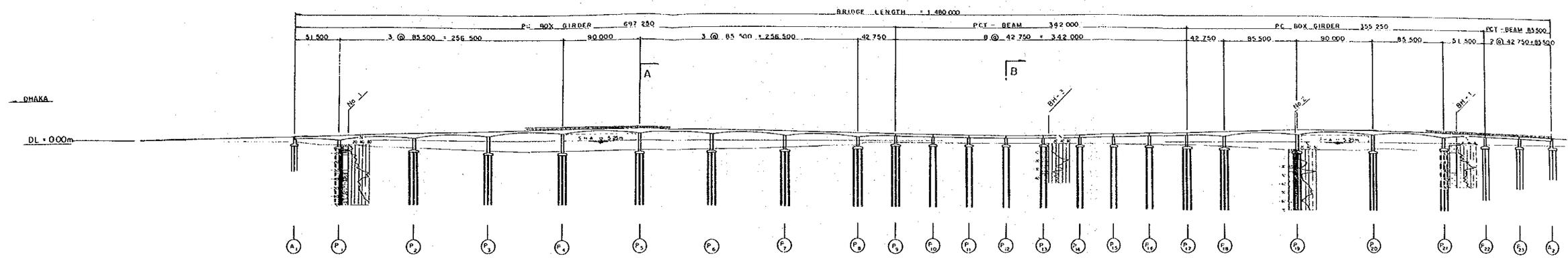
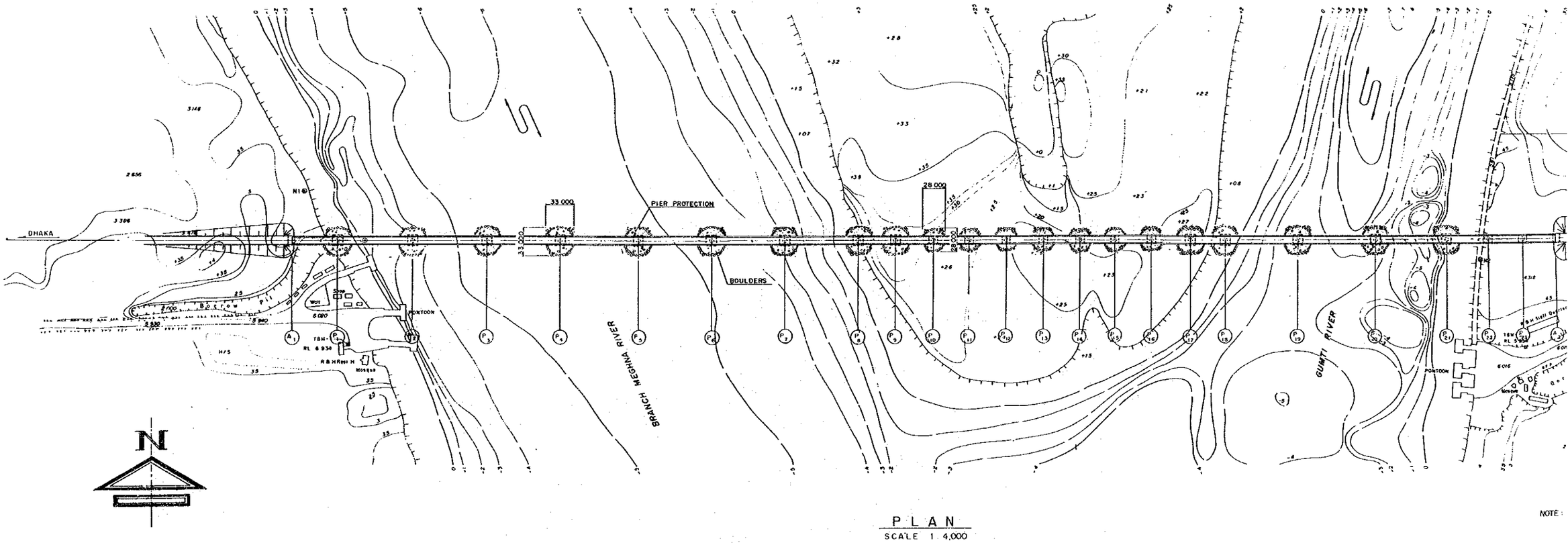


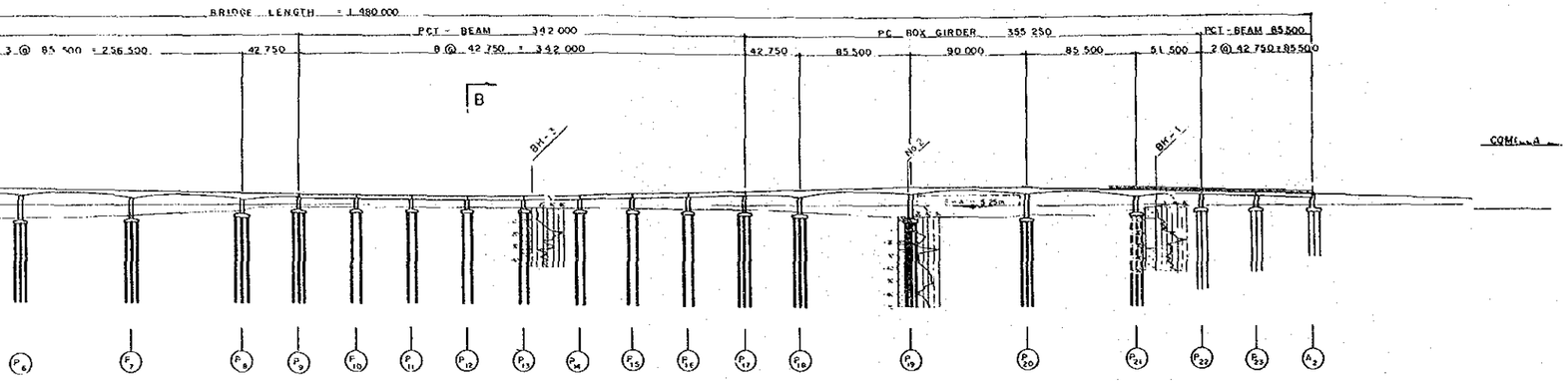
PROFILE
SCALE 1 4,000



PLAN
SCALE 1 4,000

NOTE :

GENERAL VIEW
ALTERNATIVE CASE- C



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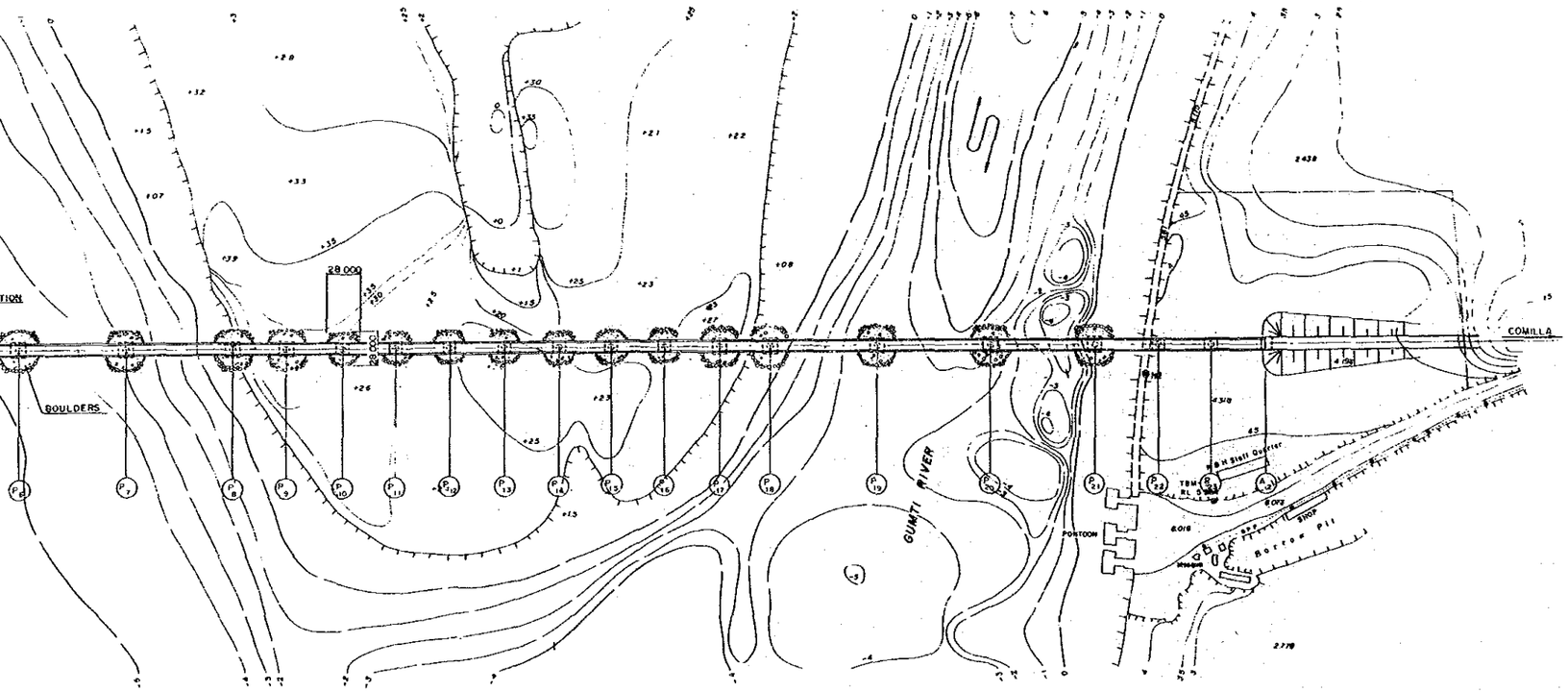
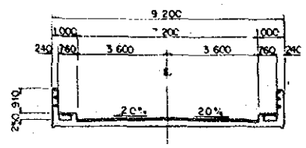
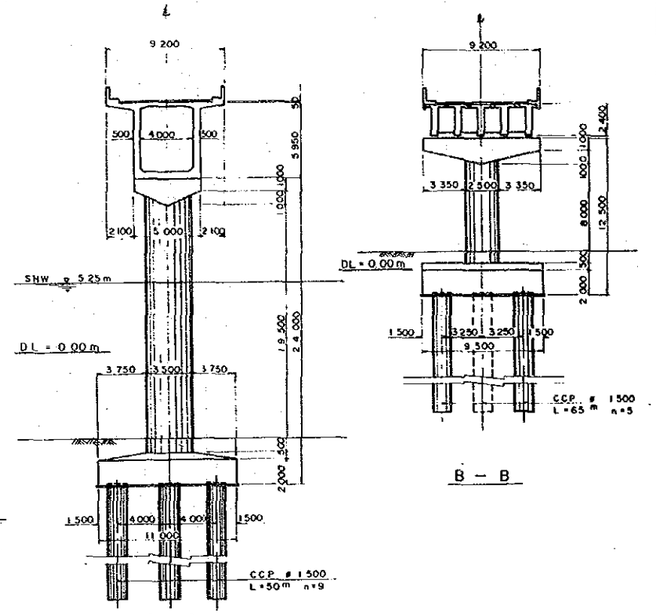


PLAN
SCALE 1 4,000

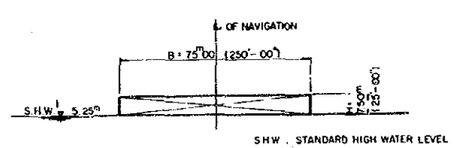
NOTE : ALL DIMENSIONS ARE SHOWN IN MILLIMETERS UNLESS OTHERWISE INDICATED



TYPICAL CROSS SECTION OF BRIDGE DECK
SCALE 1 200

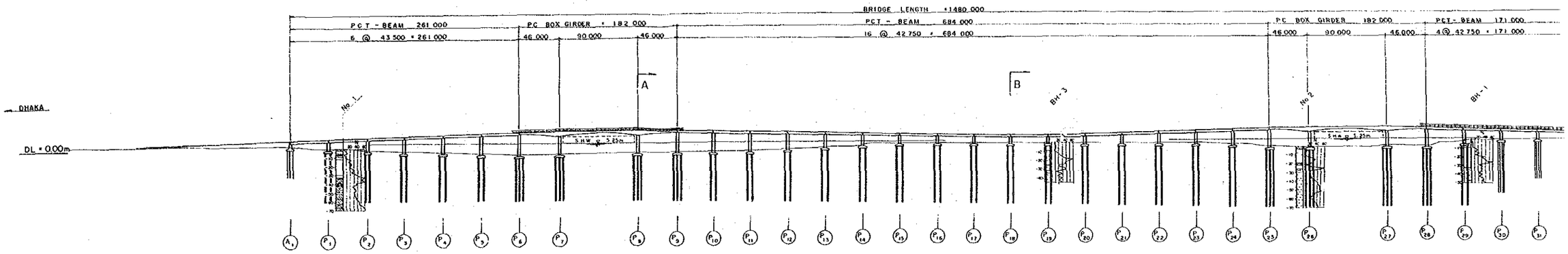


CROSS SECTION
SCALE 1 400

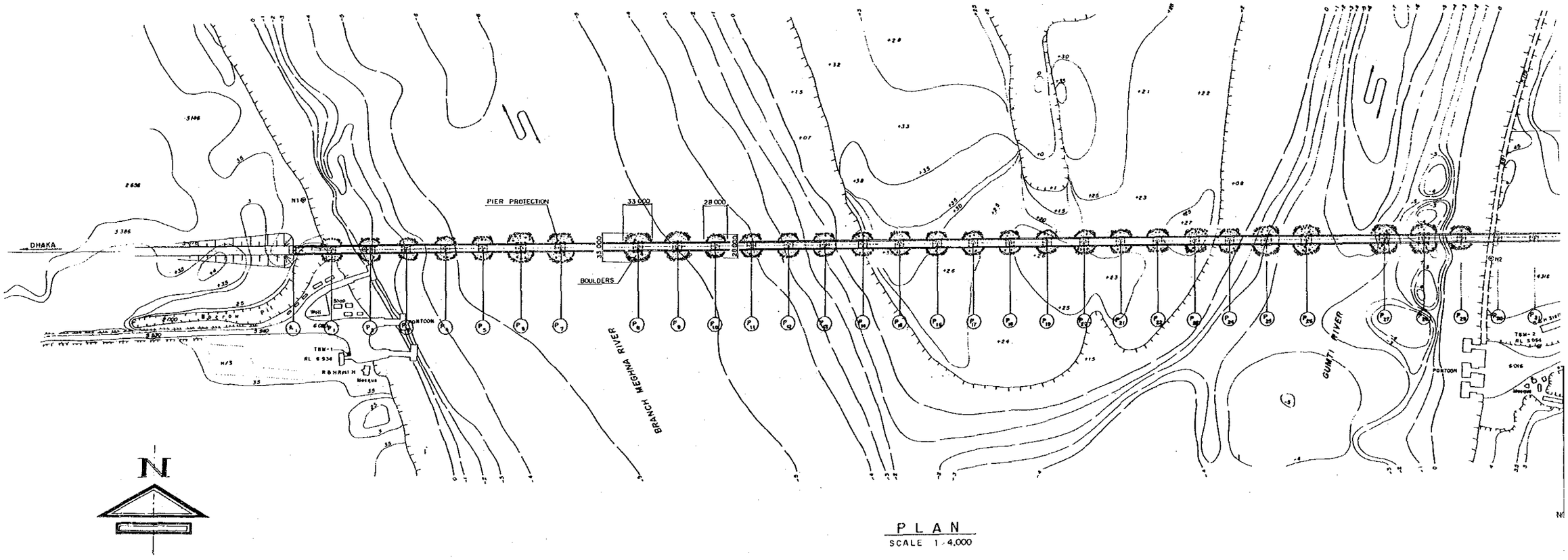


SHW . STANDARD HIGH WATER LEVEL

NAVIGATION CLEARANCE
SCALE 1 : 2,000

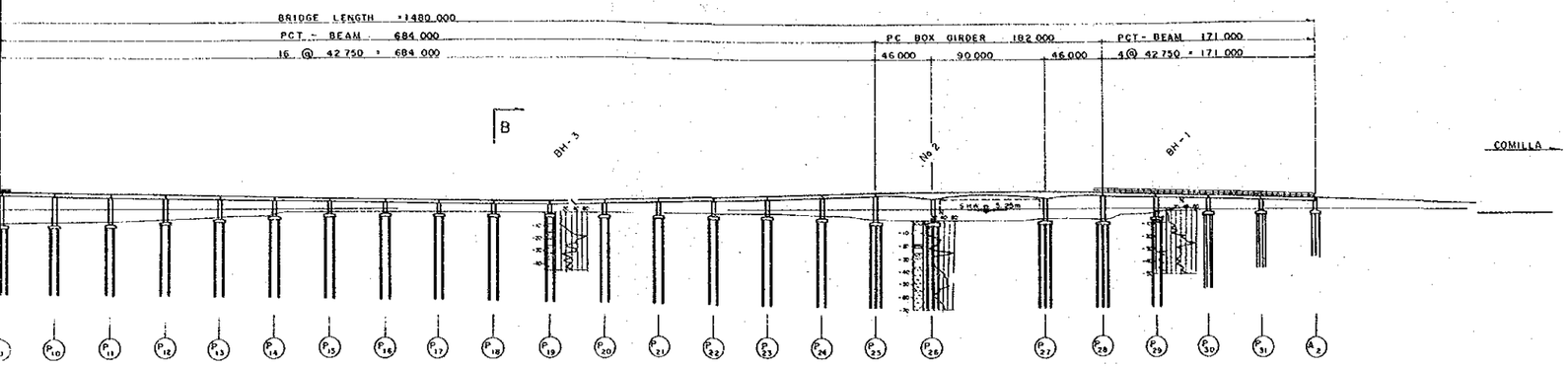


PROFILE
SCALE 1:4,000

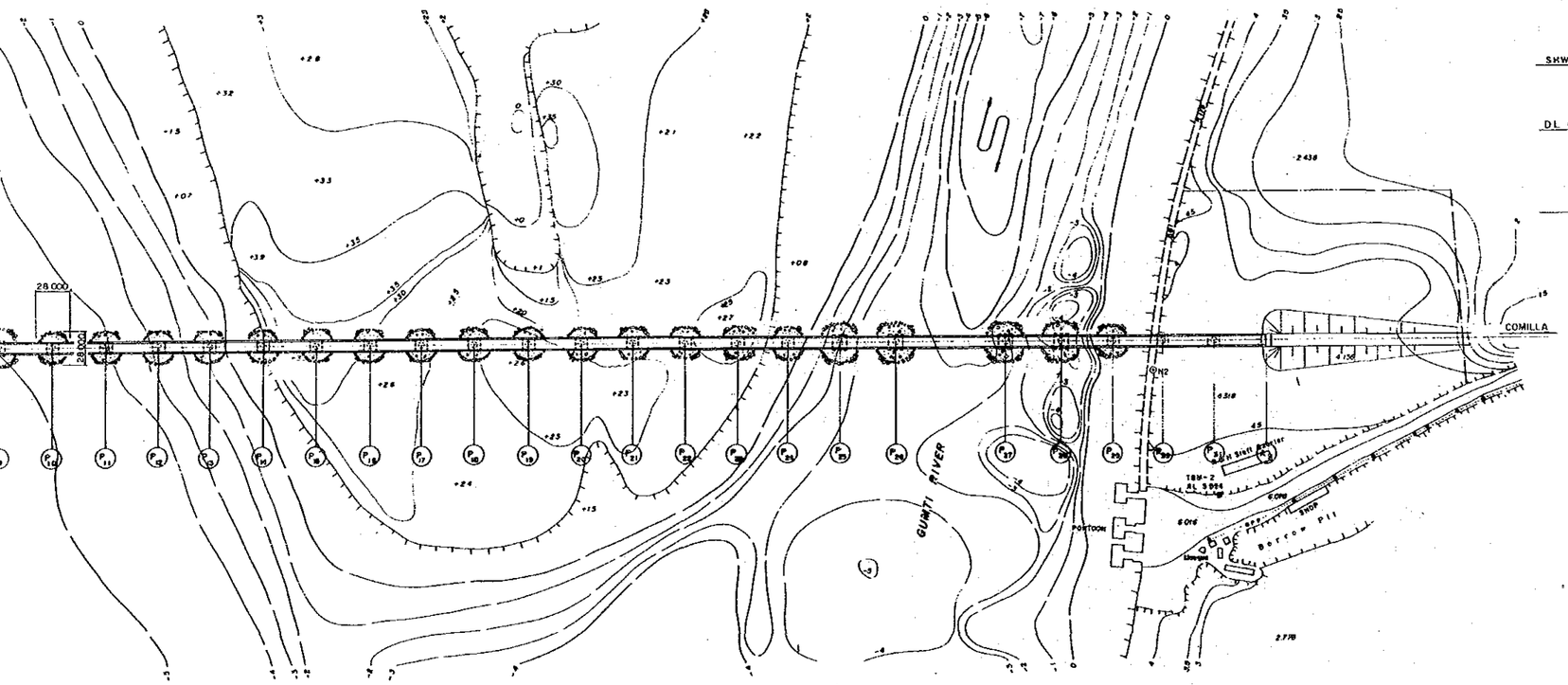


PLAN
SCALE 1:4,000

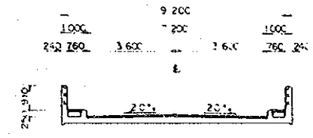
GENERAL VIEW
ALTERNATIVE: CASE - D



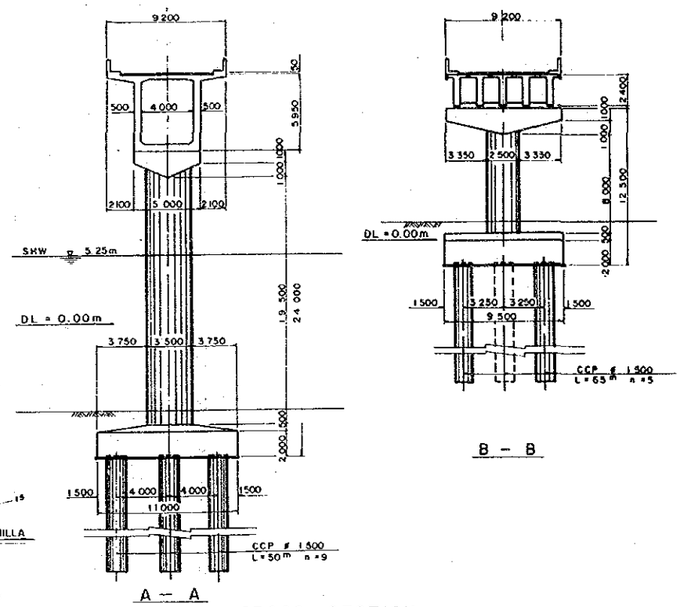
PROFILE
SCALE 1 4.000



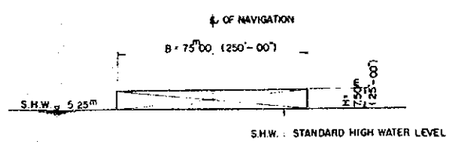
PLAN
SCALE 1 4,000



TYPICAL CROSS SECTION OF BRIDGE DECK
SCALE 1 200



CROSS SECTION
SCALE 1 400



S.H.W. : STANDARD HIGH WATER LEVEL

NAVIGATION CLEARANCE
SCALE 1 : 2,000

NOTE : ALL DIMENSIONS ARE SHOWN IN MILLIMETERS
UNLESS OTHERWISE INDICATED

AP.TABLE 7-9 COST OF CASE-A PC BOX CAST-IN-SITU

(TK)

ITEM	UNIT	QUANTITY	UNIT PRICE	AMOUNT
A. Superstructure				
PC box (C) concrete (P)	CM	12,930	4,660	60,253,800
Deformed bar	T	1,480	21,270	31,479,600
PC cable stressing	T	760	76,840	58,398,400
Railing	LM	3,090	1,290	3,986,100
Footpath & kerb	LM	3,090	850	2,626,500
Expansion joint	EACH	18	110,000	1,980,000
Centre hinge	EACH	32	81,650	2,612,800
Bearing shoe	EACH	4	40,750	163,000
Indirect cost	LS	1		48,450,800
Subtotal				209,951,000
B. Substructure				
RCD pile ϕ1.5 m	LM	9,100	19,890	180,999,000
Precast concrete pile	LM	2,010	1,980	3,979,800
Excavation in river	CM	10,540	7,740	81,579,600
Seal concrete (X)	CM	2,180	2,050	4,264,000
Footing concrete (A)	CM	5,520	2,660	14,683,200
Pier concrete	CM	2,455	3,060	7,512,300
TORSTEEL bar	T	698	22,780	15,900,440
Indirect cost	LS	1		92,684,660
Subtotal				401,633,000
Total A. + B.				611,584,000

Source: The Study Team

Note
(C): Cast-in-situ
(S): Segmental
(A): Class A concrete for box culvert, footing and piers
(P): Class P concrete for prestressed T-beam girder and box section bridge
(X): Class X concrete deposited in water and tremie concrete for cast-in-situ piles

AP.TABLE 7-10 COST OF CASE-B PC BOX AND GELBER

(TK)

	ITEM	UNIT	QUANTITY	UNIT PRICE	AMOUNT
A.	Superstructure				
	PC box (C) concrete (P)	CM	11,850	4,660	55,221,000
	PC Gelber girder concrete (P)	CM	2,140	7,100	15,194,000
	Deformed bar (Box)	T	1,370	21,270	29,139,900
	Deformed bar (GELBER)	T	48	15,300	734,400
	PC cable stressing (Box)	T	702	76,840	53,941,680
	PC cable stressing (GELBER)	T	20	52,380	1,047,600
	Railing	LM	2,960	1,290	3,818,400
	Footpath & kerb	LM	2,960	850	2,516,000
	Expansion joint	EACH	17	110,000	1,870,000
	Centre hinge	EACH	18	81,650	1,469,700
	Bearing shoe (Box)	EACH	4	40,750	163,000
	Bearing shoe (GELBER)	EACH	30	30,300	909,000
	Indirect cost	LS	1		49,807,320
	Subtotal				215,832,000
B.	Substructure				
	RCD pile ϕ1.5 m	LM	9,100	19,890	180,999,000
	Precast concrete pile	LM	2,010	1,980	3,979,800
	Excavation in river	CM	10,540	7,740	81,579,600
	Seal concrete (X)	CM	2,180	2,050	4,264,000
	Footing concrete (A)	CM	5,520	2,660	14,683,200
	Pier concrete (A)	CM	2,455	3,060	7,512,300
	TORSTEEL bar	T	698	22,780	15,900,440
	Indirect cost	LS	1		92,684,660
	Subtotal				401,633,000
	Total A. + B.				617,465,000

Source: The Study Team

AP.TABLE 7-11 COST OF CASE-C PC BOX AND T-BEAM

(TK)

ITEM	UNIT	QUANTITY	UNIT PRICE	AMOUNT
A. Superstructure				
PC Box (C) concrete (P)	CM	8,780	4,660	40,914,800
PC T-Beam concrete (P)	CM	2,380	7,610	18,111,800
Deformed bar (Box)	T	1,010	21,270	21,482,700
Deformed bar (Beam)	T	320	15,300	4,896,000
PC cable stressing (Box)	T	520	76,840	39,956,800
PC cable stressing (Beam)	T	130	52,380	6,809,400
Railing	LM	2,960	1,290	3,818,400
Footpath & kerb	LM	2,960	850	2,516,000
Expansion joint	EACH	24	110,000	2,640,000
Centre hinge	EACH	20	81,650	1,633,000
Bearing shoe	EACH	108	40,750	4,401,000
Indirect cost	LS	1		44,153,100
Subtotal				191,333,000
B. Substructure				
RCD pile ϕ1.5 m	LM	10,270	19,890	204,270,300
Precast concrete pile	LM	1,920	1,980	3,801,600
Excavation in river	CM	12,700	7,740	98,298,000
Seal concrete (X)	CM	2,630	2,050	5,391,500
Footing concrete (A)	CM	5,770	2,660	15,348,200
Pier concrete (A)	CM	2,650	3,060	8,109,000
TORSTEEL bar	T	760	22,780	17,312,800
Indirect cost	LS	1		105,759,600
Subtotal				458,291,000
Total A. + B.				649,624,000

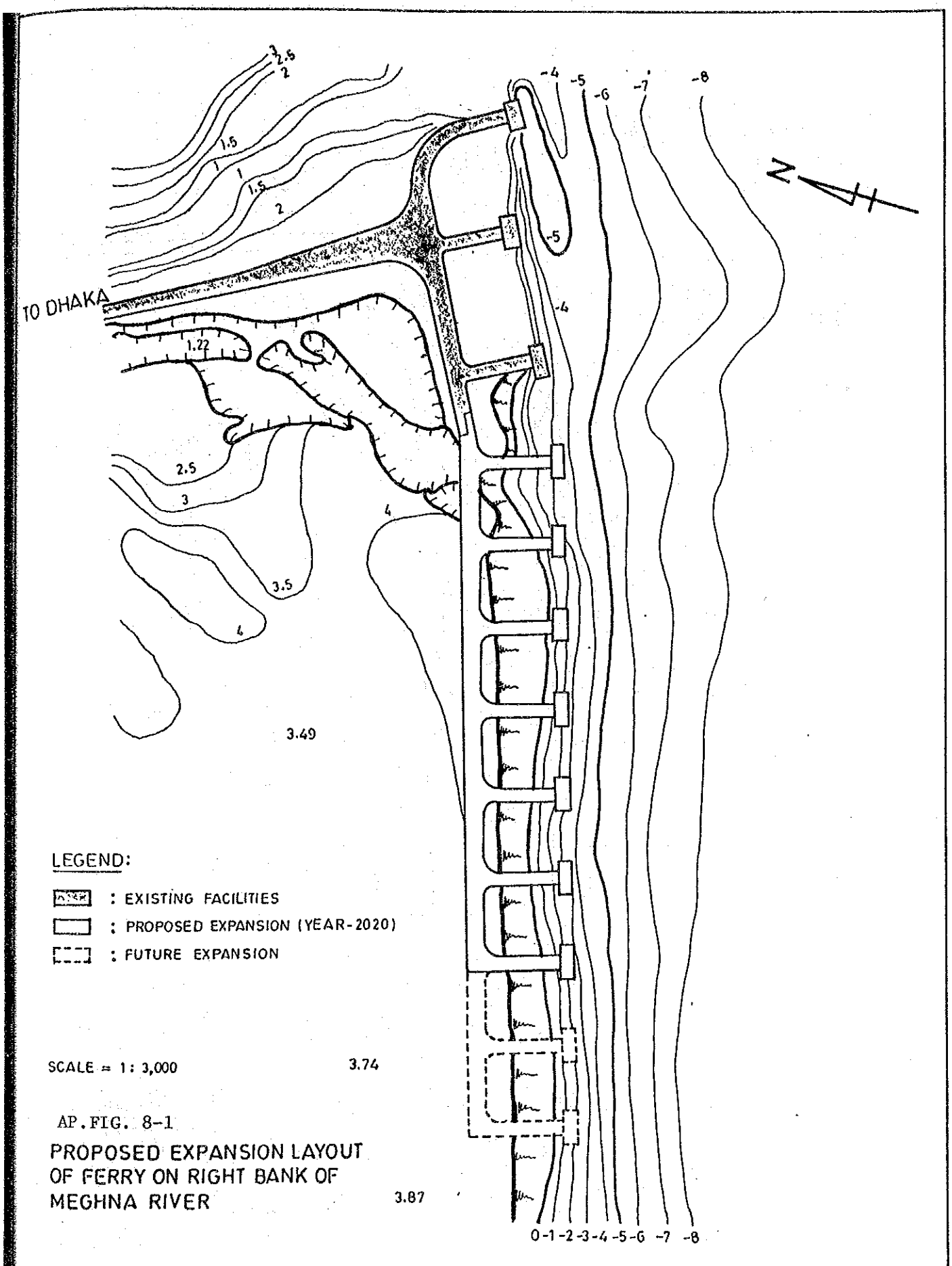
Source: The Study Team

AP.TABLE 7-12 COST OF CASE-D PC T-BEAM AND BOX

(TK)

