 4-lane	2,375	
	3) Road Flyover 3 locs.	9) Frontage Road along Belawan-Medan-Tg.Morawa Tollway 7.0 km 2-lane	2,497	
		10) Intermediate Ring Road Eastern Part 3.6 km 4-lane	12,710	
		11) Intermediate Ring Road Western Part 2.1 km 4-lane	6,219	
		12) Binjei Bypass Western Access Road 5.5 km 4-lane	3,484	
		13) Frontage Road along Binjei Bypass 3.0 km 2-lane	2,713	
		Sub Total		59,851
Road Related Facilities		1) Truck Terminal & Warehouse (Ta 32.8 ha) (Tb 1.6 ha)	13,924	
		2) Public Parking 175,600 m ²	4,016	
		3) Bus Terminal 12,900 m ²	676	
		Sub Total		18,616
		Total		111,275

Table F-8

Summary of Road Improvement Plan in April 1994 - March 1999 (Pelita VI)

		Improvement Contents		Investment Cost Rpx10 ⁶
Tollway		1) Outer Ring Road	20 km 4-lane	27,340
		Sub Total		27,340
Arterial Road	1) Railway Flyover 1 loc.	1) Jl. Belawan	14 km 4-lane	6,641
	2) Improvement Road Length 53 km 6-lane 4.2 km 4-lane 38.8 km 2-lane 10.0 km	2) Jl. Gatot Subroto - Jl. Yamin	3.7 km 4-lane	13,349
		3) Jl. Cajah Mada - Jl. Haryono	5.4 km 4-lane	9,728
	3) Road Flyover 1 loc.	4) Jl. Singamangaraja - Jl. Gaharu	4.2 km 6-lane	8,926
		5) Jl. Sutomo	3.0 km 4-lane	6,562
		6) Jl. Veteran - Jl. Yani VII	1.3 km 4-lane	1,747
		7) Jl. Sudirman - Jl. Asia	3.2 km 4-lane	3,082
		8) Jl. Kapten Mauland Lubis - Jl. Raden Saleh	1.2 km 2-lane	1,571
		9) Jl. Sutrisno	2.2 km 4-lane	2,979
		10) Outer Ring Road South-Western Access Road	2.4 km 4-lane	1,420
		11) Northern Access Road to Intermediate Ring Road	2.4 km 4-lane	1,791
		12) Frontage Road along Outer Ring Road	10.0 km 2-lane	3,674
			Sub Total	
Road Related Facilities		1) Truck Terminal Warehouse	(Ta 37.4 ha.) (Tb 0.7 ha.)	15,311
		2) Public Parking	271,800 m ²	6,217
		3) Bus Terminal	13,500 m ²	799
		Sub Total		22,327
		Total		111,137

Table F-9

Summary of Road Improvement Plan in April 1999-2000 within Pelita VII

		Improvement Contents		Investment Cost Rpx10 ⁶
Tollway		Sub Total		0
Arterial Road	1) Railway Flyover 1 loc.	1) Jl. Thamrin	2 km 6-lane	7,313
	2) Improvement Road Length 17.9 km 6-lane 2 km 4-lane 15.9	2) Jl. Patimura - Jl. S. Parman	2.6 km 4-lane	2,229
		3) Jl. Bakti - Gang Bahagia	1 km 4-lane	986
		4) Jl. Olahraga - Gang Turi	3.8 km 4-lane	2,637
		5) Jl. Kapten Muslin	7.4 km 4-lane	7,216
		6) Jl. Bakaran - Jl. Halat Connection Road	1.1 km 4-lane	1,895
		Sub Total		22,276
Road Related Facilities		1) Truck Terminal & Warehouse (Ta 148 ha.) (Tb 0.3 ha.)		6,065
		2) Public Parking	122,000 m ²	2,790
		3) Bus Terminal	6,120 m ²	363
		Sub Total		9,218
		Total		31,494