ITEM	UNIT	QUANTITY	UNIT PRICE	AMOUNT
A. Superstructure				
PC Box (C) concrete (P)	CM	3,050	4,660	14,213,000
PC T-Beam concrete (P)	CM	6,170	7,610	46,953,700
Deformed bar (Box)	T	350	21,270	7,444,500
Deformed bar (Beam)	T	830	15,300	12,699,000
PC cable stressing (Box)	T	180	76,840	13,831,200
PC cable stressing (Beam)	T	320	52,380	16,761,600
Railing	LM	2,960	1,290	3,818,400
Footpath & kerb	LM	2,960	850	2,516,000
Expansion joint	EACH	30	110,000	3,300,000
Bearing shoe	EACH	268	40,750	10,921,000
Indirect cost	LS	1		39,737,600
Subtotal				172,196,000
B. Substructure				
RCD pile ϕ1.5 m	LM	10,890	19,890	216,602,100
Precast concrete pile	LM	1,920	1,980	3,801,600
Excavation in river	CM	15,410	7,740	119,273,400
Seal concrete (X)	CM	3,190	2,050	6,539,500
Footing concrete (A)	CM	7,080	2,660	18,832,800
Pier concrete (A)	CM	3,510	3,060	10,740,600
TORSTEEL bar	T	950	22,780	21,641,000
Indirect cost	LS	1		119,229,000
Subtotal				516,660,000
Total A. + B.				688,856,000

Source: The Study Team



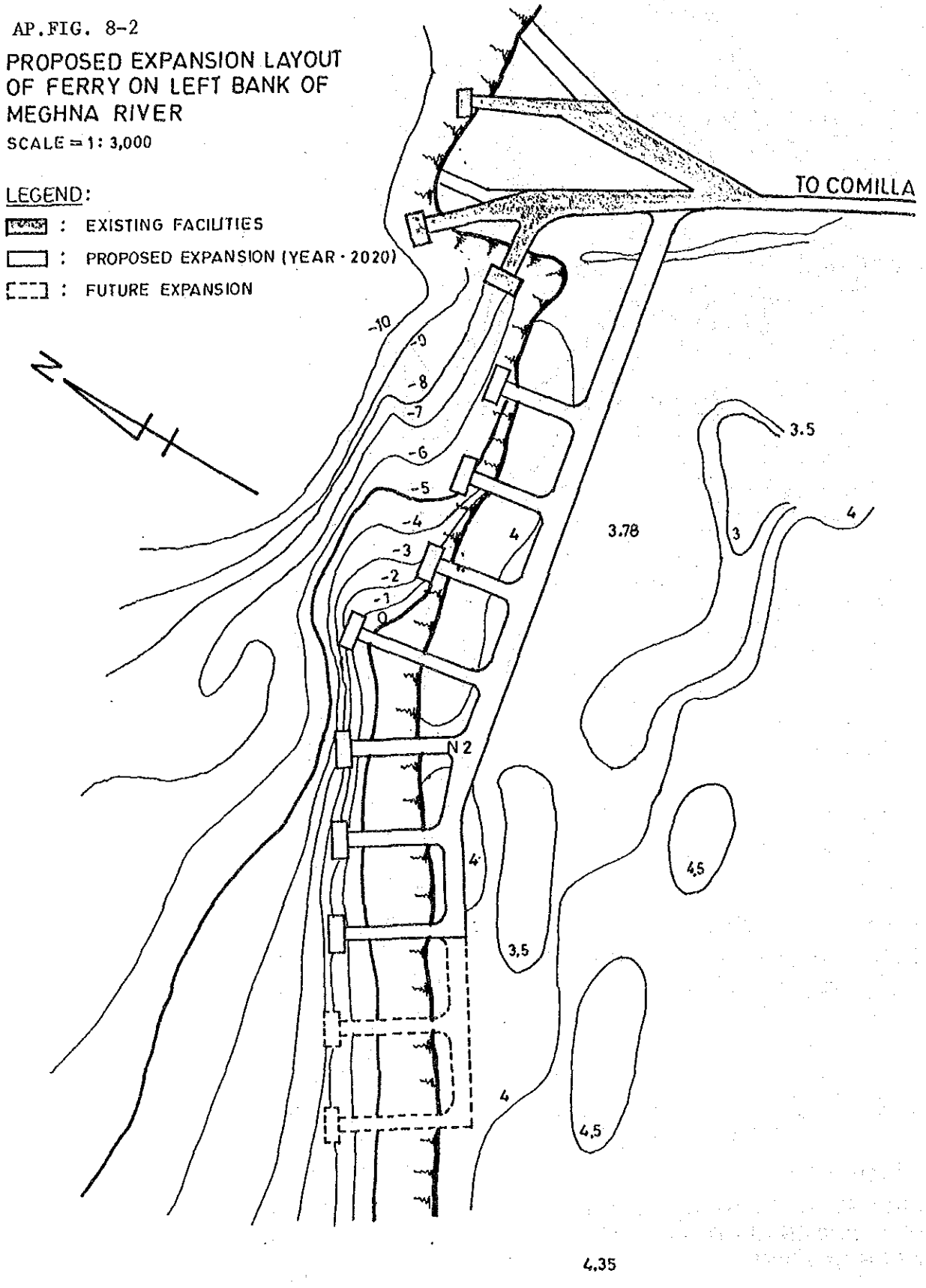
AP.FIG. 8-1

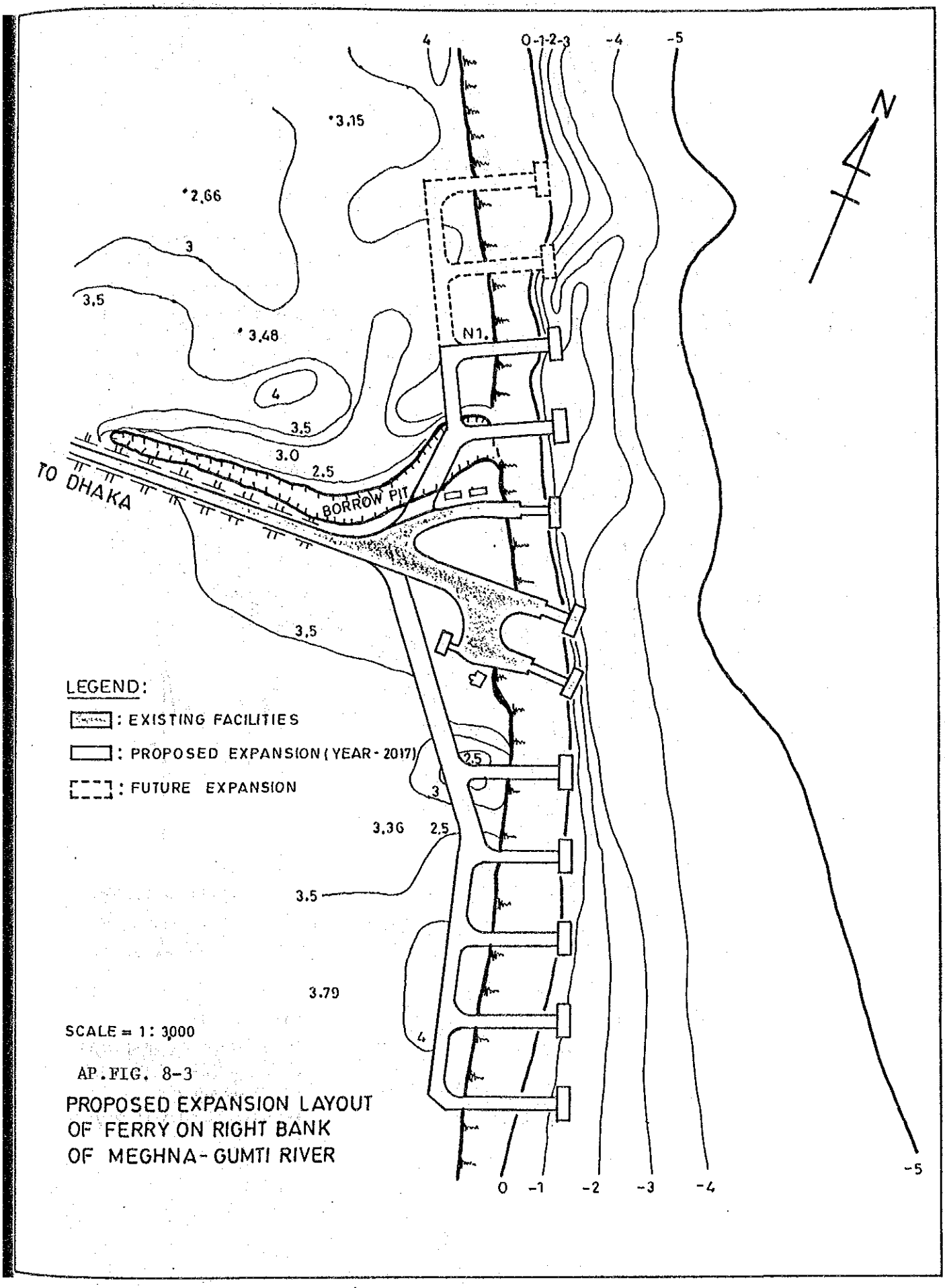
PROPOSED EXPANSION LAYOUT OF FERRY ON RIGHT BANK OF MEGHNA RIVER

AP.FIG. 8-2

PROPOSED EXPANSION LAYOUT OF FERRY ON LEFT BANK OF MEGHNA RIVER

SCALE = 1: 3,000

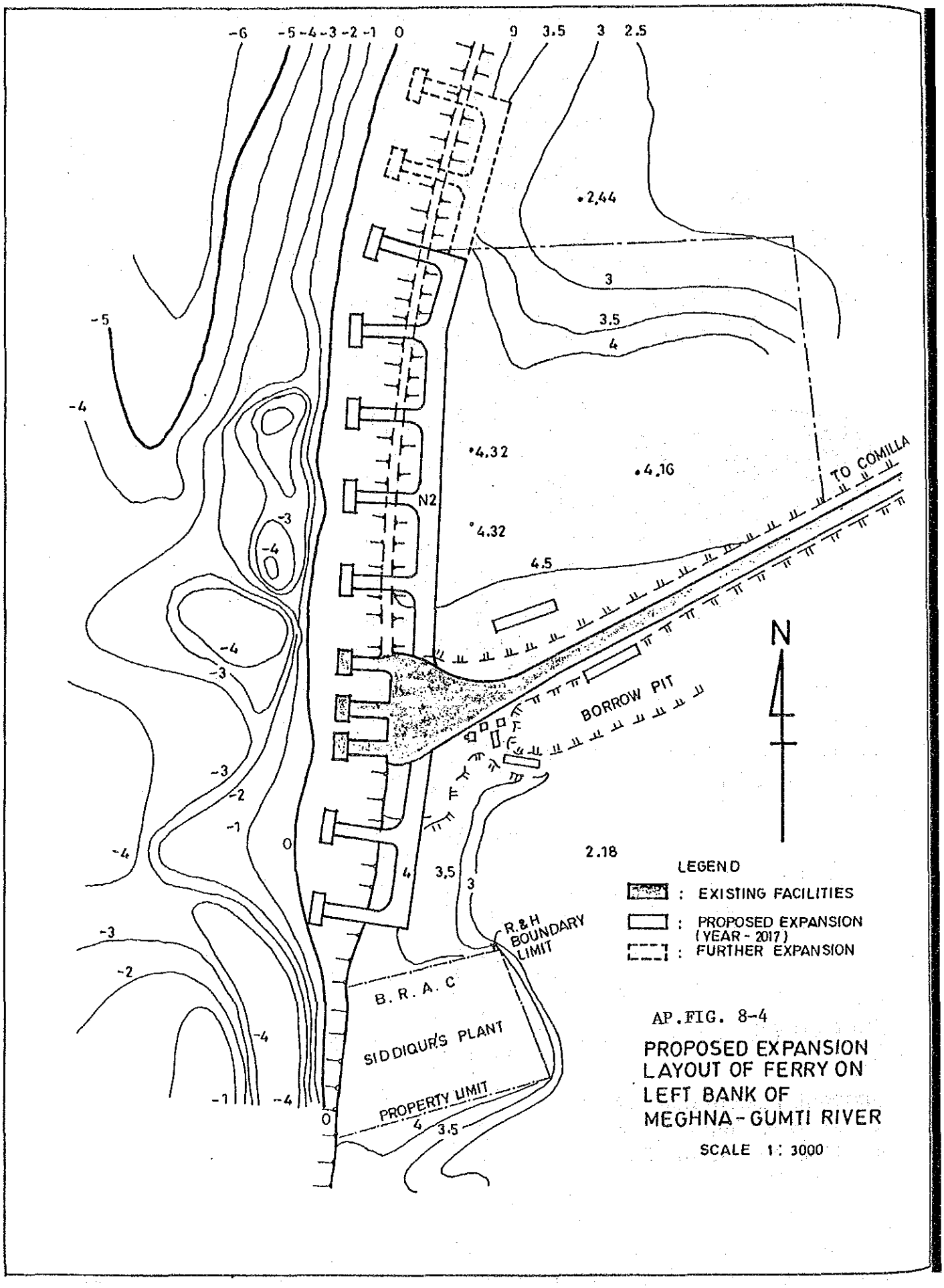




SCALE = 1 : 3,000

AP.FIG. 8-3

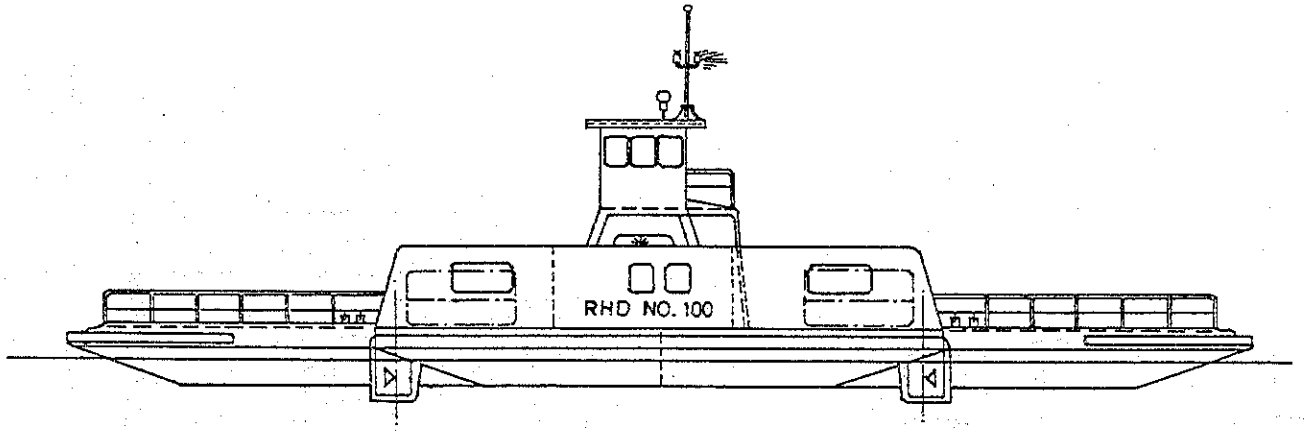
PROPOSED EXPANSION LAYOUT
OF FERRY ON RIGHT BANK
OF MEGHNA-GUMTI RIVER

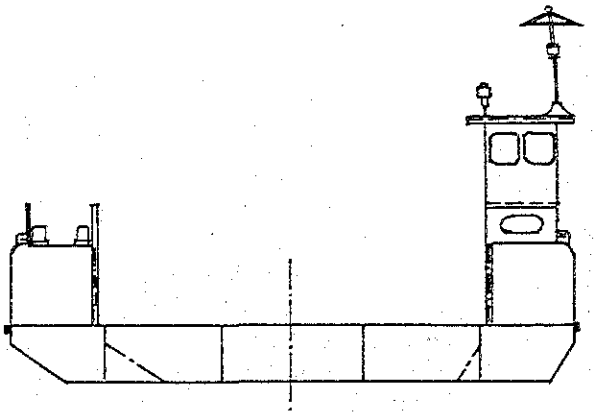


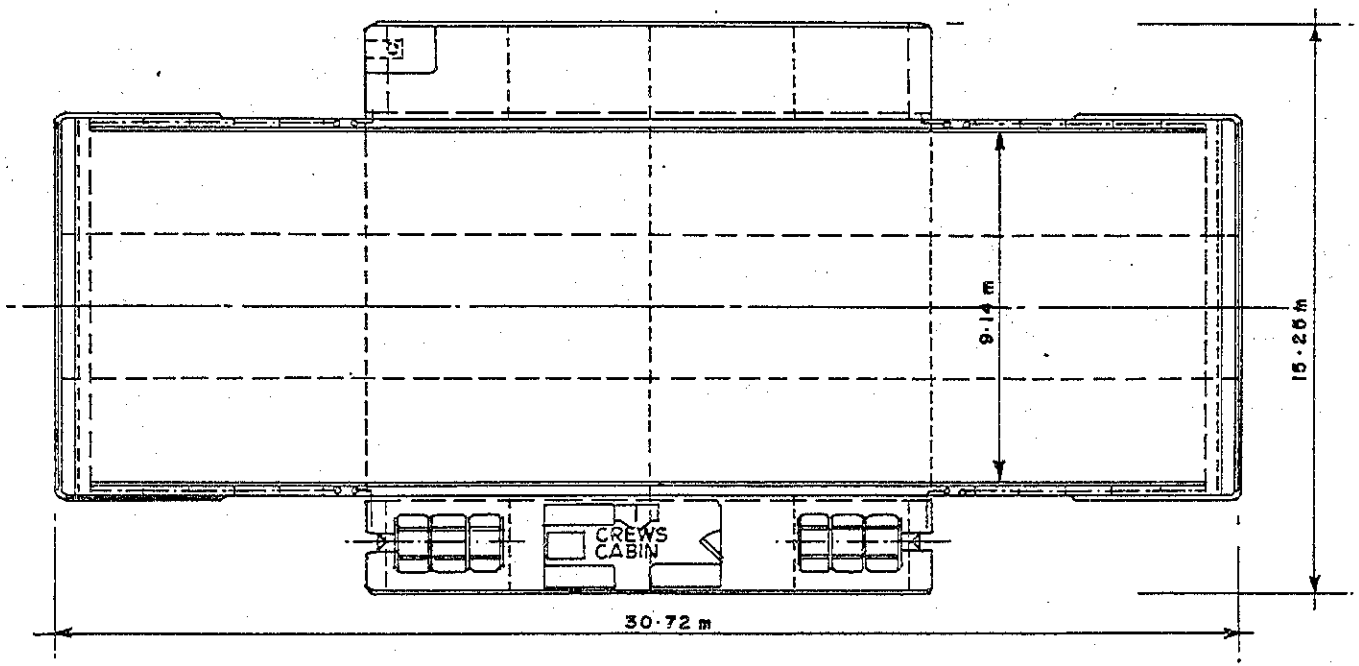
AP.FIG. 8-4

PROPOSED EXPANSION LAYOUT OF FERRY ON LEFT BANK OF MEGHNA - GUMTI RIVER

SCALE 1 : 3000







PRINCIPAL DIMENSION :

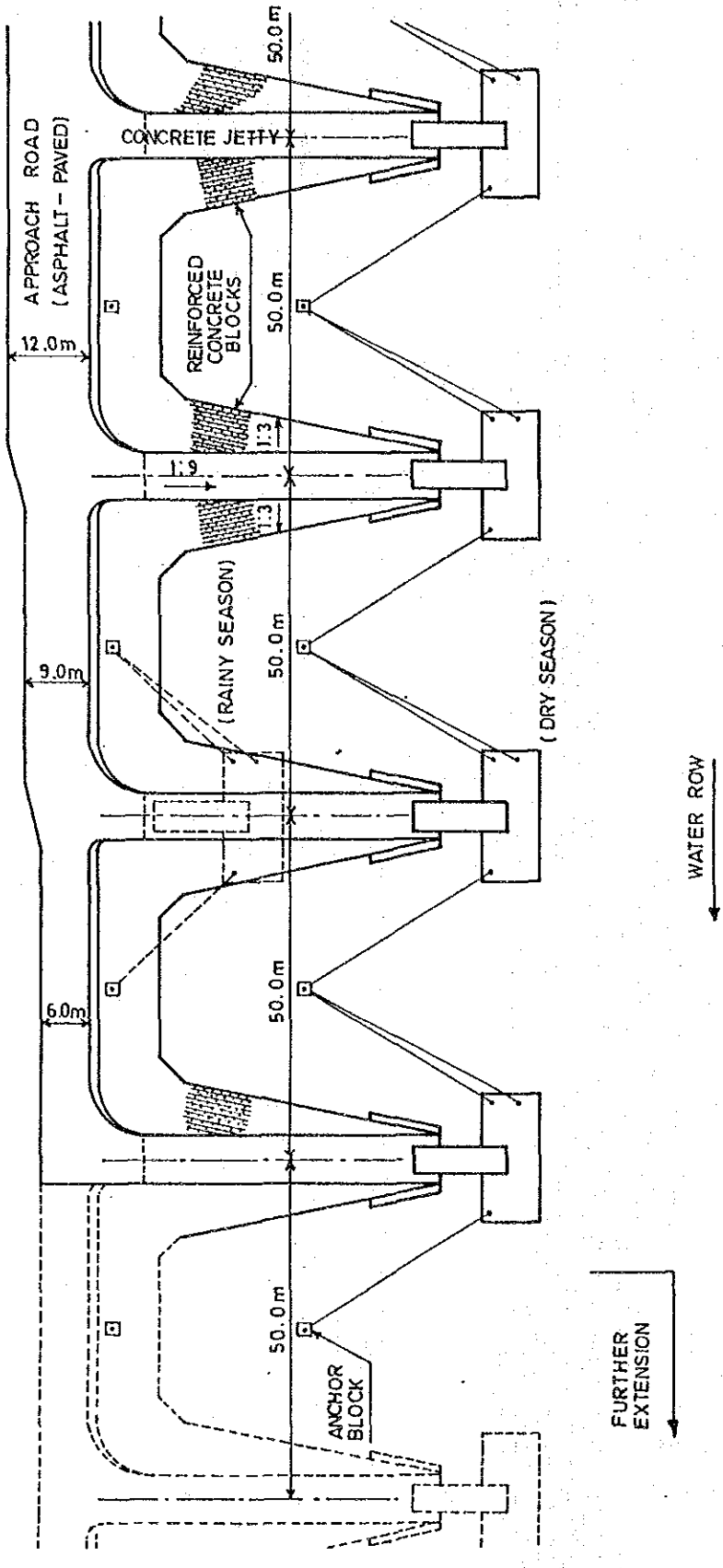
LENGHT = 30.72 m
BREADTH = 15.25 m
DEPTH = 1.42 m

AP.FIG. 8-5

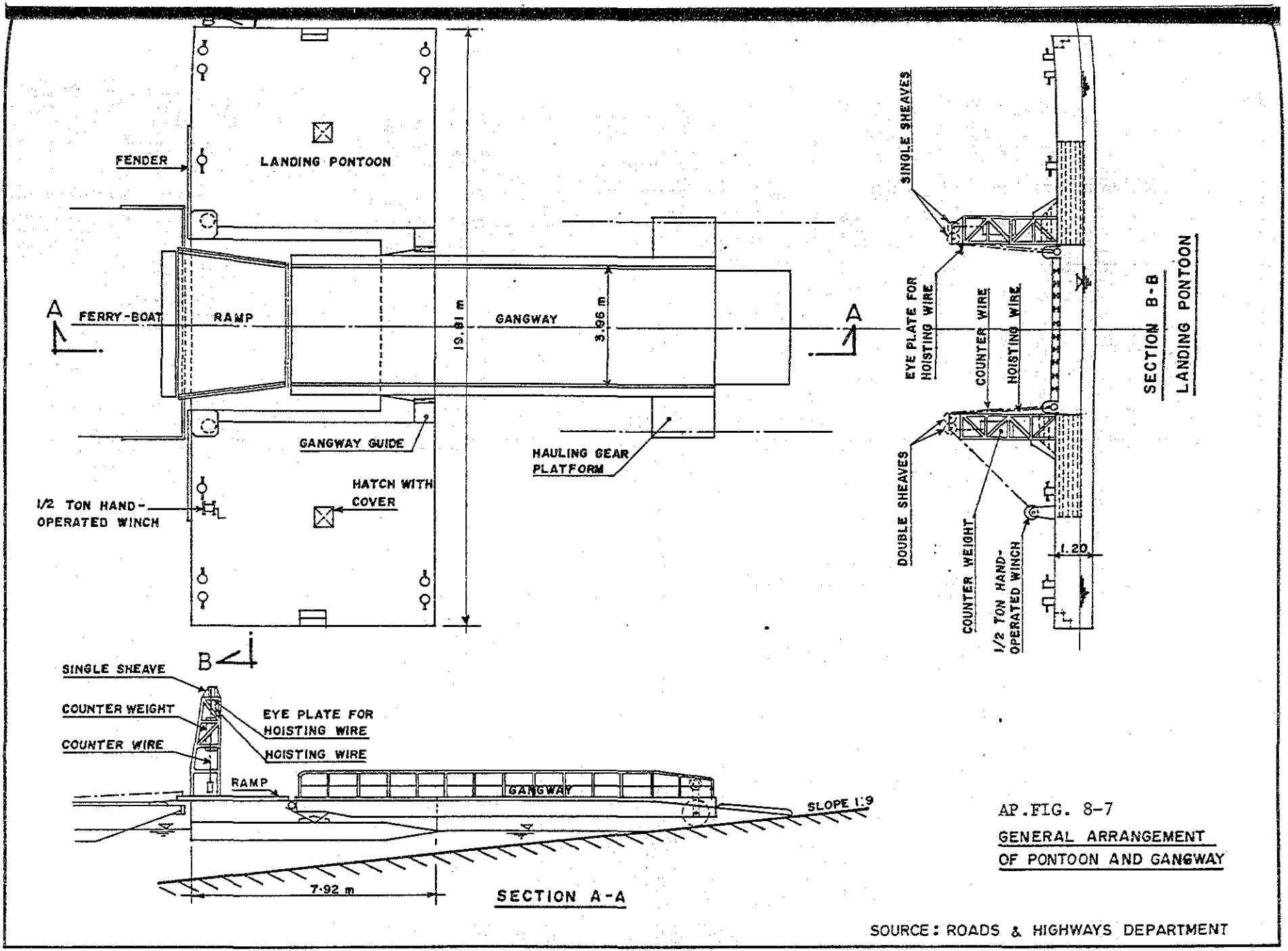
UTILITY - FERRY, TYPE I

FOR DHAKA - CHITTAGONG HIGHWAY

SOURCE : ROADS & HIGHWAYS DEPARTMENT

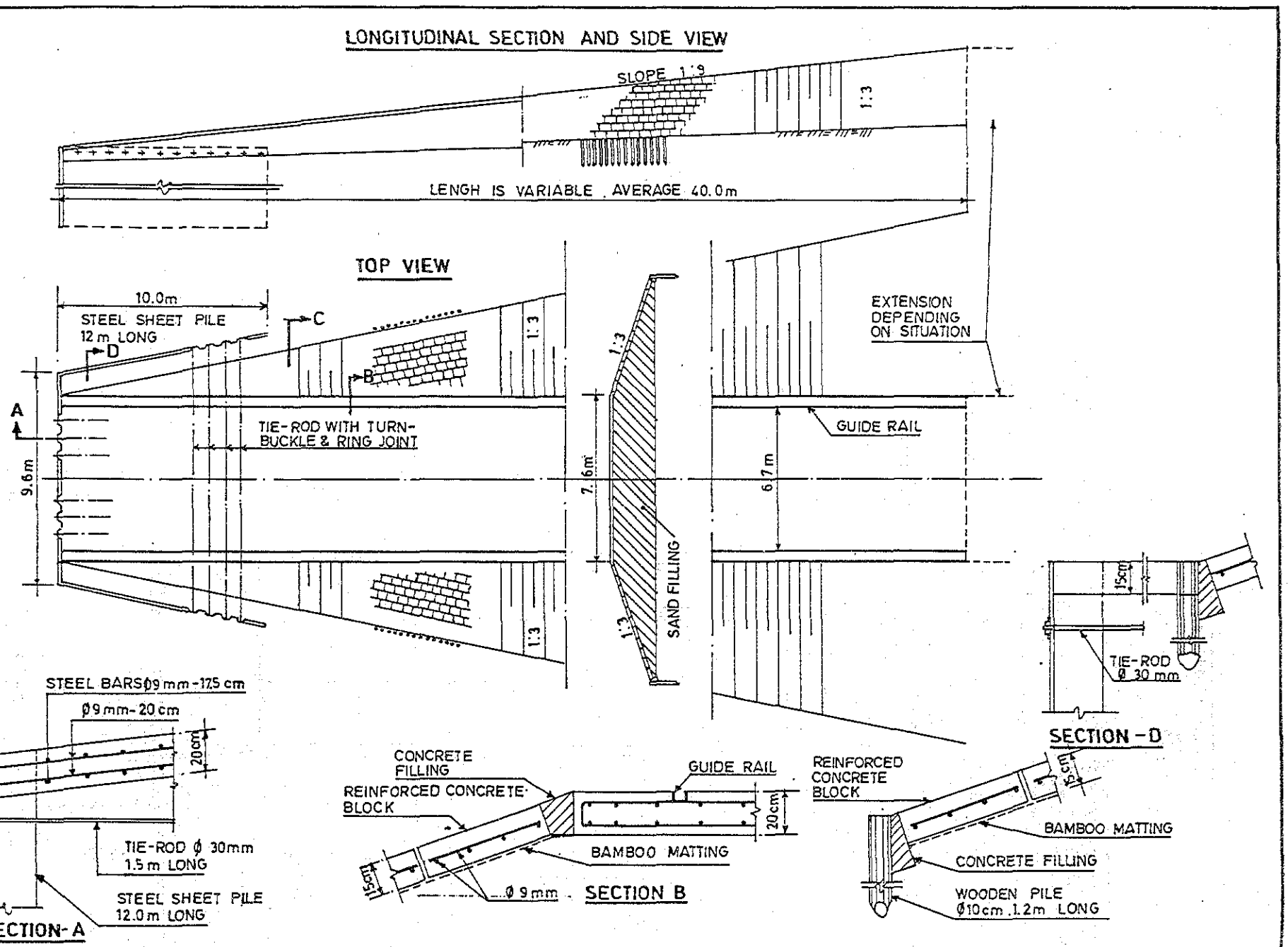


AP.FIG. 8-6 STANDARD ARRANGEMENT OF FERRY TERMINAL



AP.FIG. 8-7
GENERAL ARRANGEMENT OF PONTOON AND GANGWAY

SOURCE: ROADS & HIGHWAYS DEPARTMENT



AP.FIG. 8-8 GENERAL ARRANGEMENT OF JETTY

SOURCE : ROADS & HIGHWAYS DEPARTMENT

AP. TABLE 8-1 CONSTRUCTION COST OF JETTY FOR MEGHNA FERRY

ONE JETTY ON DHAKA SIDE Unit : Taka

Work Item	Unit	Quantity	Foreign Amount	Local Amount	Local Tax	Financial Amount
Land Acquisition	S.M	1,175		72,592		72,592
Sand Filling	C.M	2,945		38,285		38,285
Pavement of Access	S.M	535	12,128	134,734	6,125	152,987
Concrete Block in Slope	S.M	2,400	246,408	463,680	71,808	781,896
Wooden Pile Ø 100 mm	M	894		11,881		11,881
Concrete Pavement of jetty	S.M	270	64,120	113,100	18,995	196,215
Sheet Pile	M	900	275,454	115,245	349,461	740,160
Anchor Block	Set	2	476	4,110	138	4,724
Sub-Total			598,586	953,627	446,527	1,998,740

ONE JETTY ON COMILLA SIDE

Work Item	Unit	Quantity	Foreign Amount	Local Amount	Local Tax	Financial Amount
Land Acquisition	S.M	2,120		130,973		130,973
Sand Filling	C.M	3,650		47,450		47,450
Pavement of Access	S.M	650	14,736	163,696	7,443	185,875
Concrete Block in Slope	S.M	3,020	310,063	583,464	90,358	983,885
Wooden Pile Ø 100 mm	M	1,085		14,420		14,420
Concrete Pavement of Jetty	S.M	270	64,120	113,100	18,995	196,215
Sheet Pile	M	1,500	459,090	192,075	582,435	1,233,600
Anchor Block	Set	2	476	4,110	138	4,724
Sub-Total			848,485	1,249,288	699,369	2,797,142

TOTAL COST OF JETTIES/SET (DHAKA AND COMILLA)

Two Jetties(one set)	Unit	Quantity	Foreign Amount	Local Amount	Local Tax	Financial Amount
Dhaka & Comilla	UNIT	1	1,447,071	2,202,915	1,145,896	4,795,882

AP. TABLE 8-2 CONSTRUCTION COST OF JETTY FOR MEGHNA-GUMTI FERRY

ONE JETTY ON DHAKA SIDE Unit : Taka

Work Item	Unit	Quantity	Foreign Amount	Local Amount	Local Tax	Financial Amount
Land Acquisition	S.M	1,280		62,766		62,766
Sand Filling	C.M	4,100		53,300		53,300
Pavement of Access	S.M	680	15,416	171,251	7,786	194,453
Concrete Block in Slope	S.M	3,330	341,882	643,356	99,634	1,084,881
Wooden Pile Ø 100 mm	M	1,060		14,087		14,087
Concrete Pavement of jetty	S.M	375	89,055	157,084	26,381	272,520
Sheet Pile	M	900	275,454	115,245	349,461	740,160
Anchor Block	Set	2	476	4,110	138	4,715
Sub-Total			722,283	1221,199	483,400	2,426,882

ONE JETTY ON COMILLA SIDE

Work Item	Unit	Quantity	Foreign Amount	Local Amount	Local Tax	Financial Amount
Land Acquisition	S.M	Nil		-		-
Sand Filling	C.M	1,930		25,090		25,090
Pavement of Access	S.M	570	12,922	143,549	6,527	162,998
Concrete Block in Slope	S.M	2,340	240,248	452,088	70,013	762,349
Wooden Pile Ø 100 mm	M	860		11,429		11,429
Concrete Pavement of Jetty	S.M	270	64,120	113,100	18,994	196,214
Sheet Pile	M	900	275,454	115,245	349,461	740,160
Anchor Block	Set	2	476	4,110	138	4,724
Sub-Total			593,220	864,611	445,133	1,902,964

TOTAL COST OF JETTIES/SET (DHAKA AND COMILLA)

Two Jetties(one set)	Unit	Quantity	Foreign Amount	Local Amount	Local Tax	Financial Amount
Dhaka & Comilla	UNIT	1	1,315,503	2,085,810	928,533	4,329,846

AP. TABLE 9-1 UNIT PRICES OF TYPICAL MATERIALS AND FUEL

1984 June Price (Taka)

Material Items	Unit	Financial Cost	Foreign Portion	Local Portion	Tax
Cement	Ton	1,940.00	913.68	612.05	414.27
TORSTEEL Bar	Ton	19,000.00	8,250.00	8,080.00	2,670.00
* Deformed Bar	Ton	22,400.00	8,327.00	1,999.00	12,074.00
Asphalt	Ton	8,400.00	5,800.00	190.00	-
Stone, 50 kg	Cub.m	750.00	-	750.00	-
Stone, boulder	Cub.m	563.00	-	563.00	-
Stone, Shingle	Cub.m	602.00	-	602.00	-
Pea gravel	Cub.m	544.00	-	544.00	-
Sand (F.M. 2.8)	Cub.m	330.00	-	330.00	-
Pit sand (F.M. 0.5)	Cub.m	75.00	-	75.00	-
* Plasticiser	Kg	48.00	26.00	-	22.00
Wire mesh, 5 x 125 x 125	Sq.m	160.00	-	160.00	-
Wood	Cub.m	5,600.00	-	5,600.00	-
Steel Plate	Ton	18,000.00	1,100.00	15,836.00	1,064.00
* High Tensile bar, Ø 32	Ton	67,000.00	31,905.00	-	35,095.00
* High Tensile Wire, Ø 8	Ton	68,109.00	32,433.00	-	35,676.00
* U400 Sheet Pile	Ton	15,460.00	7,362.00	-	8,098.00
* H Section Steel, 400 x 400	Ton	12,582.00	5,991.00		6,591.00
Motor Spirit	L	15.08	6.11	6.11	2.36
High Octane Blended Comp.	L	17.06	6.11	8.48	2.47
* High Speed Diesel	L	7.40	6.12	0.68	0.60
Lubricating Oil	L	28.60	17.22	1.91	9.47

* Note : Imported Material

Source : Market Survey and "SCHEDULE OF RATES FOR BRIDGE WORKS" of the RHD, Sept. 1983.

AP. TABLE 9- 2 TARIFF OF CDST AND EXCISE TAX, ETC.

Imported Item	Custom Duty (CD)	Sales Tax (ST)	Surcharge, and Licence Fee
	(%)	(%)	(%)
Portland Cement	5	10	5
Asphalt	50	20	5
Wood, Plywood	150	20	5
Bars and Rods	100	20	5
Wire Rods	100	20	5
Ul/H Section Sheet	100	20	5
Machinery	50	10	5
Crushing Plant	50	10	5
Generator	50	-	5
Trucks, Special Motor Lorries, Crane	50	20	5
Bridge Section Steel Structure	50	20	5
Motor Spirit/HOBC	Tk.0.85/1	-	5
High Speed Diesel	Tk.0.30/1	-	5
Clinker	Nil	10	2
Crude Oil	-	20	-
Ingot	10	10	5
Lubricant Oil	50	-	5

Locally-made Item		Excise Tax
Portland Cement of Chittagong	...	Tk. 203/ton
Portland Cement of Chhatak	...	Tk. 500/ton
Bars, Rods and Steel Plate	...	Tk. 500/ton
Asphalt	...	Tk.1250/ton
Motor Spirit	...	Tk. 1.13/1
HOBC	...	Tk. 1.25/1
High Speed Diesel	...	Tk. 0.33/1

Source : Dr. A. Rab, Planning Commission, Dhaka, and Bangladesh Customs, Excise and Sales Tax Tariff"

AP. TABLE 9-3 DAILY OPERATION COST OF MACHINES

(1984 June Price) (Taka)

Mark	Machine	Total cost per day	Foreign portion	Local portion	Tax*
M-1	Dredger, 1,200 ps(17 hours per day)	91,797	12,168	77,538	2,091
M-2	Bulldozer, 7 ton	2,564	2,211	321	32
M-3	-do- , 11 ton	3,272	2,791	431	50
M-4	-do- , 15 ton	4,269	3,657	543	69
M-5	-do- , 21 ton	6,490	5,685	708	97
M-6	Earth carrying boat, 100 m^3(steel)	8,086	1,622	6,186	278
M-8	Tractor shovel, 1.4 m^3	3,222	2,726	444	52
M-9	Truck, 2 ton	722	543	167	13
M-10	-do- , 4 ton	1,081	833	225	23
M-11	-do- , 6 ton	1,376	1,118	233	25
M-12	Macadam roller, 10 ton	2,176	1,863	287	26
M-13	Tire roller, 10 ton	2,075	1,787	266	22
M-14	-do- , 20 ton	2,485	2,187	275	24
M-15	Belt conveyor, 7 m	264	13	249	2
M-16	-do- , 10 m	284	13	269	2
M-17	Wheel crane, 4.8 ton	1,689	1,497	167	25
M-18	Crawler crane, 22.5 ton	5,328	5,020	283	25
M-19	Motor grader, 3.1 m	2,874	2,518	324	32
M-20	Tandem roller, 10 ton	1,909	1,673	221	15
M-21	Asphalt sprayer, 200	915	639	259	17
M-22	Asphalt finisher, 3.6 m	3,408	3,182	213	13
M-23	Vibration roller, 2.5 ton	1,110	982	122	6
M-24	Water tank car, 1,800	1,858	577	159	12
M-25	Generator, 35/40 kV	786	532	235	19
M-26	-do- , 100/125 kV	2,784	1,372	553	73
M-27	-do- , 175/200 kV	6,364	2,689	780	111
M-28	Asphalt mixing plant, 30 t/h	29,796	21,824	6,933	1,039
M-29	Vibrating pile hammer, 75 t	13,125	11,486	1,508	131
M-30	Crawler crane, 50 t	9,865	9,466	361	38
M-31	Diesel pile hammer, 7.2 t	21,879	20,150	1,533	196
M-32	Water suction pump, ϕ200	2,379	1,693	613	73
M-33	Reverse circulation drill, ϕ1.50	15,156	13,757	1,286	113
M-34	Cramshell, 0.8 m^3	6,628	6,064	502	62
M-36	Batcher plant, 2 x 0.75 m^3	15,196	13,175	1,870	151
M-37	Concrete pump car, 45 m^3/h	5,547	4,930	567	50
M-38	Concrete agitator car, 3 m^3	2,102	1,622	445	35
M-39	Welding equip., 500A	2,213	1,467	673	73
M-40	Air compressor, 13.5 m^3/min	2,246	1,746	446	54
M-41	Traveling form, 150 t/m	3,494	3,494	-	-
M-42	Barge, 500 ton	16,500	1,297	14,981	222
M-43	Grout mixer, 200	2,488	1,742	673	73
M-44	PC Jack, ϕ26 BJ50 ton	1,191	697	475	19
M-45	PC Jack, ϕ65 82 ton	1,597	1,103	475	19
M-46	Concrete vibrator, ϕ450	217	43	169	5
M-47	Barge, 200 ton	4,918	235	4,643	40
M-48	Tower crane, 85.5 ton	9,587	9,202	349	36
M-49	Sheath making equip.	1,964	1,470	475	19
M-50	Bridge erection tools	553	553	-	-
MG-1	Concrete pump car, 70 m^3/h	7,535	6,855	621	59
MG-1	Delivery pipe, ϕ125 - 500 m	3,258	2,508	716	34
MG-2	Barge & crane, 22.5 ton	9,839	5,069	4,736	34
MG-3	Cantilever trucks, 150 ton	3,249	3,249	-	-

* Note: CDST of machines is not included.

Source: Depreciation Table of Japan Construction Mechanization Association

AP. TABLE 9- 4 SEA SURFACE TRANSPORTATION COST

(Taka)

Category of Cargo		Estimated Cost
(1) Iron and Steel		
	Bar, wire and U piling	Tk. 1,944 per ton
	H-section steel	Tk. 2,038 per ton
	1600 mm casing pipe	Tk. 6,338 per ton
(2) Machinery and/or Parts		
	Weight of package up to 2 tons	Tk. 3,108 per M3*
	2 tons - 10 tons	Tk. 3,400 per M3
	10 tons - 20 tons	Tk. 3,663 per M3
	20 tons - 30 tons	Tk. 4,450 per M3
(3) Steel manufactured or partly manufactured including bolts and nuts, revets, accessories,etc. (alternative plan)		
	Weight of package up to 2 tons	Tk. 2,098 per M3
	2 tons - 10 tons	Tk. 2,393 per M3
	10 tons - 20 tons	Tk. 2,655 per M3
	20 tons - 35 tons	Tk. 3,433 per M3
(4) Cement (estimated charge)		Tk. 1,845 per ton
(5) Other Materials		
	Estimated freight charge	Tk. 2,000 per ton

* Note : Measure tons in volume

Source : Japan/Bay of Bengal Freight Tariff (1983)

AP. TABLE 9-5 LABOUR COST ESTIMATED

Category of Labours	1984 June Price (Taka) Total wage per day	Net wage per day	Income Tax per day
** Civil Engineer	390	328	62
** Civi Foreman	255	238	17
** Equipment Operator	145	143	2
Specially Skilled Labour :	120	120	Nil
* Bridge worker, plant operator, welder, mechanics, electrician and general operator			
Generally Skilled Labour :	90	90	Nil
* Bar bender, carpenter and boatman			
Unskilled Special Labour :	50	50	Free
* Structural worker and pavement worker			
Unskilled General Labour	35	35	Free
* Other workers for earth works and miscellaneous works			
* Diver (3 hours/day)	900	900	Free

Note : ** - Permanent Staff
* - Temporary Staff

Source : Interview to Contractors in Dhaka, 1984

AP. TABLE 9-6 TENTATIVE CONCRETE PROPORTIONS

(kg per cub.m)

Material	Class P	Class A	Class X	Class B
Cement	390	320	370	350
Water	160	140	170	159
(W/C) %	(42)	(43.8)	(46)	(45.7)
Sand	670	740	750	710
Course aggregate	1,213	1,254	1,122	1,210
(Max. Size) mm	(25)	(25)	(40)	(25)
(S/A) %	(35.6)	(37.1)	(40.1)	(37.0)
AE Agent	1.00	1.00	1.00	1.00
Slamp	8	8	18	8
Strength - 28 days kg per sq. cm	350	210	300	300

Note : 1. Proportions are designed with weight system.

2. Sand material is mixture of sand from Sylhet and pit sand from the site

3. Coarse aggregate is mixture of stone shingle from Sylhet and crushed stone.

4. Bats is not applied for concrete material.

Class A - Concrete for box culvert, footing and piers.

Class B - Slab concrete for steel bridge of alternative.

Class P - Concrete for prestressed T-beam girder and box section bridge.

Class X - Concrete deposited in water and tremie concrete for cast-in-situ pile.

AP. TABLE 9-7 RECORDS OF RAINY DAYS AT DAUDKANDI

(day)

Month	Average	72/73	73/74	74/75	75/76	76/77	77/78	78/79	79/80	80/81	81/82
April	5.5	3	2	4	4	5	12	6	1	3	15
May	10.7	5	8	9	7	9	13	16	11	16	13
June	13.3	5	13	7	7	14	23	17	18	15	14
July	16.0	17	15	20	8	14	17	13	12	22	22
August	12.6	8	8	8	3	11	7	13	16	24	28
September	11.7	4	11	13	16	7	4	16	15	17	14
October	4.2	2	4	8	5	2	9	5	4	2	1
November	1.5	0	6	0	1	3	1	0	4	0	0
December	0.5	0	2	0	0	0	1	0	0	0	2
January	0.1	0	0	0	0	0	0	1	0	0	0
February	1.5	2	0	0	0	1	2	2	2	5	1
March	2.4	2	4	0	2	1	3	0	2	7	3

Total 80 days per year

Source : BWDB

Note : 1. Rainy days less than 10mm were neglected.

2. In rainy season from May to September, dry season average and rainy days per month.

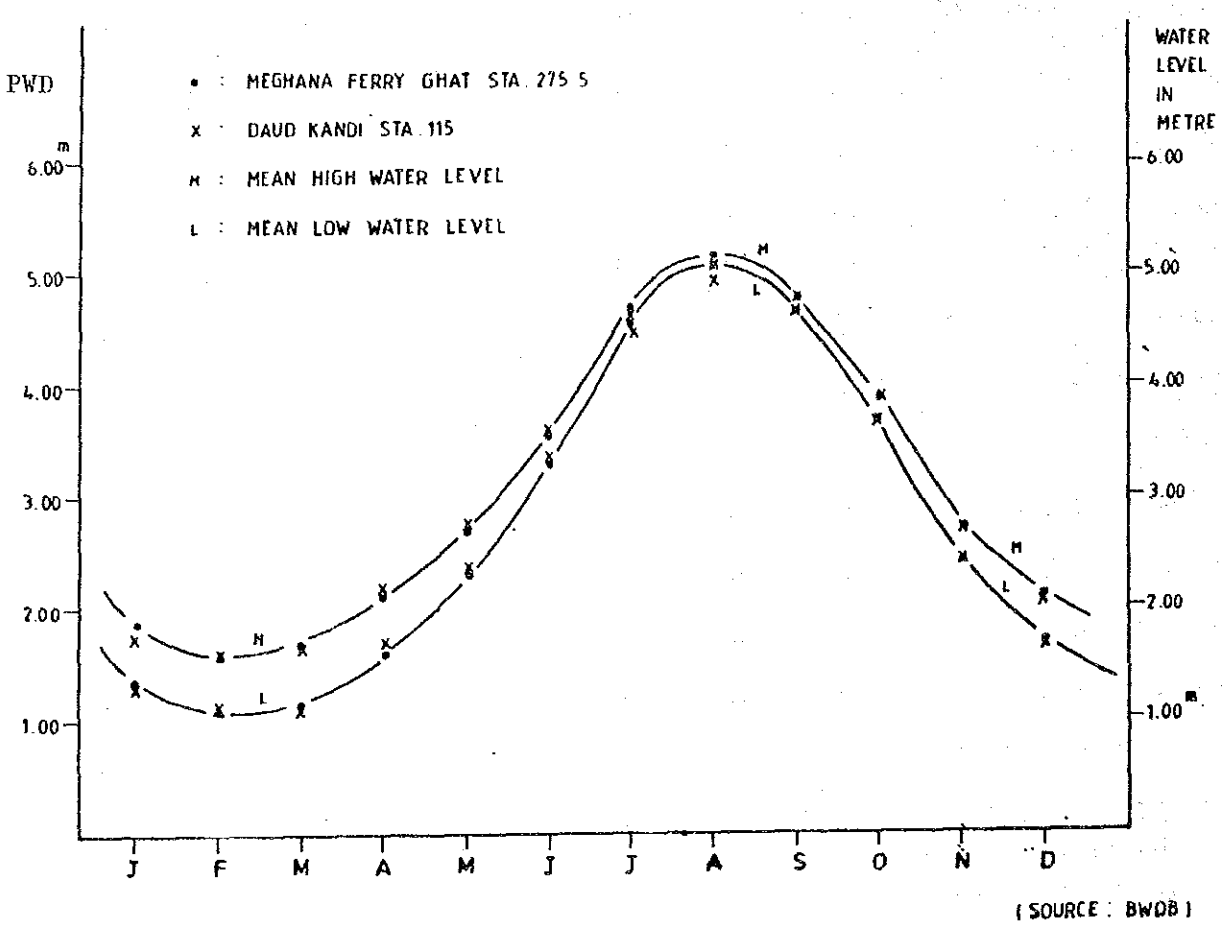
3. National holidays per year and Fridays are 15 days pulas 52 days, 67 days in total

4. Total non-workable days per year is :

$$80 + 67 \left(1 - \frac{80}{365} \right) = 132 \text{ days}$$

5. The ratio of workable days is :

$$(365 - 132) \div 365 = 63.8\%.$$



AP. FIG. 9-1 VARIATION OF RIVER WATER LEVEL

AP. TABLE 9-8 TAXES TABLE CLARIFIED FOR MEGHNA BRIDGE (To Kg)

NO.	ITEM	QUANTITY	DIRECT COST			OTHER TAXES	TOTAL TAX AMOUNT ESTIMATED
			OF GOODS & MATERIALS ①	OF TEMPORARY MATERIALS ②	OF MACHINES & PLANTS ③	COST OF RAW MATERIALS EXCISE & INCOME TAX ④	① + ② + ③ + ④
	(1) Approach Roads						
101	Road Embankment	229,200m³				451,000	451,000
102	Sub-base Course	4,100m²				5,000	5,000
103	Base Course	2,300m²				3,000	3,000
104	Asphalt Surface	2,560 t				385,000	385,000
105	Bridge Surface	810 t				122,000	122,000
106	Replacement of Soft soil	18,000m³				48,000	48,000
107	Sodding	81,000m²				14,000	14,000
108	Box Culvert (5.5x4.0)	52 m				371,000	371,000
* 109	Guard Rail	1,320 m	1,038,000			2,000	1,040,000
110	Slope Protection	1,750m²				78,000	78,000
111	Back Abutment Slab	2 nos				28,000	28,000
112	Drainage, etc.	1 L.S				44,000	44,000
	Sub total of (1)		1,038,000			1,549,000	2,587,000
	(2) Main Span Bridge						
* 201	R.C.D Piles ϕ1.5m	4,070m		13,805,000		2,027,000	15,832,000
* 202	Excavation in River	10,100m³		60,572,000		143,000	60,715,000
203	Seat Concrete (X)	1,350m³				298,000	298,000
204	Footing Concrete (A)	2,770m³				577,000	577,000
205	Pier Concrete (A)	3,740m³				2,313,000	2,313,000
206	TORSTEEL Bar	600 t				1,700,000	1,700,000
207	PC Box Concrete (P)	7,070m³				6,040,000	6,040,000
* 208	Deformed Bar	810 t	9,780,000			537,000	10,317,000
* 209	PC Cable Stressing	420 t	18,636,000			60,000	18,636,000
210	Railing	1,760m				239,000	239,000
* 211	Expansion Joint	11 nos	1,587,000			2,000	1,589,000
212	Foot path & Kerb	1,760m				466,000	466,000
* 213	Center Hinge	18 nos	2,689,000			4,000	2,693,000
* 214	Bearing Shoe	4 nos	288,000				288,000
	Sub total of (2)		32,902,000	74,377,000		14,426,000	121,705,000
	(3) Approach Span Bridge						
301	Precast Concrete Piles	2,550m				396,000	396,000
302	Footing Concrete (A)	240m³				52,000	52,000
303	Pier & Abut Concrete (A)	760m³				680,000	680,000
306	TORSTEEL Bar	921				261,000	261,000
304	PC Girder Concrete (P)	220 m³				129,000	129,000
* 305	Deformed Bar	27 t	326,000			17,000	343,000
* 308	PC Cable Stressing	9 t	636,000			5,000	643,000
210	Railing	100m				14,000	14,000
212	Footpath & Kerb	100m				26,000	26,000
* 307	Bearing Shoe	20 nos	996,000			2,000	998,000
* 211	Expansion Joint	2 nos	289,000				289,000
	Subtotal of (3)		2,249,000			1,582,000	3,831,000
	(4) Temporary Works						
* 401	Temporary Staging	3,500m²		26,011,000		107,000	26,118,000
402	Work Site Reclamation	110,000m³				150,000	150,000
* 403	Temporary Quay	150m	17,415,000			39,000	17,454,000
	Subtotal of (4)		17,415,000	26,011,000		296,000	43,722,000
	(5) Ancillary Works						
501	Stones Placing	11,400m³				2,000	2,000
* 502	Sheet Piling	60m	9,376,000			15,000	9,391,000
503	Gabion Placing	8,300m³				37,000	37,000
* 504	Pier Protection	4 nos	457,000			27,000	484,000
	Sub total of (5)		9,833,000			81,000	9,914,000
600	(6) Traffic Maintenance	1 L.S				5,385,000	5,385,000
* 700	(7) Seasurface Transport	1 L.S			35,873,000		35,873,000
800	(8) Inland Transport	1 L.S				48,000	48,000
* 900	(9) Engineers Office	1 L.S	1,972,000			519,000	2,491,000
(A)	DIRECT COST TOTAL		65,409,000	100,388,000	35,873,000	21,886,000	223,556,000
(B)	OVER HEAD (12%)		—	—	—	13,417,000	13,417,000
(A+B)	INITIAL CONST COST		65,409,000	100,388,000	35,873,000	35,303,000	236,973,000
(C)	CONTINGENCY (7.5%)		4,906,000	7,529,000	2,690,000	2,648,000	17,773,000
(A+B+C)	TOTAL CONST COST		70,315,000	107,917,000	38,563,000	37,951,000	254,746,000

Note : 1. Items with mark * includes imported goods, materials and machines.

2. CDST of temporary materials was estimated by residual rate of 30%.

Item NO.	Full amount of CDST				
201	TK. 19,721,785	x	(1-0.3)	=	TK. 13,805,000
202	TK. 86,531,740	x	(1-0.3)	=	TK. 60,572,000
401	TK. 37,158,800	x	(1-0.3)	=	TK. 26,011,000

3. CDST. of machines and plants was estimated by depreciation rate of 35%.

700	TK. 102,493,123	x	0.35	=	TK. 35,873,000

A P. TABLE 9-9 TAXES TABLE CLARIFIED FOR MEGHNA-GUMTI BRIDGE (Tk Kg)

NO.	ITEM	QUANTITY	DIRECT COST			OTHER TAXES	TOTAL TAX AMOUNTESTIMATED
			OF GOODS & MATERIALS ①	OF TEMPORARY MATERIALS ②	OF MACHINES & PLANTS ③	COST OF RAW MATERIALS EXCISE & INCOM TAX ④	① + ② + ③ + ④
	(1) Approach Roads						
101(G)	Road Embank ment	85,700m³				99,000	99,000
102	Sub base Course	2,850m³				3,000	3,000
103	Base Course	1,560m³				2,000	2,000
104(G)	Asphalt Surface	2,210 t				333,000	333,000
105(G)	Bridge Surface	1,290 t				194,000	194,000
106	Replacement of Softsoil	4,000m³				10,000	10,000
107	Sodding	44,600m²				8,000	8,000
108	Box Culvert (5.5×4.0)	20m				143,000	143,000
* 109	Guard Rail	400m	299,000			1,000	300,000
110	Slope Protection	1,750m²				78,000	78,000
111	Back Abutment Slab	2 Nos				28,000	28,000
112(G)	Drainage. etc	1 L.S				3,000	3,000
	Sub total of (1)		299,000			902,000	1,201,000
	(2) Main Span Bridge						
* 201(G)	R.C.D Piles ϕ1.5m	9,100m		37,148,000		12,309,000	49,457,000
* 202(G)	Excavation in River	10,540m³		64,832,000		273,000	65,105,000
203(G)	Seal Concrete (X)	2,180m³				486,000	486,000
204(G)	Footing Concrete (A)	5,300m³				1,115,000	1,115,000
205(G)	Pier Concrete (A)	2,190m³				1,355,000	1,355,000
206(G)	TORSTEEL Bar	650 t				1,847,000	1,847,000
207(G)	P C Box Concrete (P)	12,930m³				11,066,000	11,066,000
* 208(G)	Deformed Bar	1,480 t	17,870,000			964,000	18,834,000
* 209(G)	PC Cable Stressing	760 t	33,477,000			222,000	33,699,000
210	Railing	3,090m				420,000	420,000
* 211	Expansion Joint	18 nos	2,596,000			4,000	2,600,000
212	Footpath & Kerb	3,090m				818,000	818,000
* 213	Center Hinge	32 nos	4,781,000			7,000	4,788,000
* 214	Bearing Shoe	4 nos	288,000				288,000
	(3) Abutment Works						
301	Precast Concret Piles	2,010m				311,000	311,000
302	Footing Concrete (A)	220m³				48,000	48,000
303	Abutment Concrete (A)	265m³				237,000	237,000
206	TORSTEEL Bar	48 t				136,000	136,000
	Sub total of (2) & (3)		59,012,000	101,980,000		31,618,000	192,610,000
	(4) Tem porary Works						
* 401(G)	Temporary Staging	3,700m²		36,803,000		126,000	36,929,000
402(G)	Work Site Reclamation	270,000m²				262,000	262,000
* 403	Temporary Quay	200m		16,254,000		52,000	16,306,000
	(5) Ancillary Works						
501	Stone Placing	17,500m³				3,000	3,000
* 504	Pier Protection	8 nos	914,000			53,000	967,000
	Sub-total of (4) & (5)		914,000	53,057,000		496,000	54,467,000
600(G)	(6) Traffic Maintenance	1 L.S				3,078,000	3,078,000
* 700(G)	(7) Seasurface Transport	1 L.S			64,786,000		64,786,000
800(G)	(8) Inland Transport	1 L.S				10,000	10,000
* 900(G)	(9) Engineers Office	1 L.S	2,580,000			800,000	3,380,000
(A)	DIRECT COST TOTAL		62,805,000	155,037,000	64,786,000	36,904,000	319,532,000
(B)	OVER HEAD		—	—	—	18,214,000	18,214,000
(A+B)	INITIAL CONST COST		62,805,000	155,037,000	64,786,000	55,118,000	337,746,000
(C)	CONTINGENCY		4,710,000	11,628,000	4,859,000	4,134,000	25,331,000
(A+B+C)	TOTAL CONST COST		67,515,000	166,665,000	69,645,000	59,252,000	363,077,000

Note : 1. Items with mark * include imported goods, materials and machines.

2. COST of temporary materials was estimated by residual rate of 30%.

Item NO.	Full amount of COST		
201 (G)	TK. 53,069,465 × (1-0.3)	=	TK. 37,148,000
202 (G)	TK. 92,616,860 × (1-0.3)	=	TK. 64,832,000
401 (G)	TK. 52,576,630 × (1-0.3)	=	TK. 36,803,000
403	TK. 23,219,650 × (1-0.3)	=	TK. 16,254,000

3. COST of machines and plants was estimated by depreciation rate of 55%.

700	TK. 117,793,412 × 0.55	=	TK. 64,786,000

AP. TABLE 9-10 LAND ACQUISITION AND COMPENSATION COST

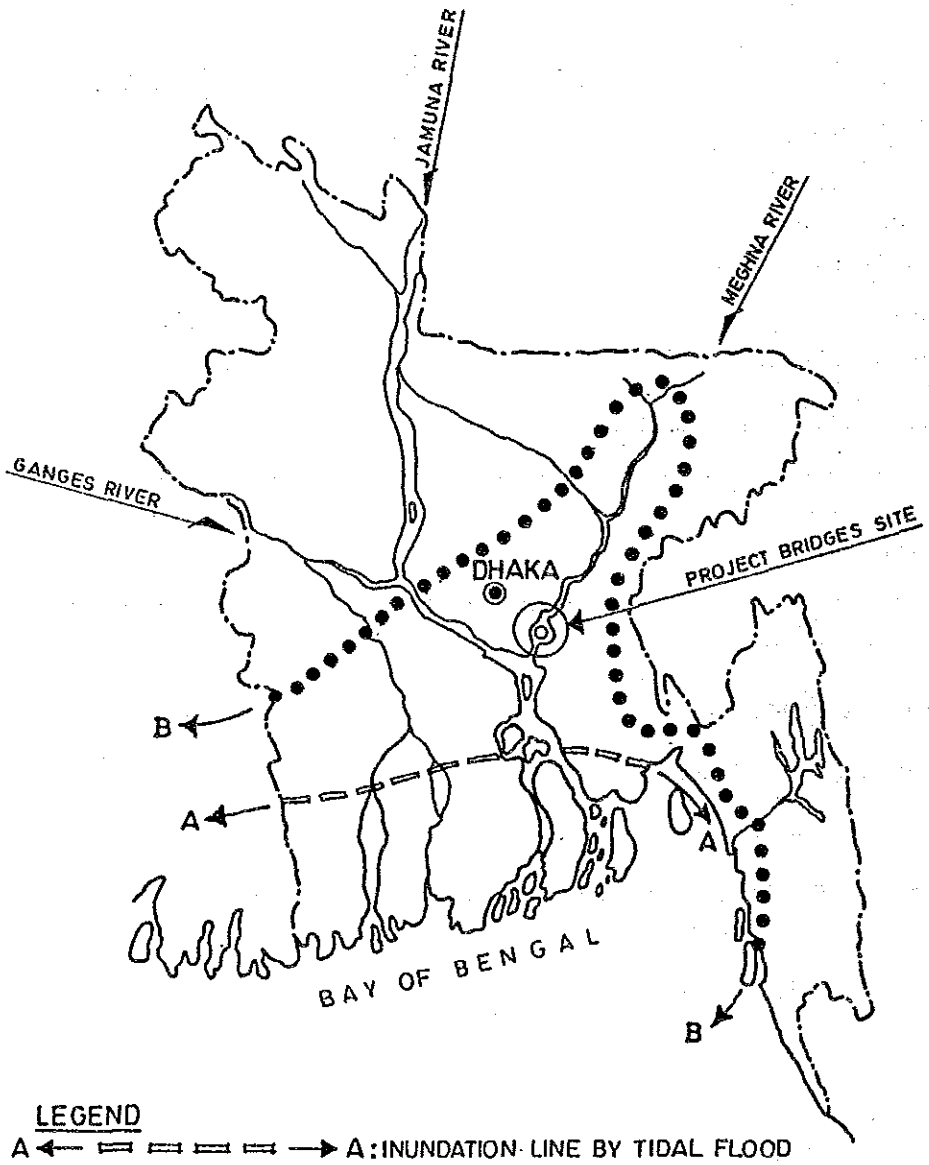
Unit : Taka per Sq.m.

No	Category of Land	Cost
1	Paddy Field	49.42
2	Vegetable Farm	61.78
3	Marsh	12.36
4	Water Course	Free
5	Naturally Reclaimed Land	9.88

No.	Nature of House	Cost
1	Brick House	1,700
2	Wooden House	1,076 - 1,345
3	Thatched or Temporary House	550

Note : Difference between normal residence and shop is negligible

Source: RHD, 1984



LEGEND

A ← = = = = → A : INUNDATION LINE BY TIDAL FLOOD

B ← • • • • • • → B : BACK WATER LINE BY TIDAL FLOOD

SOURCE : REPORT "FLOOD CONTROL IN BANGLADESH" BY DR. MD. SAYEEDUL ISLAM KHAN. 1977. AND BWDB "FLOOD CONTROL FOR EAST PAKISTAN" 1964.