Table F-10 Summary of Investment Costs for Long Term Improvement

Rp x 10⁹

	Pelita IV			Pelita V			Pelita VI			Pelita VII			Grand Total
	1986 - Mar. 1989			Apr. 1989 - Mar. 1994			Apr. 1994 - Mar. 1999			Apr. 1999 - 2000			
	Frgn.	Local	Total	Frgn.	Local	Total	Frgn.	Local	Total	Frgn.	Local	Total	
1. Construction Cost													
a. Railway													
1) Medan Station & Elevated Railway	0.3	0.1	0.4	1.2	0.5	1.7	15.9	7.3	23.2	0	0	0	25.3
2) Railway Network	6.1	2.8	8.9	26.1	11.7	37.8	26.0	11.6	37.6	15.4	6.9	22.3	106.6
3) Related Facilities	5.9	2.7	8.6	4.0	1.9	5.9	7.3	11.6	18.9	1.0	3.0	4.0	37.4
Sub-Total	12.3	5.6	17.9	31.3	14.1	45.4	49.2	30.5	79.7	16.4	9.9	26.3	169.3
b. Road													
1) Tollway Network	0	0	0	14.4	18.4	32.8	11.0	16.3	27.3	0	0	0	60.1
2) Arterial Road Network	31.6	28.8	60.4	30.8	29.1	59.9	29.1	32.3	61.4	10.1	12.2	22.3	204.0
3) Related Facilities	3.8	5.0	8.8	7.9	10.7	18.6	9.1	13.3	22.4	3.7	5.5	9.2	59.0
Sub-Total	35.4	33.8	69.2	53.1	58.2	111.3	49.2	61.9	111.1	23.8	17.7	31.5	323.1
Total	47.7	39.4	87.1	84.4	72.3	156.7	98.4	92.4	190.8	30.2	27.6	57.8	492.4
2. Rolling Stocks													
1) Railway Car	3.0	0	3.0	13.8	0	13.8	17.7	0	17.7	26.9	0	26.9	61.4
2) Bus	21.4	0	21.4	40.4	0	40.4	48.3	0	48.3	20.6	0	20.6	130.7
Total	24.4	0	24.4	54.2	0	54.2	66.0	0	66.0	47.5	0	47.5	192.1
Grand Total	72.1	39.4	111.5	133.6	72.3	210.9	164.4	92.4	256.8	77.7	27.6	205.3	684.5
	Maintenance & Operating Cost Rp x 10 ⁶			Maintenance & Operating Cost Rp x 10 ⁶			Maintenance & Operating Cost Rp x 10 ⁶			Maintenance & Operating Cost Rp x 10 ⁶			Grand Total Rp x 10 ⁹
	Frgn.	Local	Total	Frgn.	Local	Total	Frgn.	Local	Total	Frgn.	Local	Total	
1. Maintenance Cost													
1) Railway Network	-	-	-	-	-	-	-	-	-	-	-	-	-
2) Tollway Network	0	0	0	0	1,523	1,523	0	2,753	2,753	0	1,835	1,835	6,111
3) Arterial Road Network	0	1,780	1,780	0	6,198	6,198	0	11,239	11,239	0	5,266	5,266	24,483
Sub-Total	0	1,780	1,780	0	7,721	7,721	0	13,992	13,992	0	7,101	7,101	30,594
2. Operating Cost													
1) Railway System	476	1,079	1,555	1,395	3,816	5,212	1,834	8,706	10,540	744	4,427	5,271	22,478
2) Bus System	5,490	6,710	12,200	15,832	19,351	35,183	22,462	27,452	49,914	9,565	11,690	21,254	118,551
Sub-Total	5,966	7,789	13,755	17,228	23,167	40,395	24,296	36,158	60,454	10,308	16,117	26,425	141,029
Total	5,966	9,569	15,535	17,228	30,888	48,116	24,296	50,150	74,446	10,308	23,218	33,526	171,623

The relationship among tariff, number of passengers and revenue in the case of bus transport in Medan Area is evaluated as follow:

$$R = T \times P$$

where,

R : Revenue

T : Tariff

P : Number of passengers

In this Appendix it is evaluated on how much the total revenue of bus will be affected when the tariff is lowered from the proposed tariff of 60 Rp. per passenger per ride down to proposed for the year 2000 A.D. down to 50 Rp/passenger/ride.