AP. FIG. 9-2 BACK WATER AND INUNDATION BY TIDAL FLOOD

A.P. TABLE 9-11 COST BREAKDOWN OF MEGHNA BRIDGE

1984 June Prices

(Taka)

NO.	Work Item	Unit	Q'tity	Foreign Portion		Local Portion		Tax Portion		Total Financial Amount
				Rate	Amount	Rate	Amount	Rate	Amount	
100	Approach Road									
101	Road filling	C.M	229,200	24.89	5,705,000	106.59	24,431,000	1.97	452,000	30,588,000
102	Sub-base course	C.M	4,100	52.59	216,000	620.80	2,545,000	1.11	4,000	2,765,000
103	Base course	C.M	2,300	66.14	152,000	675.78	1,554,000	1.29	3,000	1,709,000
104	Asphalt surface	Ton	2,560	514.16	1,314,000	818.07	2,091,000	150.32	385,000	3,790,000
105	Bridge surface	Ton	810	514.16	416,000	818.07	662,000	150.32	122,000	1,200,000
106	Replace of soft soil	C.M	18,000	-	-	94.35	1,698,000	2.55	46,000	1,744,000
107	Sodding	S.M	81,000	-	-	17.22	1,395,000	0.17	14,000	1,409,000
108	Box Culvert (5.5x4.0)	L.M	52	26,934.39	1,401,000	51,640.26	2,685,000	7,139.59	371,000	4,457,000
109	Guard rail	L.M	1,390	903.65	1,256,000	31.59	44,000	748.05	1,040,000	2,340,000
110	Slope protection	S.M	1,750	170.56	298,000	755.37	1,322,000	44.64	78,000	1,698,000
111	Back abutment slab	Each	2	51,958.63	104,000	56,995.46	114,000	14,014.90	28,000	246,000
112	Drainage, etc.	L.S	1	271,871.20	272,000	422,804.80	423,000	43,949.30	44,000	739,000
	SUB TOTAL				11,134,000		38,964,000		2,587,000	52,685,000
200	Main Span Bridge									
201	R.C.D pile ø1.5m	L.M	4,070	10,551.46	42,944,000	3,058.47	12,450,000	3,883.97	15,832,000	71,226,000
202	Excavation in river	C.M	10,100	6,855.28	69,238,000	229.82	2,321,000	6,011.37	60,715,000	132,274,000
203	Seal concrete (X)	C.M	1,350	726.31	981,000	863.33	1,165,000	221.01	298,000	2,444,000
204	Footing concrete (A)	C.M	2,770	988.17	2,737,000	1,131.80	3,135,000	208.24	577,000	6,449,000
205	Pier concrete (A)	C.M	3,740	1,212.75	4,536,000	1,050.23	3,928,000	618.56	2,313,000	10,777,000
206	TORSTEEL bar	Ton	600	9,944.74	5,967,000	9,403.57	5,642,000	2,632.74	1,700,000	13,309,000
207	PC Box concrete (P)	C.M	7,070	2,791.25	19,734,000	1,210.59	8,559,000	854.29	6,040,000	34,333,000
208	Deformed bar	Ton	810	16,479.92	13,349,000	4,452.08	3,606,000	12,737.19	10,317,000	27,272,000
209	PC cable stressing	Ton	420	60,354.27	25,349,000	9,895.70	4,156,000	44,377.04	18,638,000	48,143,000
210	Railing	L.M	1,760	469.13	826,000	677.32	1,192,000	135.93	239,000	2,257,000
211	Expansion joint	Each	11	105,695.33	1,163,000	4,075.89	45,000	144,422.28	1,589,000	2,797,000
212	Foot path & kerb	L.M	1,760	328.77	579,000	239.95	422,000	264.61	466,000	1,467,000
213	Centre hinge	Each	18	78,976.38	1,421,000	2,449.24	44,000	149,618.68	2,693,000	4,158,000
214	Bearing shoe 150t	Each	4	38,397.46	153,000	2,611.23	10,000	72,031.57	288,000	451,000
300	Approach Span Bridge									
301	Precast concrete pile	L.M	2,560	1,007.60	2,580,000	811.06	2,076,000	154.54	396,000	5,052,000
302	Footing concrete (A)	C.M	240	1,235.17	297,000	1,582.75	380,000	217.29	52,000	729,000
303	Pier & Abut. concrete (A)	C.M	760	1,424.19	1,082,000	1,066.63	811,000	895.28	680,000	2,573,000
206	TORSTEEL bar	Ton	92	9,944.74	915,000	9,403.57	865,000	2,832.74	261,000	2,041,000
304	PC beam concrete (P)	C.M	220	2,527.51	556,000	4,814.47	1,059,000	585.55	129,000	1,744,000
305	Deformed bar	Ton	27	9,299.01	251,000	4,293.26	116,000	12,703.79	343,000	710,000
306	PC cable stressing	Ton	9	66,800.04	601,000	6,375.77	57,000	71,478.39	643,000	1,301,000
210	Railing	L.M	100	469.13	47,000	677.32	68,000	135.93	14,000	129,000
212	Foot path & Kerb	L.M	100	328.77	33,000	239.95	24,000	264.61	26,000	83,000
307	Bearing shoe 50t	Each	20	27,562.90	551,000	2,611.23	52,000	49,930.75	999,000	1,602,000
211	Expansion joint	Each	2	105,695.33	211,000	4,075.89	8,000	144,422.26	289,000	508,000
	SUB TOTAL				196,101,000		52,191,000		125,537,000	373,829,000
400	Temporary Works									
401	Temporary staging	S.M	3,500	8,750.96	30,628,000	1,349.97	4,725,000	10,647.45	25,118,000	61,471,000
402	Work site reclamation	C.M	110,000	9.93	1,092,000	81.74	8,991,000	1.36	150,000	10,233,000
403	Temporary quay	M	150	93,016.90	13,953,000	6,882.97	1,032,000	116,359.94	17,454,000	32,439,000
	SUB TOTAL				45,673,000		14,748,000		43,722,000	104,143,000
500	Ancillary Works									
501	Stones placing	C.M	11,400	-	-	902.13	10,284,000	0.17	2,000	10,286,000
502	Sheet piling	M	60	123,908.08	7,434,000	2,743.19	165,000	156,518.19	9,391,000	16,990,000
503	Gabion placing	C.M	8,300	-	-	4,363.97	36,221,000	4.47	37,000	36,258,000
504	Pier Protection	Each	4	173,947.32	696,000	43,896.85	176,000	120,897.05	484,000	1,356,000
	SUB TOTAL				8,130,000		46,846,000		9,914,000	64,890,000
600	Traffic Maintenance	L.S	1	-	7,451,000	-	3,508,000	-	3,384,000	14,353,000
700	Seasurface Tansport	L.S	1	-	11,706,000	-	-	-	35,873,000	47,579,000
800	Inland Transport	L.S	1	-	329,000	-	3,157,000	-	48,000	3,534,000
900	Engineer's Office	L.S	1	-	2,505,000	-	4,856,000	-	2,491,000	9,852,000
A.	DIRECT COST TOTAL				283,039,000		164,270,000		223,556,000	670,865,000
B.	OVER HEAD				50,947,000		88,545,000		13,417,000	153,909,000
A+B	INITIAL CONST. COST				333,986,000		253,815,000		236,973,000	824,774,000
C.	PHYSICAL CONTINGENCY				25,049,000		19,036,000		17,773,000	61,858,000
A+B+C	TOTAL CONST. COST				359,035,000		272,851,000		254,746,000	886,632,000
	(COMPONENT RATIOS)				(40.5%)		(30.8%)		(28.7%)	(100.0%)

Source: The Study Team

A.P. TABLE 9-12 COST BREAKDOWN OF MEGHNA-GUMTI BRIDGE

1984 June Prices (Taka)

NO.	Work Item	Unit	Q'tity	Foreign Portion		Local Portion		Tax Portion		Total Financial
				Rate	Amount	Rate	Amount	Rate	Amount	Amount
100	Approach Road									
101(G)	Road filling	C.M	85,700	17.08	1,525,000	59.08	5,062,000	1.16	99,000	6,686,000
102	Sub-base course	C.M	2,850	52.59	150,000	620.80	1,769,000	1.11	3,000	1,922,000
103	Base course	C.M	1,560	66.14	103,000	675.78	1,054,000	1.29	2,000	1,159,000
104(G)	Asphalt surface	Ton	2,210	515.30	1,139,000	816.98	1,805,000	150.56	333,000	3,277,000
105(G)	Bridge surface	Ton	1,290	513.46	662,000	817.08	1,054,000	150.72	195,000	1,911,000
106	Replace of soft soil	C.M	4,000	-	-	94.35	377,000	2.55	10,000	387,000
107	Sodding	S.M	44,600	-	-	17.22	1,214,000	0.17	8,000	1,222,000
108	Box culvert (5.5x4.0)	L.M	20	26,934.39	539,000	51,640.20	1,033,000	7,139.59	143,000	1,715,000
109	Guard rail	L.M	400	903.65	361,000	31.59	13,000	748.05	299,000	673,000
110	Slope Protection	S.M	1,750	170.56	299,000	755.37	1,322,000	44.64	78,000	1,699,000
111	Back abutment slab	Each	2	51,958.63	104,000	56,995.46	114,000	14,014.90	28,000	246,000
112(G)	Drainage, etc.	L.S	1	163,122.72	163,000	253,682.88	254,000	3,270.80	3,000	420,000
	SUB TOTAL				5,045,000		15,071,000		1,201,000	21,317,000
200	Main Span Bridge									
201(G)	R.C.D. pile ϕ1.5m	L.M	9,100	12,713.55	115,693,000	5,822.43	52,984,000	5,434.90	49,458,000	218,135,000
202(G)	Excavation in viver	C.M	10,540	7,262.54	76,558,000	446.08	4,702,000	6,176.95	65,105,000	146,365,000
203(G)	Seal concrete (X)	C.M	2,180	935.35	2,039,000	891.54	1,944,000	223.13	486,000	4,469,000
204(G)	Footing concrete (A)	C.M	5,300	1,228.07	6,509,000	1,202.55	6,374,000	210.38	1,115,000	13,998,000
205(G)	Pier concrete (A)	C.M	2,190	1,336.87	2,928,000	1,055.76	2,312,000	618.94	1,355,000	6,595,000
206(G)	TORSTEEL bar	Ton	650	9,893.68	6,431,000	10,042.83	6,528,000	2,840.84	1,846,000	14,805,000
207(G)	PC Box concrete (P)	C.M	12,930	2,516.95	35,544,000	1,284.99	16,615,000	853.87	11,066,000	60,225,000
208(G)	Deformed bar	Ton	1,480	13,209.87	19,551,000	7,403.06	10,957,000	12,725.51	18,834,000	49,342,000
209(G)	PC cable stressing	Ton	760	60,619.30	46,071,000	15,927.22	12,105,000	44,340.90	33,699,000	91,875,000
210	Railing	L.M	3,090	469.13	1,450,000	677.32	2,093,000	135.93	420,000	3,963,000
211	Expansion joint	Each	18	105,695.33	1,902,000	4,075.89	73,000	144,422.26	2,600,000	4,575,000
212	Foot path & kerb	L.M	3,090	328.77	1,016,000	239.95	741,000	264.61	818,000	2,575,000
213	Centre hinge	Each	32	78,976.38	2,527,000	2,449.24	78,000	149,618.68	4,788,000	7,393,000
214	Bearing shoe	Each	4	38,397.46	154,000	2,611.23	10,000	72,031.57	288,000	452,000
300	Abutment Works									
301	Precast concrete pile	L.M	2,010	1,007.60	2,025,000	811.06	1,630,000	154.54	311,000	3,966,000
302	Footing, concrete (A)	C.M	220	1,235.17	272,000	1,582.75	348,000	217.29	48,000	668,000
303	Abutment concrete (A)	C.M	265	1,424.19	377,000	1,066.63	283,000	895.28	237,000	897,000
206(G)	TORSTEEL bar	Ton	48	9,893.68	477,000	10,042.83	451,000	2,840.84	136,000	1,064,000
	SUB TOTAL				318,524,000		120,228,000		192,610,000	631,362,000
400	Temporary Works									
401(G)	Temporary staging	S.M	3,700	11,135.47	41,201,000	1,422.95	5,265,000	9,960.92	36,929,000	83,395,000
402(G)	Work site reclamation	C.M	270,000	7.84	2,117,000	54.69	14,766,000	0.97	262,000	17,145,000
403	Temporary quay	M	200	93,016.90	18,603,000	6,882.97	1,377,000	81,529.92	16,306,000	36,286,000
	SUB TOTAL				61,921,000		21,408,000		53,497,000	136,826,000
500	Ancillary Works									
501	Stones placing	C.M	17,500	-	-	902.15	15,787,000	0.17	3,000	15,790,000
504	Pier protection	Each	8	173,947.32	1,392,000	43,898.83	351,000	120,897.05	967,000	2,710,000
	SUB TOTAL				1,392,000		16,138,000		970,000	18,500,000
600(G)	Traffic Maintenance	L.S	1	-	11,329,000	-	3,823,000	-	3,078,000	18,230,000
700(G)	Seasurface Transport	L.S	1	-	6,821,000	-	-	-	64,786,000	71,607,000
800(G)	Inland Transport	L.S	1	-	57,000	-	659,000	-	10,000	726,000
900(G)	Engineer's Office	L.S	1	-	3,392,000	-	5,346,000	-	3,380,000	12,118,000
A.	DIRECT COST TOTAL				408,481,000		182,673,000		319,532,000	910,686,000
B.	OVER HEAD				73,527,000		102,674,000		18,214,000	194,415,000
A+B	INITIAL CONST. COST				482,009,000		285,347,000		337,746,000	1,105,101,000
C.	PHYSICAL CONTINGENCY				36,151,000		21,401,000		25,331,000	82,883,000
A+B+C	TOTAL CONST. COST				518,159,000		306,748,000		363,077,000	1,187,984,000
	(COMPONENT RATIOS)				(43.6%)		(25.8%)		(30.6%)	(100.0%)

Source: The Study Team

Ap.Table 10–1 Gross Domestic Products of Bangladesh, at Constant (1972–73) Prices

(Million taka)

Sectors	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83 (P)
1. Agriculture ...	33,572	33,082	33,136	34,908	35,225	36,751
i) Crops ...	26,003	26,151	26,068	27,627	27,441	28,613
ii) Forestry ...	1,490	1,520	1,579	1,703	1,882	1,960
iii) Livestock ...	3,166	3,308	3,392	3,477	3,680	3,857
iv) Fisheries ...	2,913	2,103	2,097	2,101	2,222	2,321
2. Mining and Quarrying ...	5	4	4	1	2	2
3. Industry: ...	6,209	7,065	7,210	7,602	7,722	7,598
i) Large scale ...	3,310	4,094	4,095	4,394	4,425	4,208
ii) Small scale ...	2,899	2,971	3,115	3,208	3,297	3,390
4. Construction ...	2,099	3,188	2,509	2,845	3,004	3,172
5. Power, Gas, Water and Sanitary Services ...	191	193	225	250	296	319
6. Transport, Storage and Communication ...	4,258	4,612	4,715	4,845	4,852	5,191
7. Trade Services * ...	5,617	6,253	6,781	6,866	6,272	6,432
8. Housing Services ...	4,957	5,071	5,184	5,297	5,422	5,548
9. Public Administration and Defence* ...	1,561	1,446	1,555	2,733	2,914	2,728
10. Banking and Insurance ...	710	924	1,139	1,387	1,293	1,273
11. Professional and Misc. Services* ...	4,161	4,389	4,637	4,910	5,225	5,565
12. G D P at constant market prices ...	63,340	66,227	67,095	71,644	72,227	74,579
13. Indirect tax net of subsidies (–) ...	3,100	3,414	3,509	4,130	3,767	4,050
14. G D P at constant factor cost	60,240	62,813	63,586	67,514	68,460	70,529
15. Net factor income from r.o.w. (+) ...	532	706	1,177	1,785	1,574	1,512
16. G N P at constant factor cost ...	60,772	63,519	64,763	69,299	70,034	72,041
17. Net national products (income) ...	56,594	59,175	60,270	64,541	64,939	67,155
Population (million) ...	83.7	85.6	87.7	89.9	91.6	93.6
Per capita income GDP at f.c. (Tk) ...	720	734	725	751	747	754
Per capita income GNP at f.c. (Tk) ...	726	742	738	771	765	770
Per capita income NNP at f.c. (Tk) ...	676	691	687	718	709	717
Annual rise of GDP at constant m.p. ...	6.5	4.6	1.3	6.8	0.8	3.3
Annual rise of GDP at constant f.c. ...	6.9	4.3	1.2	6.2	1.4	3.0
Annual rise of GNP at constant f.c. ...	7.4	4.5	2.0	7.0	1.1	2.9
Annual rise of NNP (income) at f.c. ...	7.5	4.6	1.9	7.1	0.6	3.4
Annual rise of per capita GDP at f.c. ...	4.5	1.9	–1.2	3.6	– 0.5	0.9
Annual rise of per capita GNP at f.c. ...	4.9	2.2	–0.5	4.5	– 0.8	0.7
Annual rise of per capita NNP (income) ...	4.9	2.2	–0.6	4.5	1.3	1.1
National income deflator	231	261	295	326	367	382

Source: B.B.S.
*Revised

f.c. – factor cost
r.o.w. – rest of the world.

AP. NOTE 10–1 DESCRIPTION OF ECONOMIC ACTIVITIES BY SECTOR OF DHAKA, CHITTAGONG, COMILLA AND NOAKHALI DISTRICTS (Source: District Statistics 1983, B.S.S.)

農　業

1. ダッカ地区

ダッカは典型的な農業地区である。この地区の全面積の７３％が農業に使用されている（全国平均は６２％）。この地区の住民の５０％は生計のため農業に従事している（全国平均は６４％）。この片寄りは、ダッカが首都であるのも１つの要因である。この地区の全世帯の３３％が農業を営んでいる（全国平均は４５％）。

a) 農作物

米、ジュート、豆類、油種、麦、砂糖きびはこの地区の重要な作物である。全国平均は６９％であるが、この地区の６２％の栽培地は田圃である。ジュートは９％（全国平均は６％）、豆類は１％（全国平均は１０％）、油種は５％（全国平均は４％）、麦は３％（全国平均は２％）、砂糖きびは１％で全国平均と同じである。

この地区の作付度は１７６％である（全国平均は１６５％）。生産量をあげるため近代技術を使用している。農家の２９％は灌漑を利用している（全国平均は３０％）。純播種地の１４％は灌漑されている（全国平均は２２％）。農家の６８％は化学肥料をほどこしている（全国平均は５６％）。

b) 畜　産

この地区の畜産資源は全国平均値並みである。８５％の農家が家畜を飼っている。世帯当り平均家畜の保有頭数は2.7頭（全国平均では3頭）である。水牛はめったに見られない。１８％の農家が山羊を飼っている（全国平均は４０％）。４％が羊を飼っている（同じく２％）。７１％の農家が鶏を飼っている（全国平均と同じ）。世帯当りの家禽数は6.2羽である。４％の農家がアヒルを飼って（全国平均は3.9％）いて、１世帯当りのアヒルは１羽（全国平均で２羽）である。

c) 森　林

この地区の森林地は非常に少ない。地区面積の３％が森林保護下にある（全国平均は１５％）。農家の林と合わせれば4.9％になる（全国平均で１6.8％）。

d) 水　産

ダッカ地区の水産資源は良好である。沼地、池、川は、それぞれ全地区の1.5％、0.8％、7％を占める（全国平均ではそれぞれ2％、1％、6％）。

2. チタゴン地区

a) 農作物

潮水が届くところの土質は砂、粘土などの肥沃な土であって、水田耕作に適している。大部分の土は固く、ローム質の土質であって、年2～3回の米穀を成育し、タバコ、ジュート等をも育てる。41％の土地は農業用である。

1980－81年には、この地区の7,000平方粁の土地のうち18.5％は農作に適さなかった。30.66％が森林で2.18％は栽培されず、8.62％は休作で、20.98％は単作地、15.19％は二毛作地、3.87％は三毛作地であった。

主な農作物は重要な順位から米、ジュート、タバコ、からし、メロン、野菜、砂糖きび等である。他の穀物や豆類も栽培される。89％の作地は米作、3％は油種、4％はその他の作物用である。

この地区の作付度は153％である。農業生産の改良のため灌漑が施されている。70％の農家は灌漑を使用している。37％の純播種地は灌漑されている。97％の農家は化学肥料を使用している。

b) 茶

バングラデシュの153茶農園のうち20茶農園がこの地区にある。全面積にして3,060ヘクタールになる。1980年のこの地区の茶生産量は約90,260Kgで、これは全国生産の約4％にあたる。

c) 畜　産

水牛、牛、山羊、羊等はチタゴン地区の畜産を構成する。92％の農家は家畜を飼っている。農家1世帯当りの家畜数は3頭である。2％の農家が水牛を飼っている（全国平均で2％）。31％の農家は山羊を飼っている。羊はめったにいない。76％の農家は鶏を飼っている。農家1世帯当りのアヒルは1羽である。

d) 森　林

森林面積は2,１３０平方粁ある。この地区の３１％は森林地であって、チークをはじめその他の種類の林産物がある。

e) 水　産

チタゴンは水産で有名である。海洋漁撈トロール船が使用されている。チタゴンでの魚の種類は、この地区が海岸に接し、河川や湿地を含んでいるので、特に多い。チタゴンの大陸棚は漁場に適しており、河川によって餌が流下され、気候がよいので、いろいろな海水魚がとれる。この地区の7,０００平方粁の土地のうち、3.5％が沼地、１％が池で３％が河川である。

f) 海　塩

近年、製塩業はこの地区で有力な家内工業に成長しつつある。生産者は乾期に溝から海水を入れて簡単に蒸発させる方法か、または浅い鍋に海水を煮沸させる方法を使用している。１９８１－８２年には1,４５０トンの塩が、この地区の小企業者によって生産された。

3. コミラ地区

a) 農作物

農作は地区内総生産の３3.９％にあたる。この地区の６1.５％にあたる約４２０万人が農民として登録されている（全国平均は６４％）。１９７７年の農業調査によれば、この地区の７４％が農耕地となっている。主要作物は米、麦、ジュート、砂糖きび、馬齢薯である。作付面積は５19,６００ヘクタールであるが、重複作付面積は８４7,４００ヘクタールで、作付度は１５３％である。約１３6,０００ヘクタールの農地（２6.１０％）が灌漑されており、８４％の農家が化学肥料を使用している。

コミラ地区では１９８１－８２年に作付面積のうち７４％が米を栽培し（全国平均で７９％）、麦は8.９３％の作付面積に栽培された。同時期にはジュートは4.3％の作付面積であった。

b) 畜　産

１９７７年の農業調査によれば、この地区の農家の７４％は家畜を飼っていた。農

家1世帯当りでは平均3頭である。３２％の農家が山羊を飼っており、世帯当りでは2.4頭となる。アヒルや家禽はそれぞれ５５％、８０％の農家が飼っており、一世帯当りの飼育数はそれぞれ4.2および8.5羽である。畜産の地区総生産に占める割合は5.１７％（全国平均で4.8％）である。

c）森　林

森林部門の地区総所得に占める割合は無視できる程非常に小さく、７６８.９ヘクタールで、地区総生産の0.０７％（全国平均で0.１２％）である。

d）水　産

この地区の水産部門は、地区総生産の5.１９％（全国平均で３％）である。地区総面積の7.4％、４９７平方粁が河川である。

4. ノアカリ地区

a）農作物

農作部門は、地区総所得の３８％を占め重要部門である。６５％の人口が農耕で生計をたてている。主要農産物は稲、麦、ジュート、砂糖きび、唐辛子、ココナッツ、ビンロ子等である。この地区の土地の７６％が農耕地である。純作付面積は344,000ヘクタール、総作付面積は５２２,０００ヘクタールで、作付度は１５２％である。農家の３９％が灌漑を利用しており、７７％が化学肥料を使用している。

b）家　畜

１９７７年の農業調査によれば、この地区の農家の７４％が家畜を飼っていた。1世帯当りの平均家畜数は2.9頭であった。農家の１％が水牛を飼い、２６％が山羊を飼っていて、1世帯当り平均2頭になる。８２％の農家が家禽を飼っている。1世帯当りのアヒルの飼育数は4.8羽である。家畜の地区総生産に占める割合は7.4％である。

c）森　林

この地区の森林地は１３４.６平方粁で、地区面積の2.５６％にあたる。植林計画が終了すると、森林地の増加の可能性がある。林業部門の地区総所得に占める割合は１％以下である。

d) 水　産

この地区の水産部門は、地区総所得の２％を占める。この地区は西側が海岸部でベンガル湾に接し、河川もあるので、水産資源には恵まれている。この地区では川、池、沼地はそれぞれ全国の7.2％、１0.0％、１２％にあたる。

工　業

1. ダッカ地区

ダッカ地区では、伝統的に織業が盛んである。現在、全国の２７％の手織所と手織器具がこの地区にある。全国の４７％の手織物はこの地区で全国の３６％にあたる織工によって生産される。全国のジュート織物工場の３６％がこの地区にあって、全国の４９％のジュート織職人を雇用している。この地区には全国の５５％の繊維工場があって、それと同じ割合の繊維品を生産している。この国の主要工場の３１％がこの地区にある。この国の冷凍庫の４０％がこの地区にあって、大部分が馬齢諸用に使用されている。この地区にはすべての工業が多く集っている。

2. チタゴン地区

チタゴンは、バングラデシュでは工業的に発達したところである。国際港が近くにあるので、必然的に重、中、軽工業が設備された。重要な工種としては、ジュート、綿、機械、電気、化学、マッチ、たばこ、合板、製材、製革等がある。バングラデシュの唯一の製油所と製鉄所がここにある。現在、この国の３％の手織所が営まれて、全国生産の１％を占めている。

3. コミラ地区

コミラ地区の工業部門の地区総生産に対する割合は7.１４％である（全国平均で9.７％）。この地区では１3,0００の家内工業所があって（全国の4.７２％）、３７,０００人が家内工業で働いている。コミラ地区には６繊維工場、３ジュート工場がある（それぞれ全国の１0.７２％、4.２９％にあたる）。主要工場の中には食糧が４１ケ、タバコ５ケ、繊維１２ケ、化学品６ケ、薬品１２ケがある。

4. ノアカリ地区

この地区の工業活動水準は低い。現在8,０００の手織所と7,０００の家内工業所がある（それぞれ全国の３％、４％にあたる）。約11,０００人が手織所で働き、他の小規模の家内工業所で働くのは21,０００人で（全国の割合はそれぞれ２％、４％）ある。地区内には、ジュート繊維工場が３ケ、綿繊維工業が２ケ、鉄工所８ケ、アルミニューム器具製作所12ケ、自動精米所が８ケ所ある。地区総所得の工業の占める割合は５％である（全国平均では８％）。

AP. NOTE 10-2 OUTLINE OF AGRICULTURAL DEVELOPMENT PROJECTS IN STUDY AREA

1) Meghna-Dhonagoda プロジェクト：

本プロジェクトはダッカの南東約５０Kmのところに位置し、１９,０３０ヘクターの面積がある。このプロジェクトは１７,５１０ヘクタールの土地の洪水予防と排水、および１４,３７５ヘクタールの灌漑を施すものである。

工事は段階ごとに進められるが、完成は１９８５年６月３０日である。

事業の完成には毎年１１３,０００トンの米および1,０００トンの麦の増産がある。毎年投入される化学肥料は１８,５５０トンと見積られている。

投資額は２７百万米ドルである。

2) Chandpur 灌漑プロジェクト：

１９７８年に完了したこのプロジェクトは５３,８５０ヘクターの土地に洪水防御、排水の役割を果たし、３０,３６５ヘクタールの農地に灌漑を施している。

本プロジェクトは毎年１０９,０００トンの米および１８,０００トンの麦の増産が計画されている。毎年投入される化学肥料は１９,６００トンである。

投資額は３６６.５２百万ドルである。

3) Muhuri 灌漑プロジェクト：

本プロジェクトは灌漑施設を施し、雨期での洪水の範囲、深さおよび期間を減少するものである。その概略は下記の通り。

投資金額	：５９２.４８百万米ドル
全面積	：２７,１２０ヘクタール
洪水防御	：　－
灌漑面積	：２０,２４０ヘクタール
穀物の増産量	：６４,６８０メートル・トン

4) Narayanganj－Narsingang灌漑プロジェクト：

本プロジェクトは同種の灌漑開発計画に従事する農民に対して、適用すべき農作業を集

中して訓練し、はげみを与えるものである。その概略は下記の通り。

投資金額	：４０.１５百万米ドル
全面積	：1,３００ヘクタール
純面積	：1,０００ヘクタール
穀物の増産量	：米　6.７９メートル・トン
	麦　0.１８メートル・トン

Ap.Table 10--2 Inventory of Dhaka--Chittagong Highway

Road portion and length	Location in millage From: Dhaka	Length in miles	Thickness of pavement with seal coat by width			
			22 ft width	20 ft width	18 ft width	Exceptional width
Dhaka–Demra 4.25 miles (6.8 km)	0–4.25	4.25			18"	
Demra–Daudkandi 20.75 miles (33.2 km)	4.2.5–7 7 – 14 4 – 25	2.75 7.00 11.00	 13" 18"	19"		
Daudkandi–Comilla 32.0 miles (51.2 km)	From : Daudkandi 0 – 1 1 – 4 4 – 6 6 – 14 14 – 21 21 – 22 22 – 23 23 – 24 24 – 25 25 – 26 26 – 29.5 29.5 – 32	 1.00 3.00 2.00 8.00 7.00 1.00 1.00 1.00 1.00 1.00 3.50 2.50	 21" 13.5" 16.5" 12" 9" 23" 14"		 13.5" 13.5" 9" 14"	 30' width 17"
Comilla–Feni 31.0 miles (49.6 km)	From : Comilla 0 –1.5 1.5 – 2.5 2.5 – 3 3 – 4 4 – 13 13 – 25 25 – 26 26 – 27 27 – 31	 1.50 1.0 0.50 1.00 9.00 12.00 1.00 1.00 4.00			 15" 14" 15" 16" 17" 16" 14"	25'to 40' width 17"
Feni – Suvapur 22.0 miles (35.2 km)	0 – 3 3 – 11 11 – 12 12 – 13 13 – 14 14 – 15 15 – 16 16 – 18 18 – 19 19 – 20 20 – 22	3.00 8.00 1.00 1.00 1.00 1.00 1.00 2.00 1.00 1.00 2.00	 19" 19" 19"	19" 19" 19" 19" 	19" 19" 19" 19" 19"	
Suvapur – Chittagong 50.0 miles (80.0 km)	From : Suvapur 0 – 25 25 – 45 44 – 50	 25.00 20.00 5.00	 18" 16.5"		 16.5"	

Source : Roads & Highways Department

AP. NOTE 10–3 CONTENTS OF IMPROVEMENT PROGRAMMES ON DHAKA-CHITTAGONG HIGHWAY

1) Polder Road (Direct link from Dhaka to Satalakhaya Bridge):

Road length	: 7.76 km
Crest width	: 19.50 m
Pavement width	: 13.40 m
Number of bridges and running length	: one bridge and 24.4 m
Start of construction	: 1983–84
Schedule for completion	: 1987–88
Total project cost	: Tk.123.75 million
Finance	: Bangladesh Government

2) Comilla and Chandina Bypass Roads:

Road length	: 23.5 km
Crest width	: 11.00 m
Pavement width	: 6.70 m
Number of bridges and running length	: 7 bridges and 190.0 m
Start of construction	: 1980–81
Schedule of completion	: 1985–86
Total project cost	: Tk.416.10 million (revised)
Finance	: Bangladesh Government with I.D.A. partly.

3) Feni Bypass Road (Pavement Improvement):

Road length	: 28.8 km
Crest width	: 12.19 m
Pavement width	: 6.70 m
Number of bridges and running length	: 3 bridges and 547 m
Present Position	: Original construction work completed a few years back with the project cost of Tk.1,541.0 million. However in some portions of the road, pavement improvement is programmed, which is under preparation.

Schedule for completion	:	1986
Revised project cost	:	Tk.217.758 million (under preparation)
Finance	:	Bangladesh Government with I.D.A. partly

4) Widening: Daudkandi-Chittagong Portion:

Road length	:	158 km
Crest widened to	:	11.00 m
Pavement widened to	:	6.70 m
Start of implementation	:	1964–65
Schedule for completion	:	1986–87
Present position	:	70% progress
Total project cost	:	Tk.577.4 million
Finance	:	Bangladesh Government

5) Reconstruction of Bridges on Dhaka-Chittagong Highway:

Total project cost	:	Tk.68.706 million
Upto date expenditure made	:	Tk.29.10 million
Finance	:	Bangladesh Government

AP. TABLE 11-1 NUMBER OF MECHANISED VEHICLES ON ROAD BY TYPE OF VEHICLES CLASSIFIED BY DISTRICTS AS ON JULY 30, 1981

	District	Private cars	Taxis	Buses	Trucks	Jeeps	Station wagongs	Auto-Rickshaws	Motor-cycles	Total
1.	Chittagong	6945 (30.1)	443 (39.8)	2155 (30.0)	4068 (30.1)	1303 (16.9)	782 (22.0)	5129 (42.8)	6279 (13.5)	27104 (23.7)
2.	Chittagong H.T.	120 (0.5)	87 (7.8)	63 (0.9)	681 (5.0)	208 (2.7)	62 (1.7)	76 (0.6)	341 (0.7)	1638 (1.4)
3.	Comilla	33 (0.1)	12 (1.1)	167 (2.3)	238 (1.8)	100 (1.3)	44 (1.2)	316 (2.6)	687 (1.5)	1597 (1.4)
4.	Noakhali	66 (0.3)	0 (0.0)	345 (4.8)	473 (3.5)	59 (0.8)	72 (2.0)	751 (6.3)	912 (2.0)	2678 (2.3)
5.	Sylhet	610 (2.6)	0 (0.0)	362 (5.0)	160 (1.2)	370 (4.8)	28 (0.8)	752 (6.3)	1299 (2.8)	3581 (3.1)
6.	Dhaka	13719 (59.4)	239 (21.5)	1879 (26.2)	3856 (28.6)	3591 (46.5)	1878 (52.9)	3214 (26.8)	17684 (38.1)	46066 (40.3)
7.	Faridpur	23 (0.1)	94 (8.5)	127 (1.8)	167 (1.2)	114 (1.5)	29 (0.8)	258 (2.2)	463 (1.0)	1275 (1.1)
8.	Jamalpur	0 (0.0)	6 (0.5)	2 (0.0)	9 (0.1)	12 (0.2)	0 (0.0)	14 (0.1)	88 (0.2)	131 (0.1)
9.	Mymensingh	89 (0.4)	9 (0.8)	107 (1.5)	224 (1.7)	74 (1.0)	35 (1.0)	75 (0.6)	1825 (3.9)	2438 (2.1)
10.	Tangail	56 (0.2)	3 (0.2)	87 (1.2)	188 (1.4)	47 (0.6)	39 (1.2)	61 (0.5)	454 (1.0)	935 (0.8)
11.	Barisal	8 (0.0)	12 (1.1)	152 (2.1)	97 (0.7)	49 (0.6)	12 (0.3)	40 (0.3)	251 (0.5)	621 (0.5)
12.	Jessore	205 (0.9)	4 (0.4)	677 (9.4)	830 (6.1)	223 (2.9)	55 (1.6)	237 (2.0)	1877 (4.0)	4108 (3.6)
13.	Khulna	744 (3.3)	102 (9.2)	465 (6.5)	846 (6.3)	373 (4.8)	250 (7.0)	475 (4.0)	2099 (4.6)	5354 (4.8)
14.	Kushtia	61 (0.3)	43 (3.9)	91 (1.3)	173 (1.3)	112 (1.4)	20 (0.6)	35 (0.3)	1308 (2.8)	1843 (1.6)
15.	Patuakhali	1 (0.0)	0 (0.0)	11 (0.2)	0 (0.0)	16 (0.2)	2 (0.1)	5 (0.0)	121 (0.3)	156 (0.1)
16.	Bogra	204 (0.9)	40 (3.6)	154 (2.1)	371 (2.7)	355 (4.6)	98 (2.8)	343 (2.9)	3351 (7.2)	4916 (4.3)
17.	Dinajpur	55 (0.2)	9 (0.8)	79 (1.1)	346 (2.6)	223 (2.9)	20 (0.6)	20 (0.1)	2413 (5.2)	3165 (2.8)
18.	Pabna	12 (0.1)	9 (0.8)	50 (0.7)	106 (0.8)	30 (0.4)	10 (0.3)	45 (0.4)	350 (0.8)	612 (0.5)
19.	Rajshahi	127 (0.5)	0 (0.0)	144 (2.0)	385 (2.8)	189 (2.4)	44 (1.2)	99 (0.8)	2117 (4.6)	3105 (2.7)
20.	Rangpur	22 (0.1)	0 (0.0)	66 (0.9)	278 (2.1)	273 (3.5)	68 (1.9)	45 (0.4)	2467 (5.3)	3219 (2.8)
21.	Total	23100 (100)	1112 (100)	7183 (100)	13496 (100)	7727 (100)	3548 (100)	11990 (100)	46386 (100)	114542 (100)

Source : Ministry of Railway, Roads, Highways and Road Transport

AP.TABLE 11- 2 ORIGIN-DESTINATION SURVEY FORM (ONE FORM FOR ONE VEHICLE)

Site . . . . . Date . . . . . Signature of surveyer . . . . . .

Items for Interview	Space For Entry by Interviewer	Coding Space
Time of Interview	AM : PM :	
* Origin	District : Thana :	
* Destination	District : Thana :	
Kind of Vehicle (Circle the Appropriate No.)	1. Truck 2. Bus 3. Mini Bus 4. Car 5. Other 4 wheeled vehicle 6. Tractor/ Trailer 7. Auto Rickshaw 8. Motor Cycle	
** Trip Purpose (Circle the appropriate No.)	1. Work 2. School 3. Social and Recreational 4. Shopping 5. Business 6. Others	
*** Number of Passengers in the Vehicle		
Article of Cargo (as detail as possible)		
**** Cargo Tonnage (Truck only)	. . . . . tons or full, $\frac{1}{8}, \frac{3}{8}, \frac{1}{4}, \frac{1}{5}$	

* For the District of Dhaka, Noakhali and Comilla, Thana is to be clarified, For a scheduled bus, the first and the last terminal are filled in.

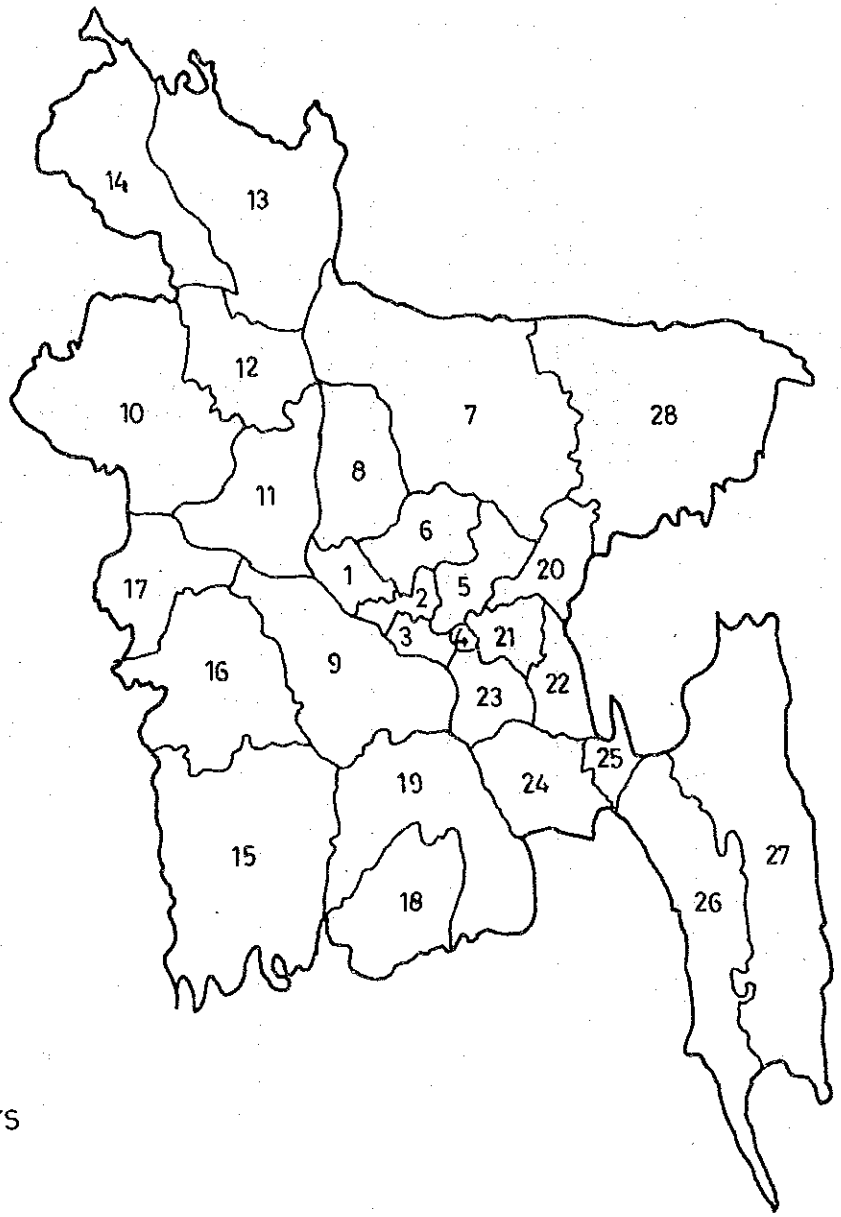
** Not required for bus and truck

*** Including driver, conductor, helper, etc.

**** If the driver does not know the tonnage, circle the appropriate proportion of the volume.

ZONE

NO	DESIGNATION
1	MANIKGANJ
2	SADAR SOUTH DHAKA
3	MUNSHIGANJ EXCEPT GAZARIA
4	GAZARIA
5	NARAYANGANJ
6	SADAR NORTH DHAKA
7	MYMENSHINGH
8	TANGAIL
9	FARIDPUR
10	RAJSHAHI
11	PABNA
12	BOGRA
13	RANGPUR
14	DINAJPUR
15	KHULNA
16	JESSORE
17	KUSHTIA
18	BARISAL
19	PATUAKHALI
20	BRAHMANBARIA
21	SADAR NORTH COMILLA
22	SADAR SOUTH COMILLA
23	CHANDPUR
24	SADAR NOAKHALI
25	FENI
26	CHITTAGONG
27	CHITTAGONG HILL TRACTS
28	SYLHET



AP. FIG. 11–1 ZONING MAP

AP. TABLE 11-3 CROSSING TIME SURVEY FORM (ONE SHEET FOR ONE VEHICLE)

Site . . . . . Date . . . . . ; Signature of surveyer . . . . . .

PARTICULARS		ENTRY SPACE	CODING SPACE
PLATE NO.			
JOINING TIME TO THE QUE	AM		
	PM		
KIND OF VEHICLE (Circle the appropriate No.)		1. Truck 2. Bus 3. Mini Bus 4. Car 5. Other 4-wheeled vehicle 6. Tractor/trailer 7. Auto Rickshaw 8. Motor Cycle	
LANDING TIME	AM		
	PM		

AP.TABLE 11-4 TRUCK TRAFFIC MATRIX

(Unit: Vehicles / day)

WEST OF MEGHNA RIVER \ EAST OF MEGHNA RIVER	20 BRAHMANBARIA	21 SADAR NORTH COMILLA	22 SADAR SOUTH COMILLA	23 CHANDPUR	24 SADAR NOAKHALI	25 FENI	26 CHITTAGONG	27 CHITTAGONG HILL TRACTS	28 SYLHET	4 GAZARIA	TOTAL:
1. MANIKGANJ											
2. SADAR SOUTH DHAKA	5	3	5	27	11	11	428	3	30		523
3. MUNSHIGANJ EXCEPT GAZARIA								3			3
4. GAZARIA											
5. NARAYANGANJ					5	3	111				119
6. SADAR NORTH DHAKA		3		5			41		3		52
7. MYMENSINGH					14		3				17
8. TANGAIL							5		3		8
9. FARIDPUR					3						3
10. RAJSHAHI							19				19
11. PABNA							8				8
12. BOGRA							8				8
13. RANGPUR							5				5
14. DINAJPUR											
15. KHULNA							19				19
16. JESSORE							19				19
17. KUSHTIA							5		3		8
18. BARISAL											
19. PATUAKHALI											
TOTAL:	5	6	5	32	33	14	671	6	39		811

Source: O-D Interview Survey, June 1984

AP.TABLE 11-5 BUS TRAFFIC MATRIX

(Unit: Vehicles / day)

WEST OF MEGHNA RIVER \ EAST OF MEGHNA RIVER	20 BRAHMANBARIA	21 SADAR NORTH COMILLA	22 SADAR SOUTH COMILLA	23 CHANDPUR	24 SADAR NOAKHALI	25 FENI	26 CHITTAGONG	27 CHITTAGONG HILL TRACTS	28 SYLHET	4 GAZARIA	TOTAL:
1. MANIKGANJ											
2. SADAR SOUTH DHAKA	24	11	75	130	81	2	116				439
3. MUNSHIGANJ EXCEPT GAZARIA											
4. GAZARIA											
5. NARAYANGANJ											
6. SADAR NORTH DHAKA											
7. MYMENSINGH											
8. TANGAIL											
9. FARIDPUR											
10. RAJSHAHI											
11. PABNA											
12. BOGRA											
13. RANGPUR											
14. DINAJPUR											
15. KHULNA											
16. JESSORE											
17. KUSHTIA											
18. BARISAL											
19. PATUAKHALI											
TOTAL:	24	11	75	130	81	2	116				439

Source: O-D Interview Survey, June 1984

AP.TABLE 11-6 MINI-BUS TRAFFIC MATRIX

(Unit: Vehicles/day)

WEST OF MEGHNA RIVER \ EAST OF MEGHNA RIVER	20 BRAHMANBARIA	21 SADAR NORTH COMILLA	22 SADAR SOUTH COMILLA	23 CHANDPUR	24 SADAR NOAKHALI	25 FENI	26 CHITTAGONG	27 CHITTAGONG HILL TRACTS	28 SYLHET	4 GAZARIA	TOTAL:
1. MANIKGANJ											
2. SADAR SOUTH DHAKA			1	33	44	1	6				85
3. MUNSHIGANJ EXCEPT GAZARIA											
4. GAZARIA											
5. NARAYANGANJ											
6. SADAR NORTH DHAKA											
7. MYMENSINGH											
8. TANGAIL											
9. FARIDPUR											
10. RAJSHAHI											
11. PABNA											
12. BOGRA											
13. RANGPUR											
14. DINAJPUR											
15. KHULNA											
16. JESSORE											
17. KUSHTIA											
18. BARISAL											
19. PATUAKHALI											
TOTAL:			1	33	44	1	6				85

Source: O-D Interview Survey, June 1984

AP.TABLE 11-7 CAR TRAFFIC MATRIX

(Unit: Vehicles/day)

WEST OF MEGHNA RIVER \ EAST OF MEGHNA RIVER	20 BRAHMANBARIA	21 SADAR NORTH COMILLA	22 SADAR SOUTH COMILLA	23 CHANDPUR	24 SADAR NOAKHALI	25 FENI	26 CHITTAGONG	27 CHITTAGONG HILL TRACTS	28 SYLHET	4 GAZARIA	TOTAL:
1. MANIKGANJ											
2. SADAR SOUTH DHAKA		2	2	49	9		37			2	101
3. MUNSHIGANJ EXCEPT GAZARIA											
4. GAZARIA											
5. NARAYANGANJ				3							3
6. SADAR NORTH DHAKA											
7. MYMENSINGH											
8. TANGAIL											
9. FARIDPUR											
10. RAJSHAHI											
11. PABNA											
12. BOGRA											
13. RANGPUR											
14. DINAJPUR											
15. KHULNA											
16. JESSORE											
17. KUSHTIA											
18. BARISAL											
19. PATUAKHALI											
TOTAL:		2	2	52	9		37			2	104

Source: O-D Interview Survey, June 1984

AP. TABLE 11-8 OTHER VEHICLES TRAFFIC MATRIX

(Unit: Vehicles / day)

WEST OF MEGHNA RIVER \ EAST OF MEGHNA RIVER	20 BRAHMANBARIA	21 SADAR NORTH COMILLA	22 SADAR SOUTH COMILLA	23 CHANDPUR	24 SADAR NOAKHALI	25 FENI	26 CHITTAGONG	27 CHITTAGONG HILL TRACTS	28 SYLHET	4 GAZARIA	TOTAL:
1. MANIKGANJ											
2. SADAR SOUTH DHAKA		4		18	1	1	4		1		29
3. MUNSHIGANJ EXCEPT GAZARIA											
4. GAZARIA											
5. NARAYANGANJ											
6. SADAR NORTH DHAKA											
7. MYMENSINGH											
8. TANGAIL											
9. FARIDPUR											
10. RAJSHAHI											
11. PABNA											
12. BOGRA											
13. RANGPUR											
14. DINAJPUR											
15. KHULNA											
16. JESSORE											
17. KUSHTIA											
18. BARISAL											
19. PATUAKHALI											
TOTAL:		4		18	1	1	4		1		29

Source: O-D Interview Survey, June 1984

AP. TABLE 11-9 TRAFFIC MATRIX FOR ALL VEHICLES

(Unit: Vehicles / day)

WEST OF MEGHNA RIVER \ EAST OF MEGHNA RIVER	20 BRAHMANBARIA	21 SADAR NORTH COMILLA	22 SADAR SOUTH COMILLA	23 CHANDPUR	24 SADAR NOAKHALI	25 FENI	26 CHITTAGONG	27 CHITTAGONG HILL TRACTS	28 SYLHET	4 GAZARIA	TOTAL:
1. MANIKGANJ											
2. SADAR SOUTH DHAKA	29	20	83	257	146	15	591	3	31	2	1177
3. MUNSHIGANJ EXCEPT GAZARIA								3			3
4. GAZARIA											
5. NARAYANGANJ				3	5	3	111				122
6. SADAR NORTH DHAKA		3		5			41		3		52
7. MYMENSINGH					14		3				17
8. TANGAIL							5		3		8
9. FARIDPUR					3						3
10. RAJSHAHI							19				19
11. PABNA							8				8
12. BOGRA							8				8
13. RANGPUR							5				5
14. DINAJPUR											
15. KHULNA							19				19
16. JESSORE							19				19
17. KUSHTIA							5		3		8
18. BARISAL											
19. PATUAKHALI											
TOTAL:	29	23	83	265	168	18	837	6	40	2	1468

Source: O-D Interview Survey, June 1984

AP. NOTE 11–1 POPULATION FORECAST BY ZONES

ゾーン別人口は下記の手法によって推定された。

第1段階：

ゾーン別人口は回帰分析で得られたゾーンごとのパラメーターを使用して予測した。

第2段階：

ゾーン別人口の合計値は、各目標年次の国全体の人口と調整して推定した。

上記の手法は下記の計算式で表わされる。

$$P'_{it} = A_i + B_i \cdot T_t$$

where P'_{it} = preliminary estimation of the future population of zone i in year t.

A_i, B_i = parametres obtained from the regression analysis

T_t = years (such as 1990, 2000, 2010 and 2020)

$$P_{it} = P'_{it} \cdot \frac{TP_t}{\sum_i P'_{it}}$$

where P_{it} = final estimate for the future population of zone i in year t

TP_t = controlled total population in year t

$$GF_{it} = \frac{P_{it}}{P_{81i}}$$

where GF_{it} = growth factor of future population of zone i in year t

P_{81i} = population of zone i in year 1981

各ゾーンにおけるパラメーターは回帰分析によって得た。

AP. NOTE 11-2 FORECASTING OF VEHICLES ON ROAD

1) 将来GDPの推定

第１１－４－２節で述べたように、将来人口は政府によって予測されているが、ＧＤＰの予測に関しては何ら情報がなかった。そこで、過去のＧＤＰの傾向を使用した。1971年から１９７７年間のＧＤＰは突飛な動きをしているが、解放戦争後は回復の状態に向うようであった。１９７８年から１９８３年の最近のＧＤＰの成長率は、年率3.4％と算定された。

将来ＧＤＰは下記の計算式で推定された。

$$GDP_t = GDP_{1983} \times (1 + r)^t$$

Where GDP_t = GDP in year t (in million Taka in 1972 prices)

GDP_{1982} = GDP in 1983

r = annual growth rate in GDP (= 0.034)

y = year

2) トラック

トラック台数の予測には、トラック台数と道路輸送量は密接な関係があるので、道路貨物輸送量を推定することが必要である。貨物輸送量はＧＤＰに関連する。

それ故に、将来の道路貨物輸送量の推定のため、下記の計算がなされた。

$$FT_t = A_0 + A_1 \cdot GDP_t$$

where FT_t = road freight transportation in year t (in 1,000 tons)

A_0, A_1 = parametres by the regression analysis

トラック台数は上記の算定式で得られた貨物輸送量に関連すると仮定すると、トラック台数の推定は下記の通り。

$$TRK_t = A_0 + A_1 \cdot FT_t$$

where TRK_t = number of trucks in year t

3) バス

バス台数は人口とＧＤＰとに確実な関連性がある。下記の計算式がバス台数の推定に使用された。

$$BUS_t = A_0 + A_1 \cdot POP_t + A_2 \cdot GDP_t$$

where BUS_t = number of buses in year t
POP_t = population in year t

4) 乗用車および他種の車輌

乗用車と他種の車輌はＧＤＰと大きな関連性がある。下記の計算式がこれらの車輌の推定に使用された。

乗用車：

$$PC_t = Ao + A_1 \cdot GDP_t$$

where PC_t = number of passenger cars in year t

その他の種類の車輌：

$$MV_t = A_0 + A_1 \cdot GDP_t$$

AP. NOTE 11–3 ESTIMATION OF FUTURE NORMAL TRAFFIC CROSSING THE RIVERS

1) Estimation of Trip Generation

FEtki = f (FEtk, FEti, PEki)

FEtk = PEk · VGFtk, and PEti = PEi · PGFti

where PEtki = generated trips of vehicle type k in zone i in year t

FEtk = generated trips of vehicle type k in year t (in control total)

FEti = generated trips in zone i in year t

FEki = generated grips of vehicle type k in zone i in present year (present pattern)

PEk = generated trips of vehicles type k in present year

VGFtk = growth factor of vehicle type k in year t

PEi = generated trips in zone i in present year

PGFti = growth factor of zone i in year t

2) Estimation of Normal Traffic Crossing the Rivers

Qtkij = f (Etki, Etkj, Pkij)

where Qtkij = traffic of type k between zones i and j in year t

Etki = generated trips of vehicle type k in zone i in year t (in control total)

Etkj = generated trips of vehicle type k in zone j in year t (in control total)

Pkij = present traffic of type k between zones i and j (present O-D pattern)

AP. TABLE 11-10 TRUCK TRAFFIC MATRIX FOR 1990

(Unit: Vehicles/day)

WEST OF MEGHNA RIVER \ EAST OF MEGHNA RIVER	20 BRAHMANBARIA	21 SADAR NORTH COMILLA	22 SADAR SOUTH COMILLA	23 CHANDPUR	24 SADAR NOAKHALI	25 FENI	26 CHITTAGONG	27 CHITTAGONG HILL TRACTS	28 SYLHET	4 GAZARIA	TOTAL:
1. MANIKGANJ											
2. SADAR SOUTH DHAKA	7	5	8	41	18	16	644	4	43		786
3. MUNSHIGANJ EXCEPT GAZARIA								4			4
4. GAZARIA											
5. NARAYANGANJ					8	4	155				167
6. SADAR NORTH DHAKA		4		7			59		4		75
7. MYMENSINGH					20		4				24
8. TANGAIL							7		4		11
9. FARIDPUR					4						4
10. RAJSHAHI							28				28
11. PABNA							11				11
12. BOGRA							11				11
13. RANGPUR							7				7
14. DINAJPUR											
15. KHULNA							27				27
16. JESSORE							28				28
17. KUSHTIA							8		4		12
18. BARISAL											
19. PATUAKHALI											
TOTAL:	7	9	8	48	50	20	989	8	56		1195

AP. TABLE 11-11 TRUCK TRAFFIC MATRIX FOR 2000

(Unit: Vehicles/day)

WEST OF MEGHNA RIVER \ EAST OF MEGHNA RIVER	20 BRAHMANBARIA	21 SADAR NORTH COMILLA	22 SADAR SOUTH COMILLA	23 CHANDPUR	24 SADAR NOAKHALI	25 FENI	26 CHITTAGONG	27 CHITTAGONG HILL TRACTS	28 SYLHET	4 GAZARIA	TOTAL:
1. MANIKGANJ											
2. SADAR SOUTH DHAKA	12	7	13	64	32	24	1063	7	66		1288
3. MUNSHIGANJ EXCEPT GAZARIA								6			6
4. GAZARIA											
5. NARAYANGANJ					13	6	240				259
6. SADAR NORTH DHAKA		7		11			93		6		117
7. MYMENSINGH					31		6				37
8. TANGAIL							12		6		18
9. FARIDPUR					6						6
10. RAJSHAHI							44				44
11. PABNA							18				18
12. BOGRA							18				18
13. RANGPUR							11				11
14. DINAJPUR											
15. KHULNA							43				43
16. JESSORE							43				43
17. KUSHTIA							12		7		19
18. BARISAL											
19. PATUAKHALI											
TOTAL:	12	14	13	75	82	30	1603	13	85		1927

AP. TABLE 11-12 TRUCK TRAFFIC MATRIX FOR 2010

(Unit: Vehicles/day)

EAST OF MEGHNA RIVER / WEST OF MEGHNA RIVER	20 BRAHMANBARIA	21 SADAR NORTH COMILLA	22 SADAR SOUTH COMILLA	23 CHANDPUR	24 SADAR NOAKHALI	25 FENI	26 CHITTAGONG	27 CHITTAGONG HILL TRACTS	28 SYLHET	4 GAZARIA	TOTAL:
1. MANIKGANJ											
2. SADAR SOUTH DHAKA	19	11	20	98	52	37	1652	11	98		1988
3. MUNSHIGANJ EXCEPT GAZARIA								9			9
4. GAZARIA											
5. NARAYANGANJ					20	8	354				382
6. SADAR NORTH DHAKA		9		16			141		9		175
7. MYMENSINGH					46		8				54
8. TANGAIL							17		9		26
9. FARIDPUR					9						9
10. RAJSHAHI							65				65
11. PABNA							26				26
12. BOGRA							26				26
13. RANGPUR							17				17
14. DINAJPUR											
15. KHULNA							63				63
16. JESSORE							65				65
17. KUSHTIA							19		9		28
18. BARISAL											
19. PATUAKHALI											
TOTAL:	19	20	20	114	127	45	2453	20	125		2943

AP. TABLE 11-13 TRUCK TRAFFIC MATRIX FOR 2020

(Unit: Vehicles/day)

EAST OF MEGHNA RIVER / WEST OF MEGHNA RIVER	20 BRAHMANBARIA	21 SADAR NORTH COMILLA	22 SADAR SOUTH COMILLA	23 CHANDPUR	24 SADAR NOAKHALI	25 FENI	26 CHITTAGONG	27 CHITTAGONG HILL TRACTS	28 SYLHET	4 GAZARIA	TOTAL:
1. MANIKGANJ											
2. SADAR SOUTH DHAKA	28	16	31	147	82	53	2484	17	142		3000
3. MUNSHIGANJ EXCEPT GAZARIA								12			12
4. GAZARIA											
5. NARAYANGANJ					30	11	507				548
6. SADAR NORTH DHAKA		14		23			207		12		256
7. MYMENSINGH					67		11				78
8. TANGAIL							25		12		37
9. FARIDPUR					13						13
10. RAJSHAHI							95				95
11. PABNA							38				38
12. BOGRA							38				38
13. RANGPUR							24				24
14. DINAJPUR											
15. KHULNA							92				92
16. JESSORE							94				94
17. KUSHTIA							28		13		41
18. BARISAL											
19. PATUAKHALI											
TOTAL:	28	30	31	170	192	64	3643	29	179		4366

AP. TABLE 11-14 BUS TRAFFIC MATRIX FOR 1990

(Unit: Vehicles/day)

WEST OF MEGHNA RIVER \ EAST OF MEGHNA RIVER	20 BRAHMANBARIA	21 SADAR NORTH COMILLA	22 SADAR SOUTH COMILLA	23 CHANDPUR	24 SADAR NOAKHALI	25 FENI	26 CHITTAGONG	27 CHITTAGONG HILL TRACTS	28 SYLHET	4 GAZARIA	TOTAL:
1. MANIKGANJ											
2. SADAR SOUTH DHAKA	32	14	105	177	112	3	154				597
3. MUNSHIGANJ EXCEPT GAZARIA											
4. GAZARIA											
5. NARAYANGANJ											
6. SADAR NORTH DHAKA											
7. MYMENSINGH											
8. TANGAIL											
9. FARIDPUR											
10. RAJSHAHI											
11. PABNA											
12. BOGRA											
13. RANGPUR											
14. DINAJPUR											
15. KHULNA											
16. JESSORE											
17. KUSHTIA											
18. BARISAL											
19. PATUAKHALI											
TOTAL:	32	14	105	177	112	3	154				597

AP. TABLE 11-15 BUS TRAFFIC MATRIX FOR 2000

(Unit: Vehicles/day)

WEST OF MEGHNA RIVER \ EAST OF MEGHNA RIVER	20 BRAHMANBARIA	21 SADAR NORTH COMILLA	22 SADAR SOUTH COMILLA	23 CHANDPUR	24 SADAR NOAKHALI	25 FENI	26 CHITTAGONG	27 CHITTAGONG HILL TRACTS	28 SYLHET	4 GAZARIA	TOTAL:
1. MANIKGANJ											
2. SADAR SOUTH DHAKA	48	21	161	275	169	4	231				909
3. MUNSHIGANJ EXCEPT GAZARIA											
4. GAZARIA											
5. NARAYANGANJ											
6. SADAR NORTH DHAKA											
7. MYMENSINGH											
8. TANGAIL											
9. FARIDPUR											
10. RAJSHAHI											
11. PABNA											
12. BOGRA											
13. RANGPUR											
14. DINAJPUR											
15. KHULNA											
16. JESSORE											
17. KUSHTIA											
18. BARISAL											
19. PATUAKHALI											
TOTAL:	48	21	161	275	169	4	231				909

AP. TABLE 11-16 BUS TRAFFIC MATRIX FOR 2010

(Unit: Vehicles/day)

EAST OF MEGHNA RIVER / WEST OF MEGHNA RIVER	20 BRAHMANBARIA	21 SADAR NORTH COMILLA	22 SADAR SOUTH COMILLA	23 CHANDPUR	24 SADAR NOAKHALI	25 FENI	26 CHITTAGONG	27 CHITTAGONG HILL TRACTS	28 SYLHET	4 GAZARIA	TOTAL:
1. MANIKGANJ											
2. SADAR SOUTH DHAKA	68	29	242	381	250	5	333				1308
3. MUNSHIGANJ EXCEPT GAZARIA											
4. GAZARIA											
5. NARAYANGANJ											
6. SADAR NORTH DHAKA											
7. MYMENSINGH											
8. TANGAIL											
9. FARIDPUR											
10. RAJSHAHI											
11. PABNA											
12. BOGRA											
13. RANGPUR											
14. DINAJPUR											
15. KHULNA											
16. JESSORE											
17. KUSHTIA											
18. BARISAL											
19. PATUAKHALI											
TOTAL:	68	29	242	381	250	5	333				1308

AP. TABLE 11-17 BUS TRAFFIC MATRIX FOR 2020

(Unit: Vehicles/day)

EAST OF MEGHNA RIVER / WEST OF MEGHNA RIVER	20 BRAHMANBARIA	21 SADAR NORTH COMILLA	22 SADAR SOUTH COMILLA	23 CHANDPUR	24 SADAR NOAKHALI	25 FENI	26 CHITTAGONG	27 CHITTAGONG HILL TRACTS	28 SYLHET	4 GAZARIA	TOTAL:
1. MANIKGANJ											
2. SADAR SOUTH DHAKA	96	39	360	519	363	6	448				1831
3. MUNSHIGANJ EXCEPT GAZARIA											
4. GAZARIA											
5. NARAYANGANJ											
6. SADAR NORTH DHAKA											
7. MYMENSINGH											
8. TANGAIL											
9. FARIDPUR											
10. RAJSHAHI											
11. PABNA											
12. BOGRA											
13. RANGPUR											
14. DINAJPUR											
15. KHULNA											
16. JESSORE											
17. KUSHTIA											
18. BARISAL											
19. PATUAKHALI											
TOTAL:	96	39	360	519	363	6	448				1831

AP. TABLE 11-18 MINI-BUS TRAFFIC MATRIX FOR 1990

(Unit: Vehicles/day)

EAST OF MEGHNA RIVER / WEST OF MEGHNA RIVER	20 BRAHMANBARIA	21 SADAR NORTH COMILLA	22 SADAR SOUTH COMILLA	23 CHANDPUR	24 SADAR NOAKHALI	25 FENI	26 CHITTAGONG	27 CHITTAGONG HILL TRACTS	28 SYLHET	4 GAZARIA	TOTAL:
1. MANIKGANJ											
2. SADAR SOUTH DHAKA			1	44	62	1	8				116
3. MUNSHIGANJ EXCEPT GAZARIA											
4. GAZARIA											
5. NARAYANGANJ											
6. SADAR NORTH DHAKA											
7. MYMENSINGH											
8. TANGAIL											
9. FARIDPUR											
10. RAJSHAHI											
11. PABNA											
12. BOGRA											
13. RANGPUR											
14. DINAJPUR											
15. KHULNA											
16. JESSORE											
17. KUSHTIA											
18. BARISAL											
19. PATUAKHALI											
TOTAL:			1	44	62	1	8				116