1.1 Basic Conditions for Evaluation

Average trip length	8.0 Km
Average running speed of bus	30 Km/hour
Average running speed of sedan	40 Km/hour
Time value of bus passenger	2.0 Rp./minute/passenger

1.2 Elasticity

According to Fig. 4.1.4 'Modal Split Curve for Public Transport' in the report, the share of bus transport is calculated as 35% in the case of 60 Rp./ride of tariff although the share of 31.9% is obtained in the case of the low motorization, the difference being due to the methodological gap between two procedures.

When the bus tariff is lowered from 60 Rp./ride down to 50 Rp./ride the difference of 10 Rp. is equivalent to 5 minutes running time of bus and the share of bus transport is increased by 14.2% due to the discount of 10 Rp. from 60 Rp.

On the other hand, the discount of 10 Rp. means 16.7% of 60 Rp. and the total revenue of bus transport is calculated as follow:

$$R = 1.142 \times (1.0 - 0.167) \times T \times P = 0.951 T \times P$$

According to this calculation when if the tariff is lowered from 60 Rp./ride/passenger down to 50 Rp./ride/passenger, then the total revenue will decrease by 4.9% from the former case. This means that if the tariff is raised the more the revenue will increase from the viewpoint of elasticity between the tariff and revenue and the number of passengers in Medan City.

However, it is noteworthy that some other view seems to be necessary in order to discuss the optimum tariff system of bus transport as a part of the public transport system, and the tariff of bus transport should be determined taking into account those of other public transport modes in Medan Area.

APPENDIX-H**GLOSSARY OF TERMS & ABBREVIATIONS**

AASHO	:	American Association of State Highway Officials
A.D.	:	Anno Domini (Latin). In the Year of Our Lord
ADB	:	Asian Development Bank
ADT	:	Average Daily Traffic
APB	:	Administrator Pelabuhan Belawan Belawan Port Authority
Area Coordinated Signal System	:	A traffic control system to utilize a wide-area road network most effectively for traffic demand, varying hourly by route as well as by zone. In this system a group of individual traffic signal installations at all intersections in the said area are mutually-related through an electronic computer. Another name is Area Full-Traffic Actuated Control System.
BAPPENAS	:	National Planning Board of Indonesia
BAPPEDA - SU	:	Planning Board of Province of North Sumatra
B/C	:	Benefit/Cost Ratio
BCEOM	:	Bureau Central par des Equipement d'Outre-Mer. French Consulting Firm which is conducting North Sumatra Transport Study Project'
Becak	:	Three-wheeled pedalled bicycle carrying a passenger or commodities in an attached side-car.
Becak-Mesin	:	Three-wheeled motorized bicycle carrying one or two passengers in an attached side-car
Bemo	:	Three-wheeled small bus capable of carrying 6 - 9 passengers plus a driver
Bina Marga	:	Directorate General of Highways, Ministry of Public Works
CBD	:	Central Business District
c.c.	:	Cubic Centimeter
Central Core District	:	The area covering zones #1 - #8 and 14 - 15, which is the most intensely populated area in the City and is smaller than that of the so-called CBD
Centroid Connector	:	An imaginary link connecting the zone centroid to the network. In case of a road network, such a link would represent the access or local roads.
CIF	:	Cost, Insurance & Freight. Terms of sale of commodities including transport to foreign port. Seller assumes freight charges etc. to foreign port.
CIPTA KARYA	:	Directorate General of Housing Building Planning and Urban & Regional Development, Ministry of Public Works