AP. TABLE 11-19 MINI-BUS TRAFFIC MATRIX FOR 2000

(Unit: Vehicles/day)

EAST OF MEGHNA RIVER / WEST OF MEGHNA RIVER	20 BRAHMANBARIA	21 SADAR NORTH COMILLA	22 SADAR SOUTH COMILLA	23 CHANDPUR	24 SADAR NOAKHALI	25 FENI	26 CHITTAGONG	27 CHITTAGONG HILL TRACTS	28 SYLHET	4 GAZARIA	TOTAL:
1. MANIKGANJ											
2. SADAR SOUTH DHAKA			2	65	95	2	12				176
3. MUNSHIGANJ EXCEPT GAZARIA											
4. GAZARIA											
5. NARAYANGANJ											
6. SADAR NORTH DHAKA											
7. MYMENSINGH											
8. TANGAIL											
9. FARIDPUR											
10. RAJSHAHI											
11. PABNA											
12. BOGRA											
13. RANGPUR											
14. DINAJPUR											
15. KHULNA											
16. JESSORE											
17. KUSHTIA											
18. BARISAL											
19. PATUAKHALI											
TOTAL:			2	65	95	2	12				176

AP. TABLE 11-20 MINI-BUS TRAFFIC MATRIX FOR 2010

(Unit: Vehicles/day)

EAST OF MEGHNA RIVER / WEST OF MEGHNA RIVER	20 BRAHMANBARIA	21 SADAR NORTH COMILLA	22 SADAR SOUTH COMILLA	23 CHANDPUR	24 SADAR NOAKHALI	25 FENI	26 CHITTAGONG	27 CHITTAGONG HILL TRACTS	28 SYLHET	4 GAZARIA	TOTAL:
1. MANIKGANJ											
2. SADAR SOUTH DHAKA			3	97	136	2	16				254
3. MUNSHIGANJ EXCEPT GAZARIA											
4. GAZARIA											
5. NARAYANGANJ											
6. SADAR NORTH DHAKA											
7. MYMENSINGH											
8. TANGAIL											
9. FARIDPUR											
10. RAJSHAHI											
11. PABNA											
12. BOGRA											
13. RANGPUR											
14. DINAJPUR											
15. KHULNA											
16. JESSORE											
17. KUSHTIA											
18. BARISAL											
19. PATUAKHALI											
TOTAL:			3	97	136	2	16				254

AP. TABLE 11-21 MINI-BUS TRAFFIC MATRIX FOR 2020

(Unit: Vehicles/day)

EAST OF MEGHNA RIVER / WEST OF MEGHNA RIVER	20 BRAHMANBARIA	21 SADAR NORTH COMILLA	22 SADAR SOUTH COMILLA	23 CHANDPUR	24 SADAR NOAKHALI	25 FENI	26 CHITTAGONG	27 CHITTAGONG HILL TRACTS	28 SYLHET	4 GAZARIA	TOTAL:
1. MANIKGANJ											
2. SADAR SOUTH DHAKA			4	134	192	3	22				355
3. MUNSHIGANJ EXCEPT GAZARIA											
4. GAZARIA											
5. NARAYANGANJ											
6. SADAR NORTH DHAKA											
7. MYMENSINGH											
8. TANGAIL											
9. FARIDPUR											
10. RAJSHAHI											
11. PABNA											
12. BOGRA											
13. RANGPUR											
14. DINAJPUR											
15. KHULNA											
16. JESSORE											
17. KUSHTIA											
18. BARISAL											
19. PATUAKHALI											
TOTAL:			4	134	192	3	22				355

AP TABLE 11-22 CAR TRAFFIC MATRIX FOR 1990

(Unit: Vehicles/day)

EAST OF MEGHNA RIVER / WEST OF MEGHNA RIVER	20 BRAHMANBARIA	21 SADAR NORTH COMILLA	22 SADAR SOUTH COMILLA	23 CHANDPUR	24 SADAR NOAKHALI	25 FENI	26 CHITTAGONG	27 CHITTAGONG HILL TRACTS	28 SYLHET	4 GAZARIA	TOTAL:
1. MANIKGANJ											
2. SADAR SOUTH DHAKA		5	5	139	26		102			7	284
3. MUNSHIGANJ EXCEPT GAZARIA											
4. GAZARIA											
5. NARAYANGANJ				7							7
6. SADAR NORTH DHAKA											
7. MYMENSINGH											
8. TANGAIL											
9. FARIDPUR											
10. RAJSHAHI											
11. PABNA											
12. BOGRA											
13. RANGPUR											
14. DINAJPUR											
15. KHULNA											
16. JESSORE											
17. KUSHTIA											
18. BARISAL											
19. PATUAKHALI											
TOTAL:		5	5	146	26		102			7	291

AP TABLE 11-23 CAR TRAFFIC MATRIX FOR 2000

(Unit: Vehicles/day)

EAST OF MEGHNA RIVER / WEST OF MEGHNA RIVER	20 BRAHMANBARIA	21 SADAR NORTH COMILLA	22 SADAR SOUTH COMILLA	23 CHANDPUR	24 SADAR NOAKHALI	25 FENI	26 CHITTAGONG	27 CHITTAGONG HILL TRACTS	28 SYLHET	4 GAZARIA	TOTAL:
1. MANIKGANJ											
2. SADAR SOUTH DHAKA		12	15	339	60		236			10	672
3. MUNSHIGANJ EXCEPT. GAZARIA											
4. GAZARIA											
5. NARAYANGANJ				17							17
6. SADAR NORTH DHAKA											
7. MYMENSINGH											
8. TANGAIL											
9. FARIDPUR											
10. RAJSHAHI											
11. PABNA											
12. BOGRA											
13. RANGPUR											
14. DINAJPUR											
15. KHULNA											
16. JESSORE											
17. KUSHTIA											
18. BARISAL											
19. PATUAKHALI											
TOTAL:		12	15	356	60		236			10	689

AP. TABLE 11-24 CAR TRAFFIC MATRIX FOR 2010

(Unit: Vehicles/day)

EAST OF MEGHNA RIVER / WEST OF MEGHNA RIVER	20 BRAHMANBARIA	21 SADAR NORTH COMILLA	22 SADAR SOUTH COMILLA	23 CHANDPUR	24 SADAR NOAKHALI	25 FENI	26 CHITTAGONG	27 CHITTAGONG HILL TRACTS	28 SYLHET	4 GAZARIA	TOTAL:
1. MANIKGANJ											
2. SADAR SOUTH DHAKA		25	28	649	119		484			19	1324
3. MUNSHIGANJ EXCEPT GAZARIA											
4. GAZARIA											
5. NARAYANGANJ				34							34
6. SADAR NORTH DHAKA											
7. MYMENSINGH											
8. TANGAIL											
9. FARIDPUR											
10. RAJSHAHI											
11. PABNA											
12. BOGRA											
13. RANGPUR											
14. DINAJPUR											
15. KHULNA											
16. JESSORE											
17. KUSHTIA											
18. BARISAL											
19. PATUAKHALI											
TOTAL:		25	28	683	119		484			19	1358

AP. TABLE 11-25 CAR TRAFFIC MATRIX FOR 2020

(Unit: Vehicles/day)

EAST OF MEGHNA RIVER / WEST OF MEGHNA RIVER	20 BRAHMANBARIA	21 SADAR NORTH COMILLA	22 SADAR SOUTH COMILLA	23 CHANDPUR	24 SADAR NOAKHALI	25 FENI	26 CHITTAGONG	27 CHITTAGONG HILL TRACTS	28 SYLHET	4 GAZARIA	TOTAL:
1. MANIKGANJ											
2. SADAR SOUTH DHAKA		41	52	1162	215		872			33	2375
3. MUNSHIGANJ EXCEPT GAZARIA											
4. GAZARIA											
5. NARAYANGANJ				56							56
6. SADAR NORTH DHAKA											
7. MYMENSINGH											
8. TANGAIL											
9. FARIDPUR											
10. RAJSHAHI											
11. PABNA											
12. BOGRA											
13. RANGPUR											
14. DINAJPUR											
15. KHULNA											
16. JESSORE											
17. KUSHTIA											
18. BARISAL											
19. PATUAKHALI											
TOTAL:		41	52	1218	215		872			33	2431

AP. TABLE 11-26 OTHER VEHICLES TRAFFIC MATRIX FOR 1990

(Unit: Vehicles/day)

EAST OF MEGHNA RIVER / WEST OF MEGHNA RIVER	20 BRAHMANBARIA	21 SADAR NORTH COMILLA	22 SADAR SOUTH COMILLA	23 CHANDPUR	24 SADAR NOAKHALI	25 FENI	26 CHITTAGONG	27 CHITTAGONG HILL TRACTS	28 SYLHET	4 GAZARIA	TOTAL:
1. MANIKGANJ											
2. SADAR SOUTH DHAKA		6		24	2	1	6		1		40
3. MUNSHIGANJ EXCEPT GAZARIA											
4. GAZARIA											
5. NARAYANGANJ											
6. SADAR NORTH DHAKA											
7. MYMENSINGH											
8. TANGAIL											
9. FARIDPUR											
10. RAJSHAHI											
11. PABNA											
12. BOGRA											
13. RANGPUR											
14. DINAJPUR											
15. KHULNA											
16. JESSORE											
17. KUSHTIA											
18. BARISAL											
19. PATUAKHALI											
TOTAL:		6		24	2	1	6		1		40

AP. TABLE 11-27 OTHER VEHICLES TRAFFIC MATRIX FOR 2000

(Unit: Vehicles/day)

EAST OF MEGHNA RIVER / WEST OF MEGHNA RIVER	20 BRAHMANBARIA	21 SADAR NORTH COMILLA	22 SADAR SOUTH COMILLA	23 CHANDPUR	24 SADAR NOAKHALI	25 FENI	26 CHITTAGONG	27 CHITTAGONG HILL TRACTS	28 SYLHET	4 GAZARIA	TOTAL:
1. MANIKGANJ											
2. SADAR SOUTH DHAKA		9		40	2	2	9		2		64
3. MUNSHIGANJ EXCEPT GAZARIA											
4. GAZARIA											
5. NARAYANGANJ											
6. SADAR NORTH DHAKA											
7. MYMENSINGH											
8. TANGAIL											
9. FARIDPUR											
10. RAJSHAHI											
11. PABNA											
12. BOGRA											
13. RANGPUR											
14. DINAJPUR											
15. KHULNA											
16. JESSORE											
17. KUSHTIA											
18. BARISAL											
19. PATUAKHALI											
TOTAL:		9		40	2	2	9		2		64

AP. TABLE 11-28 OTHER VEHICLES TRAFFIC MATRIX FOR 2010

(Unit: Vehicles/day)

EAST OF MEGHNA RIVER / WEST OF MEGHNA RIVER	20 BRAHMANBARIA	21 SADAR NORTH COMILLA	22 SADAR SOUTH COMILLA	23 CHANDPUR	24 SADAR NOAKHALI	25 FENI	26 CHITTAGONG	27 CHITTAGONG HILL TRACTS	28 SYLHET	4 GAZARIA	TOTAL:
1. MANIKGANJ											
2. SADAR SOUTH DHAKA		13		62	4	3	13		3		98
3. MUNSHIGANJ EXCEPT GAZARIA											
4. GAZARIA											
5. NARAYANGANJ											
6. SADAR NORTH DHAKA											
7. MYMENSINGH											
8. TANGAIL											
9. FARIDPUR											
10. RAJSHAHI											
11. PABNA											
12. BOGRA											
13. RANGPUR											
14. DINAJPUR											
15. KHULNA											
16. JESSORE											
17. KUSHTIA											
18. BARISAL											
19. PATUAKHALI											
TOTAL:		13		62	4	3	13		3		98

AP. TABLE 11-29 OTHER VEHICLES TRAFFIC MATRIX FOR 2020

(Unit: Vehicles/day)

EAST OF MEGHNA RIVER / WEST OF MEGHNA RIVER	20 BRAHMANBARIA	21 SADAR NORTH COMILLA	22 SADAR SOUTH COMILLA	23 CHANDPUR	24 SADAR NOAKHALI	25 FENI	26 CHITTAGONG	27 CHITTAGONG HILL TRACTS	28 SYLHET	4 GAZARIA	TOTAL:
1. MANIKGANJ											
2. SADAR SOUTH DHAKA		19		93	6	4	19		4		145
3. MUNSHIGANJ EXCEPT GAZARIA											
4. GAZARIA											
5. NARAYANGANJ											
6. SADAR NORTH DHAKA											
7. MYMENSINGH											
8. TANGAIL											
9. FARIDPUR											
10. RAJSHAHI											
11. PABNA											
12. BOGRA											
13. RANGPUR											
14. DINAJPUR											
15. KHULNA											
16. JESSORE											
17. KUSHTIA											
18. BARISAL											
19. PATUAKHALI											
TOTAL:		19		93	6	4	19		4		145

AP. TABLE 11–30 ALL VEHICLES TRAFFIC MATRIX FOR 1990

(Unit: Vehicles/day)

EAST OF MEGHNA RIVER / WEST OF MEGHNA RIVER	20 BRAHMANBARIA	21 SADAR NORTH COMILLA	22 SADAR SOUTH COMILLA	23 CHANDPUR	24 SADAR NOAKHALI	25 FENI	26 CHITTAGONG	27 CHITTAGONG HILL TRACTS	28 SYLHET	4 GAZARIA	TOTAL:
1. MANIKGANJ											
2. SADAR SOUTH DHAKA	39	30	119	425	220	21	914	4	44	7	1823
3. MUNSHIGANJ EXCEPT GAZARIA									4		4
4. GAZARIA											
5. NARAYANGANJ				7	8	4	155				174
6. SADAR NORTH DHAKA		4		7			59		4		75
7. MYMENSINGH					20		4				24
8. TANGAIL							7		4		11
9. FARIDPUR					4						4
10. RAJSHAHI							28				28
11. PABNA							11				11
12. BOGRA							11				11
13. RANGPUR						---	7				7
14. DINAJPUR											
15. KHULNA							27				27
16. JESSORE							28				28
17. KUSHTIA							8		4		12
18. BARISAL											
19. PATUAKHALI											
TOTAL:	39	34	119	439	252	25	1259	8	57	7	2239

AP. TABLE 11–31 ALL VEHICLES TRAFFIC MATRIX FOR 2000

(Unit: Vehicles/day)

EAST OF MEGHNA RIVER / WEST OF MEGHNA RIVER	20 BRAHMANBARIA	21 SADAR NORTH COMILLA	22 SADAR SOUTH COMILLA	23 CHANDPUR	24 SADAR NOAKHALI	25 FENI	26 CHITTAGONG	27 CHITTAGONG HILL TRACTS	28 SYLHET	4 GAZARIA	TOTAL:
1. MANIKGANJ											
2. SADAR SOUTH DHAKA	60	49	191	783	358	32	1551	7	68	10	3109
3. MUNSHIGANJ EXCEPT GAZARIA								6			6
4. GAZARIA											
5. NARAYANGANJ				17	13	6	240				276
6. SADAR NORTH DHAKA		7		11			93		6		117
7. MYMENSINGH					31		6				37
8. TANGAIL							12		6		18
9. FARIDPUR					6						6
10. RAJSHAHI							44				44
11. PABNA							18				18
12. BOGRA							18				18
13. RANGPUR							11				11
14. DINAJPUR											
15. KHULNA							43				43
16. JESSORE							43				43
17. KUSHTIA							12		7		19
18. BARISAL											
19. PATUAKHALI.											
TOTAL:	60	56	191	811	408	38	2091	13	87	10	3765

AP. TABLE 11-32 ALL VEHICLES TRAFFIC MATRIX FOR 2010

(Unit: Vehicles/day)

WEST OF MEGHNA RIVER \ EAST OF MEGHNA RIVER	20 BRAHMANBARIA	21 SADAR NORTH COMILLA	22 SADAR SOUTH COMILLA	23 CHANDPUR	24 SADAR NOAKHALI	25 FENI	26 CHITTAGONG	27 CHITTAGONG HILL TRACTS	28 SYLHET	4 GAZARIA	TOTAL:
1. MANIKGANJ											
2. SADAR SOUTH DHAKA	87	78	293	1287	561	47	2498	11	101	19	4982
3. MUNSHIGANJ EXCEPT GAZARIA								9			9
4. GAZARIA											
5. NARAYANGANJ				34	20	8	354				416
6. SADAR NORTH DHAKA		9		16			141		9		175
7. MYMENSINGH					46		8				54
8. TANGAIL							17		9		26
9. FARIDPUR					9						9
10. RAJSHAHI							65				65
11. PABNA							26				26
12. BOGRA							26				26
13. RANGPUR							17				17
14. DINAJPUR											
15. KHULNA							63				63
16. JESSORE							65				65
17. KUSHTIA							19		9		28
18. BARISAL											
19. PATUAKHALI											
TOTAL:	87	87	293	1337	636	55	3299	20	128	19	5961

AP. TBLE 11-33 ALL VEHICLES TRAFFIC MATRIX FOR 2020

(Unit: Vehicles/day)

WEST OF MEGHNA RIVER \ EAST OF MEGHNA RIVER	20 BRAHMANBARIA	21 SADAR NORTH COMILLA	22 SADAR SOUTH COMILLA	23 CHANDPUR	24 SADAR NOAKHALI	25 FENI	26 CHITTAGONG	27 CHITTAGONG HILL TRACTS	28 SYLHET	4 GAZARIA	TOTAL:
1. MANIKGANJ											
2. SADAR SOUTH DHAKA	124	115	447	2055	858	66	3845	17	146	33	7706
3. MUNSHIGANJ EXCEPT GAZARIA								12			12
4. GAZARIA											
5. NARAYANGANJ				56	30	11	507				604
6. SADAR NORTH DHAKA		14		23			207		12		256
7. MYMENSINGH					67		11				78
8. TANGAIL							25		12		37
9. FARIDPUR					13						13
10. RAJSHAHI							95				95
11. PABNA							38				38
12. BOGRA							38				38
13. RANGPUR							24				24
14. DINAJPUR											
15. KHULNA							92				92
16. JESSORE							94				94
17. KUSHTIA							28		13		41
18. BARISAL											
19. PATUAKHALI											
TOTAL:	124	129	447	2134	968	77	5004	29	183	33	9128

Ap. NOTE 11–4 ESTIMATION OF INDUCED TRAFFIC FROM BRIDGES PROJECT

ゾーン間を走行する時間節約からの発生交通量は次の2ケースについて推定された。1つは、メグナ橋が完成した後の交通量、もう1つは2橋梁が完成した後の交通量である。車種別に誘発率を算定するため、下記の計算が行なわれた。

1) プロジェクトがない場合にかかる時間：

$$WOTki = Li \cdot (60/Vk) + WOMk + JTi$$

where WOTki = required time (in minutes) of vehicle type k in zone-pair i

Li = road length (km) between zone-pair i

Vk = running speed of vehicle type k
(50 km/h for truck, 60 km/h for bus and 70 km/h for car)

WOMk = required time to cross the two rivers
(153 min. for truck, 83 min. for bus and 68 min. for car)

JTi = required time to cross the Jamuna River between zone-pair i

2) プロジェクトがある場合にかかる時間：

$$WTki = Li \cdot (60/Vk) + WMk + JTi$$

where WTki = required time of vehicle type k in zone-pair i

WMk = required time to cross the two rivers on the assumptions of:

– the two bridges open to traffic:
2.1 minutes irrespective of vehicle type

– Meghna Bridge only open to traffic:
(0.8 + 95) minutes for truck
(0.8 + 52) minutes for bus
(0.8 + 39) minutes for car

where 0.8 = running time of vehicles on Meghna Bridge (minutes)
95, 52 and 39 = vehicular crossint ime (minutes) on Meghna-Gumti Ferry, for truck, bus and car, respectively.

3) 誘発率

車種別の誘発率は下記の計算式で算定された。

$$IDR_{ki} = \frac{WOT_{ki}^{\beta k}}{WT_{ki}^{\beta k}} - 1$$

wher IDR_{ki} = inducing rate of vehicle type k in zone-pair i

βk = parametre for the gravity model which was obtained from the regression analysis:
β = 0.41, 0.59 and 0.81 for truck, bus and passenger car, respectively.

Ap. Table 12–1 Price of Vehicles

(Unit : Taka)

	Truck		Bus		Mini-bus		Passenger Car	
Representative Vehicle Model	Bedford		Mitsubishi		Isuzu		Mitsubishi-Lancer	
A. Engine and Chassis								
1. CKD - CIF	270,000		260,000		160,000		90,000	
2. Development Surcharge	(2%)	5,400	(2%)	5,200	(2%)	3,200	(2%)	1,800
3. Custom Duty	(20%)	55,080	(20%)	53,040	(20%)	32,640	(150%)	137,700
4. Assembling Costs		20,000		20,000		-		-
Material		(3,000)		(3,000)		-		-
Labour		(17,000)		(17,000)		-		-
5. Overhead, Profit, etc.		100,000		140,000		62,000		90,000
6. Others		49,520		41,760		12,992		34,600
7. Sales Tax		-		-	(20%)	39,168	(20%)	45,900
8. Total of Items Above		500,000		520,000		310,000		400,000
9. Less Tyre Cost		34,800		28,800		11,360		5,600
10. Total Engine and Chassis		465,200		491,200		298,640		394,400
B. Body								
1. Materials		22,000		82,000		60,000		-
Steel		(-)		(55,000)		(40,000)		-
Wood		(16,000)		(-)		(-)		-
Colours		(4,000)		(12,000)		(8,000)		-
Others		(2,000)		(15,000)		(12,000)		-
2. Labour		11,000		20,000		15,000		-
3. Overhead, Profit, etc.		7,000		15,500		15,000		-
4. Total Body		40,000		117,500		90,000		-
C. Total A + B		505,200		608,700		388,640		394,400
D Excise Tax	(10%)	50,520	(10%)	60,870		-		-
E. Total Market Price (Excluding Tyres)		555,720		669,570		388,640		394,400

Source : Field interview survey with Progoti Industry, Rangs Ltd. and others

Ap. Table 12--2 Details of Vehicle Operating Cost--Truck

(Unit : Taka)

	Market Price	Net of Taxes and Transfers	Shadow priced Economic Cost		
			Local	Foreign	Total
A. Engine and Chassis					
1. CKD - CIF	270,000	270,000	-	329,400	329,400
2. Surcharge	5,400	-	-	-	-
3. Custom Duty	55,080	-	-	-	-
4. Landing and Other Charges	49,520	49,520	49,520	-	49,520
5. Assembling Costs	20,000	20,000	13,600	3,660	17,260
(Material)	(3,000)	(3,000)	-	(3,660)	(3,660)
(Labour)	(17,000)	(17,000)	(13,600)	-	(13,600)
6. Overhead, Profit, etc.	100,000	100,000	100,000	-	100,000
7. Total Above	500,000	439,520	163,120	333,060	496,180
8. Less Tyre Costs	34,800	21,030	4,530	20,130	24,660
9. Total Assembled	465,200	418,490	158,590	312,930	471,520
B. Body					
1. Materials	22,000	22,000	18,000	4,880	22,880
(Wood)	(16,000)	(16,000)	(16,000)	-	(16,000)
(Colour)	(4,000)	(4,000)	-	(4,880)	(4,880)
(Others)	(2,000)	(2,000)	(2,000)	-	(2,000)
2. Labours	11,000	11,000	8,800	-	8,800
3. Overhead, etc.	7,000	6,000	6,000	-	6,000
4. Total Built	40,000	39,000	32,800	4,880	37,680
C. Total of A + B	505,200	457,490	191,390	317,810	509,200
D. Excise Tax	50,520	-	-	-	-
E. Total Market Price (Excluding Tyres)	555,720	457,490	191,390	317,810	509,200
F. Time-Related Operating Cost per Annum					
1. Wages	51,600	51,600	47,100	-	47,100
(Driver)	(33,600)	(33,600)	(33,600)	-	(33,600)
(Helper)	(18,000)	(18,000)	(13,500)	-	(13,500)
2. Insurance	2,250	-	-	-	-
3. Registration, Road Tax, etc.	2,293	-	-	-	-
4. Overhead, Profit, etc.	28,072	25,265	25,265	-	25,265
5. Interest Cost (0.1145)	63,630	52,383	21,914	36,389	58,303
6. Total Cost per Annum	147,845	129,248	94,279	36,389	130,668
G. Time-Related Cost per Km (V=25Km, 73,000 Km/yr)					
1. Wages	0.707	0.707	0.645	-	0.645
2. Insurance	0.031	-	-	-	-
3. Registration, Road Tax, etc.	0.031	-	-	-	-
4. Overhead Prifit, etc.	0.384	0.346	0.346	-	0.346
5. Interest Cost	0.872	0.718	0.300	0.498	0.798
6. Total	2.025	1.771	1.291	0.498	1.789

	Market Price	Net of Taxes and Transfers	Shadow priced Economic Cost		
			Local	Foreign	Total
H. Time-Related Cost per Km (V=70 km, 204,400 km/yr)					
1. Wages	0.253	0.253	0.230	-	0.230
2. Insurance	0.011	-	-	-	-
3. Registration, Road Tax, etc.	0.011	-	-	-	-
4. Overhead, Profit, etc.	0.137	0.124	0.124	-	0.124
5. Interest Cost	0.311	0.257	0.107	0.178	0.285
6. Total	0.723	0.632	0.461	0.178	0.639
I. Running Related Cost per Km (V=25 km, 73,000 Km/yr)					
1. Fuel = 3.7 Km/ℓ	2.000	1.838	0.184	2.019	2.203
2. Oil = 129.4 Km/ℓ	0.221	0.129	0.015	0.162	0.177
3. Tyres=30,000 Km/unit	1.160	0.701	0.151	0.671	0.822
4. Maintenance	1.691	1.463	0.421	1.142	1.563
(Parts)	(1.268)	(1.040)	(0.104)	(1.142)	(1.246)
(Labour)	(0.423)	(0.423)	(0.317)	-	(0.317)
5. Depreciation : 0.100	0.533	0.439	0.183	0.305	0.488
6. Total	5.605	4.570	0.954	4.299	5.253
J. Running-Related Cost per Km (V=70 km, 204,400 Km/yr)					
1. Fuel = 4.8 Km/ℓ	1.542	1.417	0.142	1.556	1.698
2. Oil = 170.9 Km/ℓ	0.167	0.112	0.011	0.123	0.134
3. Tyres=30,000 Km/unit	1.160	0.701	0.151	0.671	0.822
4. Maintenance	1.435	1.241	0.357	0.969	1.326
(Parts)	(1.076)	(0.882)	(0.088)	(0.969)	(1.057)
(Labour)	(0.359)	(0.359)	(0.269)	-	(0.269)
5. Depreciation : 0.070	0.190	0.157	0.066	0.109	0.175
6. Total	4.494	3.628	0.727	3.428	4.155
K. Combined Cost per Km (V=25 Km/h)					
1. Time Related Cost	2.025	1.771	1.291	0.498	1.789
2. Running Related Cost	5.605	4.570	0.954	4.299	5.253
3. Total	7.630	6.341	2.245	4.797	7.042
L. Combined Cost per Km (V= 70 Km/h)					
1. Time Related Cost	0.723	0.632	0.461	0.178	0.639
2. Running Related Cost	4.494	3.628	0.727	3.428	4.155
3. Total	5.217	4.260	1.188	3.600	4.794

Ap. Table 12–3 Details of Vehicle Operating Cost–Bus

(Unit : Taka)

	Market Price	Net of Taxes and Transfers	Shadow-priced Economic Cost		
			Local	Foreign	Total
A. Engine and Chassis					
1. CKD - CIF	260,000	260,000	-	317,200	317,200
2. Surcharge	5,200	-	-	-	-
3. Custom Duty	53,040	-	-	-	-
4. Landing and Other Charges	41,760	41,760	41,760	-	41,760
5. Assembling Cost	20,000	20,000	19,600	3,660	17,260
(Material)	(3,000)	(3,000)	-	(3,660)	(3,660)
(Labour)	(17,000)	(17,000)	(13,600)	-	(13,600)
6. Overhead, Profit, etc.	140,000	140,000	140,000	-	140,000
7. Total Above	520,000	461,760	195,360	320,860	516,220
8. Less Tyre Cost	28,800	17,490	3,990	16,470	20,460
9. Total Assembled	491,200	444,270	191,370	304,390	495,760
B. Body					
1. Material	82,000	82,000	70,000	14,640	84,640
(Steel)	(55,000)	(55,000)	(55,000)	-	(55,000)
(Colour)	(12,000)	(12,000)	-	(14,640)	(14,640)
(Others)	(15,000)	(15,000)	(15,000)	-	(15,000)
2. Labours	20,000	20,000	16,000	-	16,000
3. Overhead Profit, etc.	15,500	13,950	13,950	-	13,950
4. Total Built	117,500	115,950	99,950	14,640	114,590
C. Total of A + B	608,700	560,220	291,320	319,030	610,350
D. Excise Tax	60,870	-	-	-	-
E. Total Market Price (Excluding Tyres)	669,570	560,220	291,320	319,030	610,350
F. Time-Related Operating Cost per Annum					
1. Wages	85,500	85,500	74,625	-	74,625
(Driver)	(42,000)	(42,000)	(42,000)	-	(42,000)
(Conductor)	(30,000)	(30,000)	(22,500)	-	(22,500)
(Helper)	(13,500)	(13,500)	(10,125)	-	(10,125)
2. Insurance	4,950	-	-	-	-
3. Registration, Road Tax etc.	3,535	-	-	-	-
4. Overhead, Profit, etc.	47,000	42,300	42,300	-	42,300
5. Interest Cost (0.1145)	76,665	64,145	33,356	36,529	69,885
6. Total Cost per Annum	217,650	191,945	150,281	36,529	186,810
G. Time-Related Cost per Km (V=25 Km, 73,000 Km/yr)					
1. Wages	1.171	1.171	1.022	-	1.022
2. Insurance	0.068	-	-	-	-
3. Registration, Road Tax, etc.	0.048	-	-	-	-
4. Overhead, Profit, etc.	0.644	0.579	0.579	-	0.579
5. Interest Cost	1.050	0.879	0.457	0.500	0.957
6. Total	2.982	2.629	2.058	0.500	2.558

	Market Price	Net of Taxes and Transfers	Shadow-priced Economic Cost		
			Local	Foreign	Total
H. Time Related Cost per Km (V= 70 Km, 204,400 Km/yr)					
1. Wages	0.418	0.418	0.365	-	0.315
2. Insurance	0.024	-	-	-	-
3. Registration Road Tax, etc.	0.017	-	-	-	-
4. Overhead, Profit, etc.	0.230	0.207	0.207	-	0.207
5. Interest Cost	0.375	0.314	0.163	0.178	0.341
6. Total	1.065	0.939	0.735	0.178	0.913
I. Running Related Cost per Km (V= 25 Km, 73,000 Km/yr)					
1. Fuel : 3.0 Km/ℓ	2.467	2.467	0.227	2.490	2.717
2. Oil : 117.6 Km/ℓ	0.243	0.163	0.016	0.179	0.195
3. Tyres: 30,000 Km/unit	0.960	0.583	0.133	0.549	0.682
4. Maintenance	1.835	1.587	0.480	1.238	1.718
(Parts)	(1.376)	(1.128)	(0.113)	(1.238)	(1.351)
(Labour)	(0.459)	(0.459)	(0.367)	-	(0.367)
5. Depreciation: 0.070	0.642	0.537	0.279	0.306	0.585
6. Total	6.147	5.137	1.135	4.762	5.897
J. Running Related Cost per Km (V= 70 Km, 204,400 Km/yr)					
1. Fuel : 4.3 Km/ℓ	1.721	1.581	0.158	1.737	1.895
2. Oil : 155.0 Km/ℓ	0.185	0.123	0.012	0.136	0.148
3. Tyres : 30,000 Km/unit	0.960	0.583	0.133	0.549	0.682
4. Maintenance	1.433	1.240	0.357	0.969	1.326
(Parts)	(1.075)	(0.882)	(0.088)	(0.969)	(1.057)
(Labour)	(0.358)	(0.358)	(0.269)	-	(0.269)
5. Depreciation : 0.070	0.229	0.192	0.100	0.109	0.209
6. Total	4.528	3.719	0.760	3.500	4.260
K. Combined Cost per Km (V= 25 Km/h)					
1. Time Related Cost	2.982	2.629	2.058	0.500	2.558
2. Running Related Cost	6.147	5.137	1.135	4.762	5.897
3. Total	9.129	7.766	3.193	5.262	8.455
L. Combined Cost per Km (V= 70 Km/h)					
1. Time Related Cost	1.065	0.939	0.735	0.178	0.913
2. Running Related Cost	4.528	3.719	0.760	3.500	4.260
3. Total	5.593	4.658	1.495	3.678	5.173