Cordon Line	:	An imaginary line which completely encloses a given area and at which traffic counts and interviews are taken for control purposes
CBR	:	California Bearing Ratio. Unit to be used to express bearing power of soils
Daihatsu	:	Micro-bus converted from pick-up truck carrying 8 - 11 passengers plus a driver. Oplet is its another name.
DACREA	:	Indonesian Consultants Firm participating in MUDS
DAMRI	:	P.N. DAMRI State-Owned Bus Company of Indonesia
DLIAJR-SU	:	Dinas Lalu Lintas Dan Angkutan Jaya Raya Provinsi Daerah Tk. I. Sumatera Utara Office of Road Transport, Province of North Sumatra
DME	:	Distance Measuring Equipment Radar for Aircraft for the use at airport
DKI Jakarta	:	Daerah Khusus Ibukota Jakarta Area of the Capital Jakarta, also Province of Jakarta
DPUP-SU	:	Dinas Pekerjaan Umum Propinsi Sumatera Utara Public Works Office, Province of North Sumatra
DPU-Tk. II Medan	:	Dinas Pekerjaan Umum Tingkat II, Medan Public Works Office, Medan Municipal Government
DWT	:	Dead Weight (Tonnage). Maximum carrying capacity of ship including fuel, stores etc.
Engineering Science	:	American Consulting Firm conducting Medan Urban Development, Housing, Water Supply and Sanitation Project as the prime consultant of a Joint Venture with Sinotech
Exterior Study Area	:	Surrounding areas of Medan City to be covered in a radius of about 20 km from the center of the CBD. It contains zones #58 - #69.
F.C.	:	Foreign Currency Portion
FOB	:	Free on Board. Exporter/Shipper responsible for loading costs of commodities onto ship
GDP	:	Gross Domestic Products
GH	:	Green hour of traffic signal indication
GRDP	:	Gross Regional Domestic Products
ha	:	Hectare or 10,000 m ² in area
HCM	:	Highway Capacity Manual
H.P.	:	Horse Power
IBRD	:	International Bank of Reconstruction and Development
Internal Study Area	:	The city area of Medan inside of the city boundaries before 1973, covering 4 Kecamatan which include zones #1 - #46.

Intermediate Study Area	:	The area between the boundary of the Internal Study Area and that of the present city boundary, covering zones #47 - #57.
I.R.R.	:	Internal Rate of Return
Jl.	:	Jalan; Street
JICA	:	Japan International Cooperation Agency
JTC	:	Japan Transportation Consultants Company, Tokyo
Kab.	:	Kabupaten. Regency Province of North Sumatra is divided into 3 Kotamadyas and 14 Kabupatens.
Kp.	:	Kampung. Kabupatens are further divided into the smallest administrative unit of Kampung.
Kecamatan	:	Kabupaten and Kotamadya are divided into Kecamatan. For example, Kot. Medan is divided into 11 Kecamatan.
KIP	:	Kampung Improvement Programme
Kot.	:	Kotamadya. Administrative unit of Urbanized area, such as city and town.
Kot. Medan	:	Office of Medan Municipal Government
KPH	:	Kilometer per hour. Unit to express speeds.
L.C.	:	Local Currency Portion
LCN	:	Load Classification Number System for airport pavement
Legibility	:	Traffic sign's legibility consists of two qualities; pause legibility and glance legibility. The former is the distance at which a traffic sign can be read in an unlimited time, while the latter is the distance at which a traffic sign can be read at a glance (usually 0.5 to 1.4 sec. with a glance area in a 3-deg. cone, which is a cone of approximately 1.25 diameter at 25 m distance).
LI	:	Liquid Index
Link	:	An element in a network which connects two nodes
Modal Split	:	The proportions of trips using various modes of transport
MPH	:	High Level of Motorization
MPL	:	Low Level of Motorization
MUDS	:	Medan Urban Development Study
O - D	:	Origin - Destination
Offset	:	The number of seconds or percent of the time cycle that the green indication of traffic signal appears at a given control signal after a certain instant used as a reference.

Outer Study Area	:	The area includes Kab. D. Serdang, Kab. Langkat and Kot. T. Tinggi, covering zones #67 - #69.
PADCO	:	Indonesian Consultant Firm Participating in MUDS.
Pasar	:	Market Place
P. Batu	:	Pancur Batu, a small town situating south-west of Medan City in a distance of about 17 km from the center of Medan City and the end of P. Batu Line of the railway which is not in use presently.
PC	:	Pre-stressed concrete
PCI	:	Pacific Consultants International, Tokyo
PCU	:	Passenger Car Unit to express traffic volume
Pelita III	:	The Third 5-Year Development Plan
PHBD	:	Direktorat Jenderal Perhubungan Darat Directorate General of Land Transport and Inland Waterways
PJKA	:	Perusahaan Jawatan Kereta Api Indonesian State Railway
PJKA-ESU	:	Indonesian State Railway North Sumatra Regional Office
PERTAMINA	:	Indonesian State-Owned Company of Petroleum
PERMUNAS	:	Indonesian National Urban Housing Board
PLN	:	Indonesian National Electricity Company
Priority Value	:	Quality which results in a traffic sign being consistently read first in preference to all other traffic signs in a group
R 2 Rail	:	European Rail standard having 25 kg/m in weight and capable of 9 tons of axle loading.
R 14 Rail	:	European rail standard having 50 kg/m in weight and capable of 18 tons of axle loading.
RBO - II	:	Regional Betterment Office - Region II, Bina Marga
RC	:	Reinforced concrete
Recognition	:	Recognition of a traffic sign is achieved by a combination of standardization (including size, shape, color) and overall design.
Route Coordinated Signal System	:	Progressive Signal System. A signal system consist of two or more individual signal installations operated in coordination, i.e., having a fixed time-relationship to each other. To maintain such a fixed time-relationship, the total cycle length at all installations normally must be equal. In unusual cases, one installation might operate at double or half the cycle length of the system or, in the case of an actuated signal with a variable cycle, only its start of one phase is in a fixed-time relationship with other instalations.