Ap. Table 12-4 Details of Vehicle Operating Cost--Mini Bus

(Unit : Taka)

	Market Price	Net of Taxes and Transfers	Shadow-priced Economic Cost		
			Local	Foreign	Total
A. Engine and Chassis					
1. CIF Price	160,000	160,000	-	195,200	195,200
2. Surcharge	3,200	-	-	-	-
3. Custom Duty	32,640	-	-	-	-
4. Sales Tax	39,168	-	-	-	-
5. Landing and Other Charges	12,992	12,992	12,992	-	12,992
6. Overhead, Profit, etc.	62,000	55,800	55,800	-	55,800
7. Total Above	310,000	228,792	68,792	195,200	263,992
8. Less Tyre Cost	11,360	5,560	1,560	4,880	6,440
9. Total Engine and Chassis	298,640	223,232	67,232	190,320	257,552
B. Body					
1. Materials	60,000	60,000	52,000	9,760	61,760
(Steel)	(40,000)	(40,000)	(40,000)	-	(40,000)
(Colours)	(8,000)	(8,000)	-	(9,760)	(9,760)
(Others)	(12,000)	(12,000)	(12,000)	-	(12,000)
2. Labours	15,000	15,000	12,000	-	12,000
3. Overhead, Profit, etc.	15,000	13,500	13,500	-	13,500
4. Total Built	90,000	88,500	77,500	9,760	87,260
C. Total of A + B	388,640	311,732	144,732	200,080	344,812
D. Time Related Operating Cost per Annum					
1. Wages	72,000	72,000	64,500	-	64,500
(Driver)	(42,000)	(42,000)	(42,000)	-	(42,000)
(Conductor)	(30,000)	(30,000)	(22,500)	-	(22,500)
2. Insurance	3,000	-	-	-	-
3. Registration, Road Tax, etc.	2,035	-	-	-	-
4. Overhead, Profit, etc.	38,518	34,666	34,666	-	34,666
5. Interest Cost (0.1094)	42,517	34,103	15,834	21,889	37,723
6. Total	158,070	140,769	115,000	21,889	136,889
E. Time Related Cost per Km (V= 25 Km, 73,000 Km/yr)					
1. Wages	0.986	0.981	0.884	-	0.884
2. Insurance	0.041	-	-	-	-
3. Registration, Road Tax, etc.	0.028	-	-	-	-
4. Overhead, Profit, etc.	0.528	0.475	0.475	-	0.475
5. Interest Cost	0.582	0.467	0.217	0.300	0.517
6. Total	2.165	1.928	1.575	0.300	1.875

	Market Price	Net of Taxes and Transfers	Shadow-priced Economic Cost		
			Local	Foreign	Total
F. Time Related Cost per Km (V= 70 Km, 204,400 Km/yr)					
1. Wages	0.352	0.352	0.316	-	0.316
2. Insurance	0.015	-	-	-	-
3. Registration, Road Tax, etc.	0.010	-	-	-	-
4. Overhead, Profit, etc.	1.188	0.170	0.170	-	0.170
5. Interest Cost	0.208	0.167	0.077	0.107	0.184
6. Total	0.773	0.689	0.563	0.107	0.670
G. Running Related Cost per Km (V= 25 Km, 73,000 Km/yr)					
1. Fuel = 5.0 Km/ℓ	1.480	1.360	0.136	1.494	1.630
2. Oil = 257.7 Km/ℓ	0.111	0.074	0.007	0.082	0.089
3. Tyres : 30,000 Km/unit	0.379	0.185	0.052	0.160	0.212
4. Maintenance	0.985	0.852	0.246	0.665	0.911
(Parts)	(0.739)	(0.606)	(0.061)	(0.665)	(0.726)
(Labour)	(0.246)	(0.246)	(0.185)	-	(0.185)
5. Depreciation : 0.080	0.425	0.342	0.159	0.219	0.378
6. Total	3.380	2.813	0.600	2.620	3.220
H. Running Related Cost per Km (V= 70 Km, 204,400 Km/yr)					
1. Fuel = 7.2 Km/ℓ	1.028	0.944	0.094	1.038	1.132
2. Oil = 303.0 Km/ℓ	0.094	0.063	0.006	0.069	0.075
3. Tyres : 30,000 Km/unit	0.379	0.185	0.052	0.163	0.215
4. Maintenance	0.751	0.650	0.187	0.508	0.695
(Parts)	(0.563)	(0.462)	(0.046)	(0.508)	(0.554)
(Labour)	(0.188)	(0.188)	(0.141)	-	(0.141)
5. Depreciation : 0.080	0.152	0.122	0.057	0.078	0.135
6. Total	2.404	1.964	0.396	1.856	2.252
I. Combined Cost per Km (V= 25 Km/h)					
1. Time Related Cost	2.165	1.928	1.575	0.300	1.875
2. Running Related Cost	3.380	2.813	0.600	2.620	3.220
3. Total	5.545	4.741	2.175	2.920	5.095
J. Combined Cost per Km (V= 70 Km/h)					
1. Time Related Cost	0.773	0.689	0.563	0.107	0.670
2. Running Related Cost	2.404	1.964	0.396	1.856	2.252
3. Total	3.177	2.653	0.959	1.963	2.922

Ap. Table 12–5 Details of Vehicle Operating Cost–Car

(Unit : Taka)

	Market Price	Net of Taxes and Transfers	Shadow-priced Economic Cost		
			Local	Foreign	Total
A. Complete Set					
1. CIF Price	90,000	90,000	-	109,800	109,800
2. Surcharge	1,800	-	-	-	-
3. Custom Duty	137,700	-	-	-	-
4. Sales Tax	45,900	-	-	-	-
5. Landing and Other Charges	34,600	34,600	34,600	-	34,600
6. Overhead, Profit, etc.	90,000	81,000	81,000	-	81,000
7. Total Above	400,000	205,600	115,600	109,800	225,400
8. Less Tyre Cost	5,600	2,700	700	2,446	3,140
9. Total	394,400	202,900	114,900	107,360	222,260
B. Time Related Operating Cost per Annum					
1. Wage (Driver)	15,000	15,000	11,250	-	11,250
2. Insurance	3,700	-	-	-	-
3. Registration, Road Tax, etc.	925	-	-	-	-
4. Interest Cost (0.1044)	41,175	21,183	11,996	11,208	23,204
5. Total	60,800	36,183	23,246	11,208	34,454
C. Time Related Cost per Km (V= 25 Km, 36,500 Km/yr)					
1. Wage	0.411	0.411	0.308	-	0.308
2. Insurance	0.101	-	-	-	-
3. Registration, Road Tax, etc.	0.025	-	-	-	-
4. Interest Cost (0.1044)	1.128	0.580	0.329	0.307	0.636
5. Total	1.666	0.991	0.637	0.307	0.944
D. Time Related Cost per Km (V= 70 Km, 102,200 Km/yr)					
1. Wage	0.147	0.147	0.110	-	0.110
2. Insurance	0.036	-	-	-	-
3. Registration, Road Tax, etc.	0.009	-	-	-	-
4. Interest Cost	0.403	0.207	0.117	0.110	0.227
5. Total	0.595	0.354	0.227	0.110	0.337
E. Running Related Cost per Km (V= 25 Km, 36,500 Km/yr)					
1. Fuel = 7.5 Km/ℓ	1.692	1.438	0.795	0.784	1.579
2. Oil = 704.2 Km/ℓ	0.041	0.027	0.003	0.030	0.033
3. Tyres : 25,000 Km/Unit	0.224	0.108	0.028	0.098	0.126
4. Maintenance	0.979	0.847	0.244	0.661	0.905
(Parts)	(0.734)	(0.602)	(0.060)	(0.661)	(0.721)
(Labour)	(0.245)	(0.245)	(0.184)	-	(0.184)
5. Depreciation : 0.090	0.972	0.500	0.283	0.265	0.548
6. Total	3.908	2.920	1.353	1.838	3.191

	Market Price	Net of Taxes and Transfers	Shadow-priced Economic Cost		
			Local	Foreign	Total
F. Running Related Cost per Km (V= 70 Km, 102,200 Km/yr)					
1. Fuel = 13.5 Km/ℓ	1.190	1.012	0.559	0.552	1.111
2. Oil = 854.7 Km/ℓ	0.033	0.022	0.002	0.025	0.027
3. Tyres : 25,000 Km/unit	0.224	0.108	0.028	0.098	0.126
4. Maintenance	0.724	0.626	0.181	0.488	0.669
(Parts)	(0.543)	(0.445)	(0.045)	(0.488)	(0.533)
(Labour)	(0.181)	(0.181)	(0.136)	-	(0.136)
5. Depreciation: 0.090	0.347	0.179	0.101	0.095	0.196
6. Total	2.518	1.947	0.871	1.258	2.129
G. Combined Cost per Km (V= 25 Km/h)					
1. Time Related Cost	1.666	0.991	0.637	0.307	0.944
2. Running Related Cost	3.908	2.920	1.353	1.838	3.191
3. Total	5.574	3.991	1.990	2.145	4.135
H. Combined Cost per Km (V = 70 Km/h)					
1. Time Related Cost	0.595	0.354	0.227	0.110	0.337
2. Running Related Cost	2.518	1.947	0.871	1.258	2.129
3. Total	3.113	2.301	1.098	1.368	2.466

Ap. Table 12–6 Personnel Expenses for Meghna and Meghna–Gumti Ferry Services

(Unit : 1,000 Taka)

	Average Monthly Wage(Tk)	Meghna		Meghna-Gumti		Total Annual Wage
		No. of Persons	Annual Wage	No. of Persons	Annual Wage	
Ferry Crew						
Master	1,670	2	40.1	2	40.1	80.2
Driver	1,550	8	148.8	8	148.8	297.6
Boatman	860	22	227.0	18	185.8	412.8
Greaser	750	4	36.0	4	36.0	72.0
Subtotal		36	451.9	32	410.7	862.6
Terminal Worker						
Manager	3,500	1	42.0	1	42.0	84.0
Superviser	1,550	12	223.2	12	223.2	446.4
Toll Collector	1,500	4	72.0	4	72.0	144.0
Gateman	750	12	108.0	18	162.0	270.0
Pontoon Boatman	750	12	108.0	8	72.0	180.0
Guard, Boy, Sweeper	700	4	33.6	12	100.8	134.4
Others	750	-	0	4	36.0	36.0
Mechanic	1,550	3	55.8	2	37.2	93.0
Mechanic Helper	980	2	23.5	2	23.5	47.0
Electrician	1,500	1	18.0	1	18.0	36.0
Electrician Helper	850	1	10.2	1	10.2	20.4
Carpenter	1,500	2	36.0	2	36.0	72.0
Mason	1,350	1	16.2	1	16.2	32.4
Mason Helper	850	2	20.4	2	20.4	40.8
Fuel Dump Guard	700	3	25.2	3	25.2	50.4
Fuel Store Keeper	920	1	11.0	1	11.0	22.0
Truck Driver	1,550	1	18.6	1	18.6	37.2
Truck helper	850	1	10.2	1	10.2	20.4
Generator Driver	1,500	4	72.0	2	36.0	108.0
Subtotal	-	67	903.9	78	970.5	1,874.4
TOTAL		103	1,355.8	110	1,381.2	2,737.0

Source : Field Interview Survey at Meghna and Meghna-Gumti Ferry Ghats and data obtained from the Ferry Circle, RHD

Ap. Table 12–7 Consumption of Fuel and Lubricant Oil for Meghna and Meghna–Gumti Ferries

(1) Unit Consumption of Fuel and Lubricant Oil per Round Trip

(Unit : ℓ/Round trip)

	Meghna		Meghna-Gumti	
	Type I	Type II & Unifloat	Type I	Type II & Unifloat
Diesel Oil	11.37	10.23	25.01	25.51
Lubricant Oil	0.39	0.39	0.85	0.85

(2) Number of Round Trips per Day

	Ferry Boat Type I	Ferry Boat Type II & Unifloat
Meghna	(3 x 17) + (2 x 8.5) = 68	4 x 17 = 68
Meghna-Gumti	(4 x 13.5) + (2 x 65) = 67	3 x 13.5 = 40

(3) Fuel Oil Consumption per Day

Meghna	(11.37ℓ x 68) + (10.23ℓ x 68)	= 1,469 ℓ
Meghna-Gumti	(25.01ℓ x 67) + (22.51ℓ x 40)	= 2,576 ℓ

(4) Lubricant Oil Consumption per Day

Meghna	(0.39ℓ x 68) + (0.39ℓ x 68)	= 53 ℓ
Meghna-Gumti	(0.85ℓ x 67) + (0.85ℓ x 40)	= 91 ℓ

(5) Annual Costs for Fuel and Lubricant Oil for Ferries

	Annual Consumption (1,000ℓ)	Market Cost		Economic Cost	
		Unit Price	1,000 Taka	Unit Price	1,000 Taka
Meghna					
Fuel	536.2	7.40	3,967.9	8.15	4,370.0
Lubricant	19.3	28.60	552.0	22.92	442.4
Meghna-Gumti					
Fuel	940.2	7.40	6,957.5	8.15	7,662.6
Lubricant	33.2	28.60	949.5	22.92	760.9
Total					
Fuel	1,476.4	7.40	10.925.4	8.15	12,032.6
Lubricant	52.5	28.60	1,501.5	22.92	1,203.3

Source : Field Interview Survey at Meghna and Meghna-Gumti Ferry Ghats and data obtained from the Ferry Circle, RHD

Ap. Table 12–8 Maintenance Costs of Ferries and Pontoons

(1) Running Maintenance Costs

(Unit : 1,000 Taka)

	Average Annual Unit Cost	Meghna		Meghna-Gumti	
		No. of Boats	Annual Costs	No. of Boats	Annual Costs
Ferry Boat Type I	172	4	688	4	688
Type II & Unifloat	115	4	460	4	460
Total	-	8	1,148	8	1,148

(2) Overhauling Costs of Engines

(Unit : 1,000 Taka)

	Average Annual Unit Cost	Meghna		Meghna-Gumti	
		No. of Units	Annual Costs	No. of Units	Annual Costs
Ferry Boat Type I	183	4	732	4	732
Type II & Unifloat	125	4	500	4	500
Total	-	8	1,232	8	1,232

(3) Regular Maintenance Costs

(Unit : 1,000 Taka)

	Average Unit Cost	Frequency of Maintenance	Average Annual Unit Cost
Ferry Boat Type I	97.5	once for 3 years	32.5
Type II & Unifloat	60	once for 3 years	20
Pontoon & Gangway	100	once for 4 years	25

(Unit : 1,000 Taka)

	Average Annual Unit Cost	Meghna		Meghna-Gumti	
		No. of Boats	Annual Costs	No. of Boats	Annual Costs
Ferry Boat Type I	32.5	4	130	4	130
Type II & Unifloat	20	4	80	4	80
Pontoon/Gangway	25	3	75	3	75
Total	-	-	285	-	285

Source : Data obtained from the Ferry Circle, RHD

Ap. Table 12-9 Depreciation Costs

(1) Unit Annual Depreciation Cost

(Unit : 1,000 Taka)

	Economic Life (years)	Salvage Value (%)	Market Price		Economic Price	
			Unit Cost	Annual Cost	Unit Cost	Annual Cost
Utility Ferry Type I	10	30	8,700	609	6,315	442
Spare Engines (I)	10	20	2,962	237	1,975	158
Type II & Unifloat	10	30	6,500	455	4,679	328
Spare Engines (II)	10	20	2,418	193	1,612	129
Pontoon with Gangway	10	30	1,750	123	1,626	114

(2) Annual Depreciation Costs

(Unit : 1,000 Taka)

	Meghna			Meghna-Gumti		
	Unit	Market Cost	Economic Cost	Unit	Market Cost	Economic Cost
Utility Ferry Type I	4	2,436	1,768	4	2,436	1,768
Spare Engines (I)	2	474	316	2	474	316
Type II & Unifloat	4	1,820	1,312	4	1,820	1,312
Spare Engines (II)	2	386	258	2	386	258
Pontoon with Gangway	3	369	342	3	369	342
Others	-	1,645	1,199	-	1,645	1,199
Total	-	7,130	5,195	-	7,130	5,195

Source : Field Interview survey at Meghna and Meghna-Gumti Ferry Ghats and data obtained from the Ferry Circle, RHD

AP. TABLE 13-1 CALCULATION OF STANDARD CONVERSION FACTOR

Item	Domestic/Border Price	Absorption
Rice	1.060	344,214
Wheat	1.060	23,053
Jute	1.000	14,532
Cotton	1.113	158
Tea	1.000	917
Other Crops	1.060	120,055
Livestock	1.060	92,523
Fisheries	1.060	89,669
Forestries	1.060	19,666
Sugar	1.492	34,055
Edible Oils	1.413	19,863
Salt	1.300	8,680
Tabacco Products	1.500	24,353
Other Food	1.060	38,714
Cotton Yarn	1.600	18,669
Cloth, Mill Made	1.800	15,326
Cloth, Handloom	1.800	48,120
Jute Textiles	1.000	3,093
Paper	2.123	10,392
Leather	1.080	25,435
Fertilisers	1.000	10,092
Pharmaceuticals	1.165	18,156
Other Chemicals	1.433	47,170
Cement	1.064	9,198
Basic Metals	1.327	29,473
Metal Products	1.680	47,626
Machinery	1.236	55,499
Transport Equipment	2.650	29,591
Wood Products	2.500	9,332
Miscellaneous Industries	2.000	75,981
Petroleum Products	1.176	45,381
Total/Average	1.214	1,329,975
Standard Conversion Factor		0.82

Source : Planning Commission TIP

AP. TABLE 13-2 COST OF FERRY BOAT

(Unit : 1,000 Taka/Unit)

	Type I		Type II & Unifloat	
	Financial cost	Economic cost	Financial cost	Economic cost
Imported				
Propulsion Unit	3,195	3,898	2,605	3,178
Rubber Fender	335	409	110	134
Diesel Generator	115	140	65	80
Subtotal	3,645	4,447	2,780	3,392
Surcharge (2%)	73	-	56	-
Custom Duty (50%)	1,859	-	1,418	-
Sales Tax (20%)	1,115	-	851	-
Handling Charge & Agent Commission	68	61	55	50
Total imported	6,760	4,508	5,160	3,442
Domestic				
Material (Steel)(1)	1,550	1,480	950	907
Labour	240	192	215	172
Overhead, etc.	150	135	175	158
Total domestic	1,940	1,807	1,340	1,237
TOTAL COSTS	8,700	6,315	6,500	4,679

(1) Domestic steel price is Tk.18,000/ton, Net of taxes Tk. 16,936, FC Tk.1,100,LC Tk.15,836 and Conversion Factor is 0.955

Source : Ferry Circle, RHD

AP. TABLE 13-3 COST OF SPARE ENGINE

(Unit : 1,000 Taka/Unit)

	Financial Cost	Economic Cost
CIF Import	1,598	1,950
Surcharge (2%)	32	-
Custom Duty (50%)	815	-
Sales Tax (20%)	489	-
Handling Charge & Agent Commission	28	25
TOTAL COSTS	2,962	1,975

Source : Ferry Circle, RHD

AP. TABLE 13-4 COST OF PONTOON/GANGWAY

(Unit : 1,000 Taka/Set)

	Financial Cost	Economic Cost
Steel (Domestic)	1,150	1,098
Other Materials	150	143
Labour	200	160
Overhead, Profit, etc.	250	225
TOTAL COSTS	1,750	1,626

Source : Ferry Circle, RHD

AP. TABLE 13-5 COST OF JETTY AND FERRY APPROACH ROAD

(Unit : 1,000 Taka)

	Market Cost	Net of Taxes	F/C Costs	L/C Costs		Economic cost
				Labour	Others	
Meghna Ferry						
Dhaka side	1,998	1,532	593	110	829	1,640
Comilla Side	2,797	2,073	841	138	1,094	2,230
Total set	4,795	3,605	1,434	248	1,923	3,870
Meghna-Gumti Ferry						
Dhaka side	2,427	1,919	716	149	1,054	2,047
Comilla side	1,903	1,439	588	102	749	1,548
Total set	4,330	3,358	1,304	251	1,803	3,595

Source : Ap. Tables 8-1 and 8-2

AP.13-6 FERRY SERVICE PERSONNEL PLANNING

(Unit : Number)

	Meghna								Meghna-Gumti							
	1984	1990	1995	2000	2005	2010	2015	2020	1984	1990	1995	2000	2005	2010	2015	2020
(Number of Ferries,etc.)																
Ferry boat	8	8	9	11	14	17	21	25	8	8	10	12	15	19	23	28
Pontoon	3	4	5	6	7	9	11	13	3	3	4	5	6	7	9	11
Total Round Trip/ Day	136	200	225	275	350	425	525	625	107	160	200	240	300	380	460	560
(Ferry Crew)																
Master	2	3	3	4	5	6	8	9	2	3	4	5	6	7	9	10
Driver	8	12	12	15	21	24	32	36	8	12	15	18	24	27	36	42
Boatman	22	32	36	45	57	69	84	102	18	27	33	42	51	63	78	96
Greaser	4	6	6	9	9	12	15	18	4	6	6	9	12	15	18	21
Subtotal	36	53	57	73	92	111	139	165	32	48	58	74	93	112	141	169
(Terminal Worker)																
Manager	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Superviser	12	18	20	24	32	38	46	55	12	18	22	27	33	42	51	63
Toll Collector	4	6	6	8	10	12	15	18	4	6	7	9	12	14	17	21
Gateman	12	18	20	24	32	38	46	55	18	27	33	40	51	63	78	93
Pontoon Khalashi	12	24	30	36	42	54	66	78	8	18	24	30	36	42	54	66
Guard, Sweeper,etc.	4	6	6	8	10	12	15	18	16	24	30	36	45	56	69	84
Mechanic	3	4	5	6	8	9	12	14	2	3	4	4	6	7	9	10
Mechanic Helper	2	3	3	4	5	6	8	9	2	3	4	4	6	7	9	10
Electrician	1	1	2	2	3	3	4	5	1	2	2	2	3	4	4	5
Electrician Helper	1	2	2	2	3	3	4	5	1	2	2	2	3	4	4	5
Carpenter	2	3	3	4	5	6	8	9	2	3	4	4	6	7	9	10
Mason	1	1	2	2	3	3	4	5	1	2	2	2	3	4	4	5
Mason Helper	2	3	3	4	5	6	8	9	2	3	4	4	6	7	9	10
Fuel Dump Guard	3	5	5	6	8	9	12	14	3	4	6	7	8	10	12	16
Fuel Store Keeper	1	2	2	2	3	3	4	5	1	2	2	2	3	4	4	5
Truck Driver	1	2	2	2	3	3	4	5	1	2	2	2	3	4	4	5
Truck Helper	1	2	2	2	3	3	4	5	1	2	2	2	3	4	4	5
Generator Driver	4	6	6	8	10	12	15	18	2	3	4	4	6	7	9	10
Subtotal	67	107	120	145	186	221	276	328	78	125	155	182	234	287	351	424
Total	103	160	177	218	278	332	415	493	110	173	213	256	327	399	492	593

AP. TABLE 13-7 FERRY SERVICE PERSONNEL EXPENDITURE

(Unit : 1,000 Taka/year)

	Meghna								Meghna-Gumti							
	1984	1990	1995	2000	2005	2010	2015	2020	1984	1990	1995	2000	2005	2010	2015	2020
(FINANCIAL COSTS)																
Ferry Crew																
Master	40	60	60	80	100	120	160	180	40	60	80	100	120	140	180	200
Driver	149	223	223	279	391	446	595	670	149	223	279	335	446	502	670	781
Boatman	227	330	372	464	588	712	867	1053	186	279	341	433	526	650	805	991
Greaser	36	54	54	81	81	108	135	162	36	54	54	81	108	135	162	189
Subtotal	452	667	709	904	1160	1386	1757	2065	411	616	754	949	1200	1427	1817	2161
Terminal Worker																
Manager	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42
Superviser	223	335	372	446	595	707	856	1023	223	335	409	502	614	781	949	1172
Toll Collector	72	108	108	144	180	216	270	324	72	108	126	162	216	252	306	378
Gateman	108	162	180	216	288	342	414	495	162	243	297	360	459	567	702	837
Pontoon Khalashi	108	216	270	324	378	486	594	702	72	162	216	270	324	378	486	594
Guard, Sweeper,etc.	34	50	50	67	84	101	126	151	137	202	252	302	378	470	580	706
Mechanic	56	74	93	112	149	167	223	260	37	56	74	74	112	130	167	186
Mechanic Helper	24	35	35	47	59	71	94	106	24	35	47	47	71	82	106	118
Electrician	18	18	36	36	54	54	72	90	18	36	36	36	54	72	72	90
Electrician Helper	10	20	20	20	31	31	41	51	10	20	20	20	31	41	41	51
Carpenter	36	54	54	72	90	108	144	162	36	54	72	72	108	126	162	180
Mason	16	16	32	32	49	49	65	81	16	32	32	32	49	65	65	81
Mason Helper	20	31	31	41	51	61	82	92	20	31	41	41	61	71	92	102
Fuel Dump Guard	25	42	42	50	67	76	101	118	25	34	50	59	67	84	101	134
Fuel Store Keeper	11	22	22	23	33	33	44	55	11	22	22	22	33	44	44	55
Truck Driver	19	37	37	37	56	56	74	93	19	37	37	37	56	74	74	93
Truck Helper	10	20	20	20	31	31	41	51	10	20	20	20	31	41	41	51
Generator Driver	72	108	108	144	180	216	270	324	36	54	72	72	108	126	162	180
Subtotal	904	1390	1552	1873	2417	2847	3553	4220	970	1523	1865	2170	2814	3446	4192	5050
TOTAL FINANCIAL COSTS	1356	2057	2261	2777	3577	4233	5310	6285	1381	2139	2619	3119	4014	4873	6009	7211
(ECONOMIC COSTS)																
Ferry Crew	362	534	567	723	928	1109	1406	1652	329	493	603	759	960	1142	1454	1729
Terminal Worker	723	1112	1242	1498	1934	2278	2842	3376	776	1218	1492	1736	2251	2757	3354	4040
TOTAL ECONOMIC COSTS	1085	1646	1809	2221	2862	3387	4248	5028	1105	1711	2095	2495	3211	3899	4808	5769

AP. TABLE 13-8 ASSUMED FUEL AND LUBRICANT OIL CONSUMPTION VOLUME FOR FERRY BOATS

	Meghna								Meghna-Gumti							
	1984	1990	1995	2000	2005	2010	2015	2020	1984	1990	1995	2000	2005	2010	2015	2020
Number of Round Trip																
Type I Ferry Boats	68	200	225	275	350	425	525	625	67	160	200	240	300	380	460	560
TypeII & Unifloat	68	-	-	-	-	-	-	-	40	-	-	-	-	-	-	-
Diesel Oil Consumption /Day	1,469	2,274	2,558	3,127	3,980	4,832	5,969	7,106	2,576	4,002	5,002	6,002	7,503	9,504	11,505	14,006
Lubricant Oil Consumption /Day	53.0	78.0	87.8	107.3	136.5	165.8	204.8	243.8	91.0	136.0	170.0	204.0	255.0	323.0	391.0	476.0

AP. TABLE 13-9 PROJECTED FINANCIAL COSTS OF FUEL AND LUBRICANT OIL FOR FERRY BOATS

(Unit : 1,000 Taka/year)

	Meghna								Meghna-Gumti							
	1984	1990	1995	2000	2005	2010	2015	2020	1984	1990	1995	2000	2005	2010	2015	2020
Diesel Oil	3,968	6,142	6,909	8,446	10,750	13,051	16,122	19,193	6,958	10,809	13,510	16,211	20,266	25,670	31,075	37,830
Lubricant Oil	553	814	917	1,120	1,425	1,731	2,138	2,545	950	1,420	1,775	2,130	2,662	3,372	4,082	4,969
TOTAL	4,521	6,956	7,826	9,566	12,175	14,782	18,260	21,738	7,908	12,229	15,285	18,341	22,928	29,042	35,157	47,799

AP. TABLE 13-10 PROJECTED ECONOMIC COST OF FUEL AND LUBRICANT OIL FOR FERRY BOATS

(Unit : 1,000 Taka/Year)

	Meghna								Meghna-Gumti							
	1984	1990	1995	2000	2005	2010	2015	2020	1984	1990	1995	2000	2005	2010	2015	2020
Diesel Oil	4,370	6,765	7,609	9,302	11,840	14,374	17,756	21,139	7,663	11,905	14,880	17,854	22,320	28,272	34,224	41,664
Lubricant Oil	442	653	735	898	1,142	1,387	1,713	2,040	761	1,138	1,422	1,707	2,133	2,702	3,271	3,982
TOTAL	4,812	7,418	8,344	10,200	12,982	15,761	19,469	23,179	8,424	13,043	16,302	19,561	24,453	30,974	37,495	45,646

AP. TABLE 13-11 MAINTENANCE COST OF FERRY BOATS AND PONTOON/GANGWAYS

(Unit : 1,000 Taka)

	Meghua								Meghna-Gumti							
	1984	1990	1995	2000	2005	2010	2015	2020	1984	1990	1995	2000	2005	2010	2015	2020
(Number of Ferries and Pontoons)																
Utility Ferry boats Type I	4	8	9	11	14	17	21	25	4	8	10	12	15	19	23	28
Type II & Uni-float	4	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-
Pontoon/Gang-ways	3	4	5	6	7	9	11	13	3	3	4	5	6	7	9	11
(Ferry Boat Maintenance Costs)																
Regular Maintenance																
Type I	130	260	293	358	455	553	683	813	130	260	325	390	488	618	748	910
Type II & Uni-float	80	-	-	-	-	-	-	-	80	-	-	-	-	-	-	-
Running Maintenance																
Type I	688	1,376	1,548	1,892	2,408	2,924	3,612	4,300	688	1,376	1,720	2,064	2,580	3,268	3,956	4,816
Type II & Uni-float	460	-	-	-	-	-	-	-	460	-	-	-	-	-	-	-
Overhauling of Engines																
Type I	732	1,464	1,647	2,013	2,562	3,111	3,843	4,575	732	1,464	1,830	2,196	2,745	3,477	4,209	5,124
Type II & Uni-float	500	-	-	-	-	-	-	-	500	-	-	-	-	-	-	-
Total Maintenance Costs	2,590	3,100	3,488	4,263	5,425	6,588	8,138	9,688	2,590	3,100	3,875	4,650	5,813	7,363	8,913	10,850
(Pontoon/Gangway Maintenance Costs)																
Regular Maintenance	75	100	125	150	175	225	275	325	75	75	100	125	150	175	225	275
(Economic Maintenance Costs)																
Ferry Boats	2,124	2,542	2,860	3,496	4,449	5,402	6,673	7,944	2,124	2,542	3,178	3,813	4,767	6,038	7,309	8,897
Pontoon/Gang-ways	62	82	103	123	144	185	226	267	62	62	82	103	123	144	185	226
Total	2,186	2,624	2,963	3,619	4,593	5,587	6,899	8,211	2,186	2,604	3,260	3,916	4,890	6,182	7,494	9,123

AP. TABLE 13-12 ECONOMIC VOC SAVINGS BENEFIT FOR MEGHNA BRIDGE

(1) VOC Savings Benefit for Normal Traffic per Day

(Unit : 1,000 Taka)

		Total	Truck	Bus	Mini-bus	Car/Others
Unit VOC/km : V = 70 km/h		-	4.794	5.173	2.922	2.466
V = 25 km/h		-	7.042	8.455	5.095	4.135
Running Distance in km: "With"		2.9	2.9	2.9	2.9	2.9
"Without"		1.9	1.9	1.9	1.9	1.9
1990	Traffic Volume	2,239	1,195	597	116	331
	VOC "With"	29.0	16.6	9.0	1.0	2.4
	VOC "Without"	19.3	16.0	9.6	1.1	2.6
	VOC Savings	0.3	-0.6	0.6	0.1	0.2
2000	Traffic Volume	3,765	1,927	909	176	753
	VOC "With"	47.3	26.8	13.6	1.5	5.4
	VOC "Without"	48.0	25.8	14.6	1.7	5.9
	VOC Savings	0.7	-1.0	1.0	0.2	0.5
2010	Traffic Volume	5,961	2,943	1,308	254	1,456
	VOC "With"	73.1	40.9	19.6	2.2	10.4
	VOC "Without"	74.3	39.4	21.0	2.5	11.4
	VOC Savings	1.2	-1.5	1.4	0.3	1.0
2020	Traffic Volume	9,128	4,366	1,831	355	2,576
	VOC "With"	109.6	60.7	27.5	3.0	18.4
	VOC "Without	111.4	58.4	29.4	3.4	20.2
	VOC Savings	1.8	-2.3	1.9	0.4	1.8