Rp	:	Rupiah
Rp x 10 ³	:	Million Rupiahs
Rp x 10 ⁶	:	Billion Rupiahs
Running Speed	:	The speed of traffic between intersections, excluding intersection delay
SAUTI	:	Italian Consulting Firm which conducted the feasibility study of Medan - Padang Highway Project and also that of Belawan - Medan - T. Morawa Highway
Screen Line	:	An imaginary line drawn across part of a study area. The total number of movements of any particular type observed crossing the screen line is compared with the estimated present-day volumes obtained from the traffic model, and the comparison used to assess the ability of the traffic model to forecast the present-day patterns of movement.
SD	:	Primary School
SINOTECH	:	Taiwanese Consulting Firm participating in MUDS as a member of a Joint Venture with Engineering Science
SLP	:	Secondary School, Junior High School
SLA	:	Senior High School
Study Area	:	The area including 4 administrative areas of Medan City, Kot. T. Tinggi, Kot. Binjai, Kab. D. Serdang and Kab. Langkat. The area is also divided into Internal Study Area, Intermediate Study Area, Exterior Study Area and Outer Study Area for study purpose. The total of those study areas excluding Outer Study Area is covered in an circular area of a radius of 20 km from the center of Medan City.
Target Value	:	Characteristic that makes a traffic sign as a group of traffic signs stand out from the background and surrounding objects.
Tk. II	:	Tingkat II The Second Stage
T. Morawa	:	Tanjung Morawa, a town in Kab Deli Serdang, situat- ing immediately outside of the city border of Medan's south-east corner. at a distance of 16 km from the center of Medan City.
T. Tinggi	:	Tebing Tinggi, a town in Kab. Deli Serdang, situating in the south-east direction of Medan City at a distance of 79 km from the center of Medan.
Traffic zones	:	A basic unit for travel analysis, drawn up on the basis of the transport system, major barriers to traffic flow and land-use characteristics.

Transport model	:	The series of models including the trip end model, distribution model, modal split model and assignment model
Travel Speed	:	The speed of traffic including running speeds and intersection delay
Trip ends	:	The origin or destination of a trip
Trip Matrix	:	An arrangement of values in the form of a table for transport planning, the values often arranged are intrazonal and interzonal trips in the form of a trip matrix
Through Band	:	The time in seconds elapsed between the passing of the first and the last possible vehicle in a group of vehicles moving in accordance with the designed speed of a route coordinated signal system.
U-Ditch	:	U-shaped concrete ditch
UNDP	:	United Nations Development Programme
US-AID	:	United States Agency for International Development
Walikotamadya	:	Mayor's Office
Weight Bridge	:	Scaling Station to weight truck weight together with pay loads. The station is operated by DLI AJR.
Wilajah	:	District. Province of North Sumatra is divided into Wilajah I, Wilajah II and Wilajah III. Wilajah I consists of Kab. Langkat, Kab. Deli Serdang, Kab. Bedagei, Kab. Karo, Kab. Dairi
Zone centroid	:	A point which represents a traffic zone for the purposes of traffic analysis.

APPENDIX-I

Currency Equivalents

Rp. 625 = US\$ 1.00 = ¥240

In all figures, decimal is indicated with a dot; and thousand, million and billion are marked off with comma.

Fiscal Year

April 1

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March 31

APPENDIX-J

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