(2) VOC Savings Benefit for Induced Traffic per Day - Meghna Case I

(Unit : 1,000 Taka)

		Total	Truck	Bus	Mini-bus	Car/Others
1990	Traffic Volume	180	70	53	10	47
	VOC "With"	2.2	1.0	0.8	0.1	0.3
	VOC "Without"	2.3	0.9	0.9	0.1	0.4
	VOC Savings	0.1	-0.1	0.1	0	0.1
	VOC Savings Benefits	0.1	-0.1	0.1	0	0.1
2000	Traffic Volume	316	113	81	16	106
	VOC "With"	6.5	4.4	1.2	0.1	0.8
	VOC "Without"	6.4	4.2	1.3	0.1	0.8
	VOC Savings	0.1	-0.2	0.1	0	0
	VOC Saving Benefits	0.1	-0.1	0.1	0	0
2010	Traffic Volume	515	173	116	23	203
	VOC "With"	10.6	7.2	1.7	0.2	1.5
	VOC "Without"	10.6	6.9	1.9	0.2	1.6
	VOC Savings	0	-0.3	0.2	0	0.1
	VOC Saving Benefits	0	-0.2	0.1	0	0.1
2020	Traffic Volume	796	245	162	31	358
	VOC "With"	16.4	11.1	2.4	0.3	2.6
	VOC "Without"	16.4	10.7	2.6	0.3	2.8
	VOC Savings	0	-0.4	0.2	0	0.2
	VOC Saving Benefits	0	-0.2	0.1	0	0.1

(3) VOC Savings Benefit for Induced Traffic per Day - Meghna Case II

(Unit : 1,000 Taka)

		Total	Truck	Bus	Mini-bus	Car/Others
1990	Traffic Volume	572	213	179	35	145
	VOC "With"	7.0	3.0	2.7	0.3	1.0
	VOC "Without"	7.1	2.8	2.9	0.3	1.1
	VOC Savings	0.1	-0.2	0.2	0	0.1
	VOC Saving Benefits	0.1	-0.1	0.1	0	0.1
2000	Traffic Volume	992	342	274	53	323
	VOC "With"	11.6	4.8	4.1	0.4	2.3
	VOC "Without"	12.0	4.6	4.4	0.5	2.5
	VOC Savings	0.4	-0.2	0.3	0.1	0.2
	VOC Saving Benefits	0.2	-0.1	0.2	0	0.1
2010	Traffic Volume	1,611	524	394	77	616
	VOC "With"	18.3	7.3	5.9	0.7	4.4
	VOC "Without"	18.9	7.0	6.3	0.8	4.8
	VOC Savings	0.6	-0.3	0.4	0.1	0.4
	VOC Saving Benefits	0.3	-0.2	0.2	0.1	0.2
2020	Traffic Volume	2,538	787	557	108	1,086
	VOC "With"	28.0	10.9	8.4	0.9	7.8
	VOC "Without"	28.9	10.5	8.9	1.0	8.5
	VOC Savings	0.9	-0.4	0.5	0.1	0.7
	VOC Saving Benefits	0.5	-0.2	0.2	0.1	0.4

(4) Total Annual VOC Savings benefits

(Unit : 1,000 Taka)

	1990	2000	2010	2020
Meghna - Case I	146.0	292.0	438.0	657.0
Meghna - Case II	146.0	328.5	547.5	839.5

Source: Table 12-1-7 and Table 11-4-5

AP. TABLE 13-13 ECONOMIC VOC SAVINGS BENEFIT FOR MEGHNA-GUMTI BRIDGE

(1) VOC Savings Benefit for Normal Traffic per Day

(Unit : 1,000 Taka)

		Total	Truck	Bus	Mini-bus	Car/Others
Unit VOC/km :	V = 70 km/h	-	4.794	5.173	2.922	2.466
	V = 25 km/h	-	7.042	8.455	5.095	4.135
Running Distance :	"With"	2.8	2.8	2.8	2.8	2.8
	"Without"	1.4	1.4	1.4	1.4	1.4
1990	Traffic Volume	2,239	1,195	597	116	331
	VOC "With"	27.8	16.0	8.6	0.9	2.3
	VOC "Without"	21.6	11.8	7.1	0.8	1.9
	VOC Savings	-6.2	-4.2	-1.5	0.1	-0.4
2000	Traffic Volume	3,765	1,927	909	176	753
	VOC "With"	45.7	25.9	13.2	1.4	5.2
	VOC "Without"	35.5	19.0	10.8	1.3	4.4
	VOC Savings	-10.2	-6.9	-2.4	-0.1	-0.8
2010	Traffic Volume	5,961	2,943	1,308	254	1,456
	VOC "With"	70.6	39.5	18.9	2.1	10.1
	VOC "Without"	54.7	29.0	15.5	1.8	8.4
	VOC Savings	-15.9	-10.5	-3.4	-0.3	-1.7
2020	Traffic Volume	9,128	4,366	1,831	355	2,576
	VOC "With"	105.8	58.6	26.5	2.9	17.8
	VOC "Without"	82.1	43.0	21.7	2.5	14.9
	VOC Savings	-23.7	-15.6	-4.8	-0.4	-2.9

(2) VOC Savings Benefit for Induced Taffic per Day

(Unit: 1,000 Taka)

		Total	Truck	Bus	Mini-bus	Car/Others
1990	Traffic Volume	572	213	179	35	145
	VOC "With"	6.8	2.9	2.6	0.3	1.0
	VOC "Without"	5.2	2.1	2.1	0.2	0.8
	VOC Saving	-1.6	-0.8	-0.5	-0.1	-0.2
	VOC Saving Benefits	-0.8	-0.4	-0.3	0	-0.1
2000	Traffic Volume	992	342	274	53	323
	VOC "With"	11.2	4.6	4.0	0.4	2.2
	VOC "Without"	8.9	3.4	3.2	0.4	1.9
	VOC Savings	-2.3	-1.2	-0.8	0	-0.3
	VOC Saving Beneftis	-1.2	-0.6	-0.4	0	-0.2
2010	Traffic Volume	1,611	524	394	77	616
	VOC "With"	17.6	7.0	5.7	0.6	4.3
	VOC "Without"	14.0	5.2	4.7	0.5	3.6
	VOC Savings	-3.6	-1.8	-1.0	-0.1	-0.7
	VOC Saving Benefits	-1.8	-0.9	-0.5	0	-0.4
2020	Traffic Volume	2,538	787	557	108	1,086
	VOC "With"	27.1	10.6	8.1	0.9	7.5
	VOC "Without"	21.5	7.8	6.6	0.8	6.3
	VOC Savings	-5.6	-2.8	-1.5	-0.1	-1.2
	VOC Saving Benefits	-2.8	-1.4	-0.7	-0.1	-0.6

(3) Total Annual VOC Savings Benefits

(Unit: 1,000 Taka)

	1990	2000	2010	2020
Meghna-Gumti	-2,555.0	-4,161.0	-6,460.5	-9,672.5

Source: Table 12-1-7 and Table 11-4-5

AP. TABLE 13-14 TIME COST SAVINGS BENEFIT FOR MEGHNA BRIDGE

(1) Time Cost Saving Benefits for Normal Traffic per Day

(Unit : 1,000 Taka/Day)

	Unit	1990	2000	2010	2020
Traffic Volume	(Unit time saved)				
Truck	60.6 minutes	1,195	1,927	2,943	4,366
Bus	33.1 minutes	597	909	1,308	1,831
Mini-bus	33.1 minutes	116	176	254	355
Car/Others	30.6 minutes	331	753	1,456	2,576
Vehicle Time Value	(Unit Value)				
Truck	0.597 Taka/minute	43.2	69.7	106.5	157.9
Bus	0.853 Taka/minute	16.9	25.7	36.9	51.7
Mini-bus	0.625 Taka/minute	2.4	3.6	5.3	7.3
Car/Others	0.315 Taka/minute	3.2	7.3	14.0	24.8
Passengers' Time Value	(Unit Value)				
Bus	2.769 Taka/minute	54.7	83.3	119.9	167.8
Mini-bus	1.463 Taka/minute	5.6	8.5	12.3	17.2
Car/Others	0.567 Taka/minute	5.7	13.1	25.3	44.7

(2) Time Cost Savings Benefit for Induced Traffic per Day - Meghna Case I

(Unit : 1,000 Taka/Day)

	Unit	1990	2000	2010	2020
Traffic Volume	(Unit Time saved)				
Truck	60.6 minutes	70	113	173	245
Bus	33.1 minutes	53	81	116	162
Mini-bus	33.1 minutes	10	16	23	31
Car/Others	30.6 minutes	47	106	203	358
Vehicle Time Value	(Unit Value)				
Truck	0.298 Taka/minute	1.3	2.0	3.1	4.4
Bus	0.426 Taka/minute	0.7	1.1	1.6	2.3
Mini-bus	0.312 Taka/minute	0.1	0.2	0.2	0.3
Car/Others	0.157 Taka/minute	0.2	0.5	1.0	1.7
Passengers' Time Value	(Unit Value)				
Bus	1.384 Taka/minute	2.4	3.7	5.3	7.4
Mini-bus	0.731 Taka/minute	0.2	0.4	0.6	0.8
Car/Others	0.283 Taka/minute	0.4	0.9	1.8	3.1

(3) Time Cost Savings Benefit for Induced Traffic per Day - Meghna Case II

(Unit : 1,000 Taka/Day)

	Unit	1990	2000	2010	2020
Traffic Volume	(Unit time saved)				
Truck	60.6 minutes	213	342	524	787
Bus	33.1 minutes	179	274	394	557
Mini-bus	33.1 minutes	35	53	77	108
Car/Others	30.6 minutes	145	323	616	1,086
Vehicle Time value	(Unit Value)				
Truck	0.298 Taka/minute	3.8	6.2	9.5	14.2
Bus	0.426 Taka/minute	2.5	3.9	5.6	7.9
Mini-bus	0.312 Taka/minute	0.4	0.5	0.8	1.1
Car/Others	0.157 Taka/minute	0.7	1.6	3.0	5.2
Passengers' Time Value	(Unit Value)				
Bus	1.384 Taka/minute	8.2	12.6	18.0	25.5
Mini-bus	0.73 Taka/minute	0.8	1.3	1.8	2.6
Car/Others	0.283 Taka/minute	1.3	2.8	5.3	9.4

(4) Total Annual Time Cost Savings Benefits

(Unit : 1,000 Taka/Year)

	1990	2000	2010	2020
Meghna - Case I				
Vehicle Time Value	24,820.0	40,186.5	61,539.0	91,396.0
Passengers' Time Value	25,185.0	40,113.5	60,298.0	87,965.0
Total Time Cost Saving Benefits	50,000.0	80,300.0	121,837.0	179,361.0
Meghna - Case II				
Vehicle Time Value	26,681.5	43,252.5	66,284.0	98,586.5
Passengers' Time Value	27,849.5	44,384.0	66,649.0	97,528.0
Total Time Cost Saving Benefits	54,531.0	87,636.5	132,933.0	196,114.5

Source: Tables 11-4-5, 12-2-1, 12-2-2 and 13-5-5

AP. TABLE 13-15 TIME COST SAVING BENEFIT FOR MEGHNA-GUMTI BRIDGE

(1) Time Cost Saving Benefit for Normal Traffic per Day

(Unit : 1,000 Taka/Day)

	Unit	1990	2000	2010	2020
Traffic Volume	(Unit time saved)				
Truck	95.5 minutes	1,195	1,927	2,943	4,366
Bus	53.0 minutes	597	909	1,308	1,831
Mini-bus	53.0 minutes	116	176	254	355
Car/Others	40.0 minutes	331	753	1,456	2,576
Vehicle Time Value	(Unit Value)				
Truck	0.597 Taka/minute	68.1	109.9	167.8	248.9
Bus	0.853 Taka/minute	27.0	41.1	59.1	82.8
Mini-bus	0.625 Taka/minute	3.8	5.8	8.4	11.8
Car/Others	0.315 Taka/minute	4.2	9.5	18.3	32.5
Passengers' Time Value	(Unit Value)				
Bus	2,769 Taka/minute	87.6	133.4	192.0	268.7
Mini-bus	1.463 Taka/minute	9.0	13.6	19.7	27.5
Car/Others	0.567 Taka/minute	7.5	17.1	33.0	58.4

(2) Time Cost Savings Benefit for Induced Traffic per Day

(Unit : 1,000 Taka/Day)

	Unit	1990	2000	2010	2020
Traffic Volume	(Unit time saved)				
Truck	95.5 minutes	213	342	524	787
Bus	53.0 minutes	179	274	394	557
Mini-bus	53.0 minutes	35	53	77	108
Car/Others	40.0 minutes	145	323	616	1,086
Vehicle Time Value	(Unit Value)				
Truck	0.298 Taka/minute	6.1	9.7	14.9	22.4
Bus	0.426 Taka/minute	4.0	6.2	8.9	12.6
Mini-bus	0.312 Taka/minute	0.6	0.9	1.3	1.8
Car/Others	0.157 Taka/minute	0.9	2.0	3.9	6.8
Passengers'Time Value	(Unit Value)				
Bus	1.384 Taka/minute	13.1	20.1	28.9	40.9
Mini-bus	0.731 Taka/minute	1.4	2.1	3.0	4.2
Car/Others	0.283 Taka/minute	1.6	3.7	7.0	12.3

(3) Total Annual Time Cost Savings Benefits

(Unit : 1,000 Taka/Year

	1990	2000	2010	2020
Vehicle Time Value	41,865.5	67,561.5	103,149.0	153,154.0
Passengers' Time Value	43,873.0	69,350.0	103,514.0	150,380.0
Total Time Cost Saving Benefits	85,738.5	136,911.5	206,663.0	303,534.0

Source: Table 11-4-5, 12-2-1, 12-2-2 and 13-5-5

Ap.Table 13–16 Economic Cost and Benefit Flows for Meghna – Case I

(Unit : Million Taka)

	Costs			Ferry Cost Svg.		VOC	Time Cost Svg.		Total	Net Cash
Year	Const.	Maint.	Total	Invest.	Operat.	Saving	Vehicle	Passgr.	Benefit	Flow
1985	-38.0	0.0	-38.0	0.0	0.0	0.0	0.0	0.0	0.0	-38.0
1986	-138.9	0.0	-138.9	0.0	0.0	0.0	0.0	0.0	0.0	-138.9
1987	-159.2	0.0	-159.2	0.0	0.0	0.0	0.0	0.0	0.0	-159.2
1988	-204.3	0.0	-204.3	0.0	0.0	0.0	0.0	0.0	0.0	-204.3
1989	-150.3	0.0	-150.3	0.0	0.0	0.0	0.0	0.0	0.0	-150.3
1990	-123.5	0.0	-123.5	0.0	0.0	0.0	0.0	0.0	0.0	-123.5
1991	0.0	-0.3	-0.3	0.0	17.5	0.2	26.0	26.3	70.0	69.7
1992	0.0	-0.3	-0.3	0.0	17.9	0.2	27.3	27.6	73.0	72.7
1993	0.0	-0.3	-0.3	0.0	18.3	0.2	28.7	28.9	76.1	75.8
1994	0.0	-0.3	-0.3	13.8	18.8	0.2	30.1	30.3	93.2	92.9
1995	0.0	-0.3	-0.3	0.0	19.2	0.2	31.6	31.7	82.7	82.4
1996	0.0	-1.3	-1.3	0.0	20.0	0.2	33.1	33.2	86.5	85.2
1997	0.0	-0.3	-0.3	0.0	20.8	0.2	34.8	34.8	90.6	90.3
1998	0.0	-0.3	-0.3	6.3	21.7	0.3	36.5	36.5	101.3	101.0
1999	0.0	-0.3	-0.3	0.0	22.6	0.3	38.3	38.3	99.5	99.2
2000	0.0	-0.3	-0.3	13.8	23.5	0.3	40.2	40.1	117.9	117.6
2001	0.0	-1.3	-1.3	0.0	24.7	0.3	41.9	41.8	108.7	107.4
2002	0.0	-0.3	-0.3	6.3	25.9	0.3	43.8	43.5	119.8	119.5
2003	0.0	-0.3	-0.3	8.3	27.2	0.4	45.7	45.3	126.9	126.6
2004	0.0	-0.3	-0.3	0.0	28.5	0.4	47.7	47.2	123.8	123.5
2005	0.0	-0.3	-0.3	11.8	29.9	0.4	49.7	49.2	141.0	140.7
2006	0.0	-1.3	-1.3	0.0	31.1	0.4	51.9	51.2	134.6	133.3
2007	0.0	-0.3	-0.3	8.3	32.3	0.4	54.1	53.4	148.5	148.2
2008	0.0	-0.3	-0.3	0.0	33.5	0.4	56.5	55.6	146.0	145.7
2009	0.0	-0.3	-0.3	6.3	34.8	0.4	58.9	57.9	158.3	158.0
2010	0.0	-0.3	-0.3	13.8	36.2	0.4	61.5	60.3	172.2	171.9
2011	0.0	-1.3	-1.3	6.3	37.8	0.4	64.0	62.6	171.1	169.8
2012	0.0	-0.3	-0.3	8.3	39.4	0.5	66.6	65.0	179.8	179.5
2013	0.0	-0.3	-0.3	0.0	41.1	0.5	69.3	67.5	178.4	178.1
2014	0.0	-0.3	-0.3	11.8	42.9	0.6	72.1	70.1	197.5	197.2
2015	0.0	-0.3	-0.3	8.3	44.7	0.6	75.0	72.8	201.4	201.1
2016	0.0	-1.3	-1.3	0.0	46.3	0.6	78.0	75.7	200.6	199.3
2017	0.0	-0.3	-0.3	6.3	48.0	0.6	81.2	78.6	214.7	214.4
2018	0.0	-0.3	-0.3	13.8	49.7	0.7	84.4	81.6	230.2	229.9
2019	0.0	-0.3	-0.3	6.3	51.5	0.7	87.8	84.7	231.0	230.7
2020	407.1	-0.3	406.8	13.8	53.3	0.7	91.4	88.0	247.2	654.0

IRR	B-C	B/C
IRR=10.22%	At 10% = Tk. 17.2, million	At 10% = 1.03
	At 15% = Tk. -207.2, million	At 15% = 0.57

Ap.Table 13-17 Economic Cost and Benefit Flows for Meghna – Case II

(Unit : Million Taka)

	Costs			Ferry Cost Svg.		VOC	Time Cost Svg.		Total	Net Cash
Year	Const.	Maint.	Total	Invest.	Operat.	Saving	Vehicle	Passgr.	Benefit	Flow
1985	-38.0	0.0	-38.0	0.0	0.0	0.0	0.0	0.0	0.0	-38.0
1986	-138.9	0.0	-138.9	0.0	0.0	0.0	0.0	0.0	0.0	-138.9
1987	-159.2	0.0	-159.2	0.0	0.0	0.0	0.0	0.0	0.0	-159.2
1988	-204.3	0.0	-204.3	0.0	0.0	0.0	0.0	0.0	0.0	-204.3
1989	-150.3	0.0	-150.3	0.0	0.0	0.0	0.0	0.0	0.0	-150.3
1990	-123.5	0.0	-123.5	0.0	0.0	0.0	0.0	0.0	0.0	-123.5
1991	0.0	-0.3	-0.3	0.0	17.5	0.2	26.0	26.3	70.0	69.7
1992	0.0	-0.3	-0.3	0.0	17.9	0.2	27.3	27.6	73.0	72.7
1993	0.0	-0.3	-0.3	0.0	18.3	0.2	28.7	28.9	76.1	75.8
1994	0.0	-0.3	-0.3	13.8	18.8	0.2	30.1	30.3	93.2	92.9
1995	0.0	-0.3	-0.3	0.0	19.2	0.2	31.6	31.7	82.7	82.4
1996	0.0	-1.3	-1.3	0.0	21.5	0.2	35.7	36.8	94.2	92.9
1997	0.0	-0.3	-0.3	0.0	22.4	0.2	37.5	38.6	98.7	98.4
1998	0.0	-0.3	-0.3	6.3	23.3	0.3	39.3	40.4	109.6	109.3
1999	0.0	-0.3	-0.3	0.0	24.3	0.3	41.3	42.4	108.3	108.0
2000	0.0	-0.3	-0.3	13.8	25.3	0.3	43.3	44.4	127.1	126.8
2001	0.0	-1.3	-1.3	0.0	26.6	0.3	45.2	46.2	118.3	117.0
2002	0.0	-0.3	-0.3	6.3	27.9	0.3	47.2	48.2	129.9	129.6
2003	0.0	-0.3	-0.3	8.3	29.2	0.3	49.2	50.1	137.1	136.8
2004	0.0	-0.3	-0.3	0.0	30.7	0.4	51.3	52.2	134.6	134.3
2005	0.0	-0.3	-0.3	11.8	32.2	0.4	53.6	54.4	152.4	152.1
2006	0.0	-1.3	-1.3	0.0	33.5	0.4	55.9	56.6	146.4	145.1
2007	0.0	-0.3	-0.3	8.3	34.8	0.4	58.3	59.0	160.8	160.5
2008	0.0	-0.3	-0.3	0.0	36.1	0.5	60.9	61.4	158.9	158.6
2009	0.0	-0.3	-0.3	6.3	37.5	0.5	63.5	64.0	171.8	171.5
2010	0.0	-0.3	-0.3	13.8	39.0	0.5	66.3	66.6	186.2	185.9
2011	0.0	-1.3	-1.3	6.3	40.7	0.5	69.0	69.2	185.7	184.4
2012	0.0	-0.3	-0.3	8.3	42.4	0.5	71.8	71.9	194.9	194.6
2013	0.0	-0.3	-0.3	0.0	44.3	0.6	74.7	74.7	194.3	194.0
2014	0.0	-0.3	-0.3	11.8	46.2	0.6	77.7	77.6	213.9	213.6
2015	0.0	-0.3	-0.3	8.3	48.3	0.6	80.9	80.6	218.7	218.4
2016	0.0	-1.3	-1.3	0.0	50.0	0.7	84.1	83.7	218.5	217.2
2017	0.0	-0.3	-0.3	6.3	51.8	0.7	87.5	87.0	233.3	233.0
2018	0.0	-0.3	-0.3	13.8	53.7	0.7	91.1	90.3	249.6	249.3
2019	0.0	-0.3	-0.3	6.3	55.6	0.8	94.8	93.9	251.4	251.1
2020	407.1	-0.3	406.8	13.8	57.6	0.8	98.6	97.5	268.3	675.1

IRR	B-C	B/C
IRR=10.66%	At 10% = Tk. 52.2, million	At 10% = 1.09
	At 15% = Tk. -193.0, million	At 15% = 0.60

Ap.Table 13–18 Economic Cost and Benefit Flows for Meghna–Gumti

(Unit : Million Taka)

Year	Costs			Ferry Cost Svg.		VOC	Time Cost Svg.		Total	Net Cash
	Const.	Maint.	Total	Invest.	Operat.	Saving	Vehicle	Passgr.	Benefit	Flow
1985	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1986	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1987	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1988	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1989	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1990	-25.7	0.0	-25.7	0.0	0.0	0.0	0.0	0.0	0.0	-25.7
1991	-179.8	0.0	-179.8	0.0	0.0	0.0	0.0	0.0	0.0	-179.8
1992	-135.0	0.0	-135.0	0.0	0.0	0.0	0.0	0.0	0.0	-135.0
1993	-199.2	0.0	-199.2	0.0	0.0	0.0	0.0	0.0	0.0	-199.2
1994	-301.5	0.0	-301.5	0.0	0.0	0.0	0.0	0.0	0.0	-301.5
1995	-173.8	0.0	-173.8	0.0	0.0	0.0	0.0	0.0	0.0	-173.8
1996	0.0	-0.3	-0.3	0.0	35.7	-3.5	55.8	57.8	145.8	145.5
1997	0.0	-0.3	-0.3	13.5	37.0	-3.6	58.6	60.5	166.0	165.7
1998	0.0	-0.3	-0.3	0.0	38.3	-3.8	61.4	63.3	159.2	158.9
1999	0.0	-0.3	-0.3	0.0	39.7	-4.0	64.4	66.6	166.7	166.4
2000	0.0	-0.3	-0.3	6.3	41.2	-4.2	67.6	69.4	180.3	180.0
2001	0.0	-1.8	-1.8	0.0	43.1	-4.4	70.5	72.2	181.4	179.6
2002	0.0	-0.3	-0.3	8.3	45.1	-4.6	73.6	75.2	197.6	197.3
2003	0.0	-0.3	-0.3	11.5	47.2	-4.8	76.7	78.2	208.8	208.5
2004	0.0	-0.3	-0.3	8.3	49.4	-5.0	80.0	81.4	214.1	213.8
2005	0.0	-0.3	-0.3	0.0	51.7	-5.2	83.5	84.8	214.8	214.5
2006	0.0	-1.8	-1.8	6.3	54.2	-5.5	87.1	88.2	230.3	228.5
2007	0.0	-0.3	-0.3	0.0	56.7	-5.7	90.8	91.8	233.6	233.3
2008	0.0	-0.3	-0.3	13.5	59.4	-6.0	94.8	95.5	257.2	256.9
2009	0.0	-0.3	-0.3	6.3	62.2	-6.2	98.8	99.4	260.5	260.2
2010	0.0	-0.3	-0.3	8.3	65.2	-6.5	103.1	103.5	273.6	273.3
2011	0.0	-1.8	-1.8	0.0	67.8	-6.8	107.3	107.4	275.7	273.9
2012	0.0	-0.3	-0.3	6.3	70.4	-7.0	111.6	111.5	292.8	292.5
2013	0.0	-0.3	-0.3	8.3	73.2	-7.3	116.1	115.8	306.1	305.8
2014	0.0	-0.3	-0.3	6.3	76.1	-7.6	120.8	120.2	315.8	315.5
2015	0.0	-0.3	-0.3	13.5	79.1	-7.9	125.7	124.8	335.2	334.9
2016	0.0	-1.8	-1.8	6.3	82.3	-8.3	130.8	129.5	340.6	338.8
2017	0.0	-0.3	-0.3	13.5	85.6	-8.6	136.0	134.4	360.9	360.6
2018	0.0	-0.3	-0.3	6.3	89.0	-9.0	141.5	139.6	367.4	367.1
2019	0.0	-0.3	-0.3	8.3	92.6	-9.3	147.3	144.9	383.8	383.5
2020	0.0	-0.3	-0.3	11.5	96.3	-9.7	153.2	150.4	401.7	401.4
2021	0.0	-1.8	-1.8	8.3	100.2	-10.1	159.4	156.1	413.9	412.1
2022	0.0	-0.3	-0.3	6.3	104.2	-10.5	165.8	162.1	427.9	427.6
2023	0.0	-0.3	-0.3	13.5	108.4	-10.9	172.3	168.2	451.5	451.2
2024	0.0	-0.3	-0.3	6.3	112.7	-11.4	179.5	174.7	461.8	461.5
2025	507.5	-0.3	507.2	8.3	117.2	-11.8	186.7	181.3	481.7	988.9

IRR	B-C	B/C
IRR=14.82%	At 10% = Tk. 310.0, million At 15% = Tk. -5.3, million	At 10% = 1.73 At 15% = 0.98

Ap.Table 13–19 Economic Cost and Benefit Flows for Combined Meghna and Meghna–Gumti

(Unit : Million Taka)

Year	Costs			Ferry Cost Svg.		VOC	Time Cost Svg.		Total	Net Cash
	Const.	Maint.	Total	Invest.	Operat.	Saving	Vehicle	Passgr.	Benefit	Flow
1985	-38.0	0.0	-38.0	0.0	0.0	0.0	0.0	0.0	0.0	-38.0
1986	-138.9	0.0	-138.9	0.0	0.0	0.0	0.0	0.0	0.0	-138.9
1987	-159.2	0.0	-159.2	0.0	0.0	0.0	0.0	0.0	0.0	-159.2
1988	-204.3	0.0	-204.3	0.0	0.0	0.0	0.0	0.0	0.0	-204.3
1989	-150.3	0.0	-150.3	0.0	0.0	0.0	0.0	0.0	0.0	-150.3
1990	-149.2	0.0	-149.2	0.0	0.0	0.0	0.0	0.0	0.0	-149.2
1991	-179.8	-0.3	-180.1	0.0	17.5	0.2	26.0	26.3	70.0	-110.1
1992	-135.0	-0.3	-135.3	0.0	17.9	0.2	27.3	27.6	73.0	-62.3
1993	-199.2	-0.3	-199.5	0.0	18.3	0.2	28.7	28.9	76.1	-123.4
1994	-301.5	-0.3	-301.8	13.8	18.8	0.2	30.1	30.3	93.2	-208.6
1995	-173.8	-0.3	-174.1	0.0	19.2	0.2	31.6	31.7	82.7	-91.4
1996	0.0	-1.6	-1.6	0.0	57.2	-3.3	91.5	94.6	240.0	238.4
1997	0.0	-0.6	-0.6	13.5	59.4	-3.4	96.1	99.1	264.7	264.1
1998	0.0	-0.6	-0.6	6.3	61.6	-3.5	100.7	103.7	268.8	268.2
1999	0.0	-0.6	-0.6	0.0	64.0	-3.7	105.7	109.0	275.0	274.4
2000	0.0	-0.6	-0.6	20.1	66.5	-3.9	110.9	113.8	307.4	306.8
2001	0.0	-3.1	-3.1	0.0	69.7	-4.1	115.7	118.4	299.7	296.6
2002	0.0	-0.6	-0.6	14.6	73.0	-4.3	120.8	123.4	327.5	326.9
2003	0.0	-0.6	-0.6	19.8	76.4	-4.5	125.9	128.3	345.9	345.3
2004	0.0	-0.6	-0.6	8.3	80.1	-4.6	131.3	133.6	348.7	348.1
2005	0.0	-0.6	-0.6	11.8	83.9	-4.8	137.1	139.2	367.2	366.6
2006	0.0	-3.1	-3.1	6.3	87.7	-5.1	143.0	144.8	376.7	373.6
2007	0.0	-0.6	-0.6	8.3	91.5	-5.3	149.1	150.8	394.4	393.8
2008	0.0	-0.6	-0.6	13.5	95.5	-5.5	155.7	156.9	416.1	415.5
2009	0.0	-0.6	-0.6	12.6	99.7	-5.7	162.3	163.4	432.3	431.7
2010	0.0	-0.6	-0.6	22.1	104.2	-6.0	169.4	170.1	459.8	459.2
2011	0.0	-3.1	-3.1	6.3	108.5	-6.3	176.3	176.6	461.4	458.3
2012	0.0	-0.6	-0.6	14.6	112.8	-6.5	183.4	183.4	487.7	487.1
2013	0.0	-0.6	-0.6	8.3	117.5	-6.7	190.8	190.5	500.4	499.8
2014	0.0	-0.6	-0.6	18.1	122.3	-7.0	198.5	197.8	529.7	529.1
2015	0.0	-0.6	-0.6	21.8	127.4	-7.3	206.6	205.4	553.9	553.3
2016	0.0	-3.1	-3.1	6.3	132.3	-7.6	214.9	213.2	559.1	556.0
2017	0.0	-0.6	-0.6	19.8	137.4	-7.9	223.5	221.4	594.2	593.6
2018	0.0	-0.6	-0.6	20.1	142.7	-8.3	232.6	229.9	617.0	616.4
2019	0.0	-0.6	-0.6	14.6	148.2	-8.5	242.1	238.8	635.2	634.6
2020	407.1	-0.6	406.5	25.3	153.9	-8.9	251.8	247.9	670.0	1076.5
2021	0.0	-1.8	-1.8	8.3	100.2	-10.1	159.4	156.1	413.9	412.1
2022	0.0	-0.3	-0.3	6.3	104.2	-10.5	165.8	162.1	427.9	427.6
2023	0.0	-0.3	-0.3	13.5	108.4	-10.9	172.3	168.2	451.5	451.2
2024	0.0	-0.3	-0.3	6.3	112.7	-11.4	179.5	174.7	461.8	461.5
2025	507.5	-0.3	507.2	8.3	117.2	-11.8	186.7	181.3	481.7	988.9

IRR	B-C	B/C
IRR=12.41%	At 10% = Tk. 362.2, million At 15% = Tk. -198.2, million	At 10% = 1.37 At 15% = 0.74