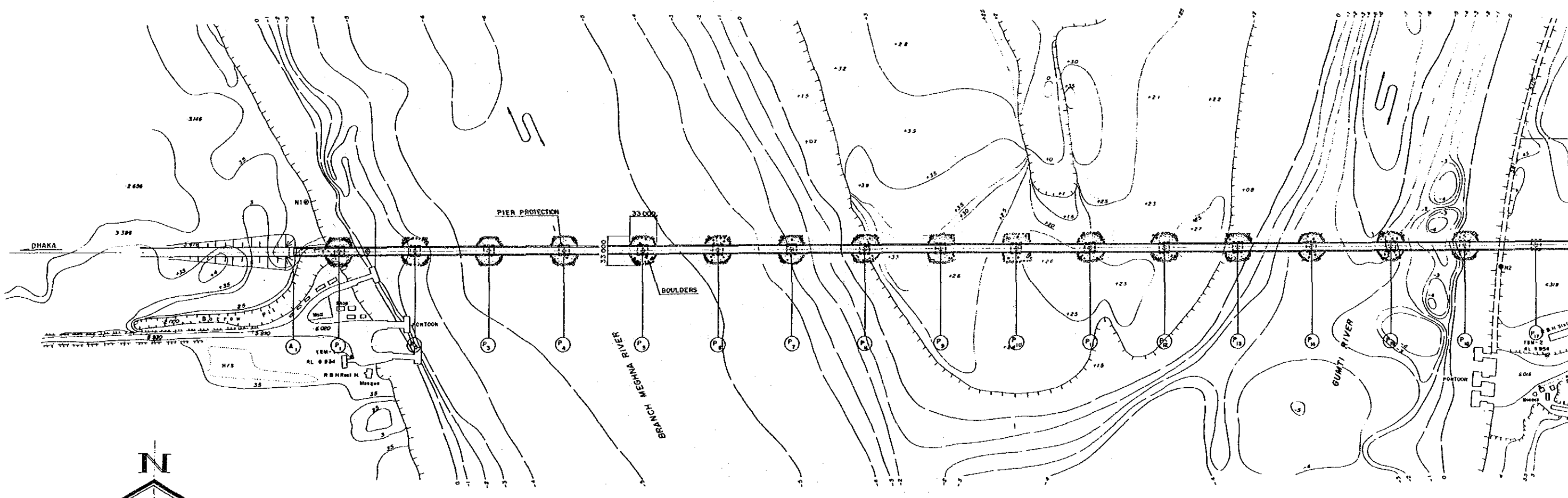
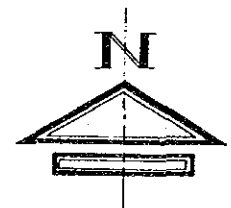
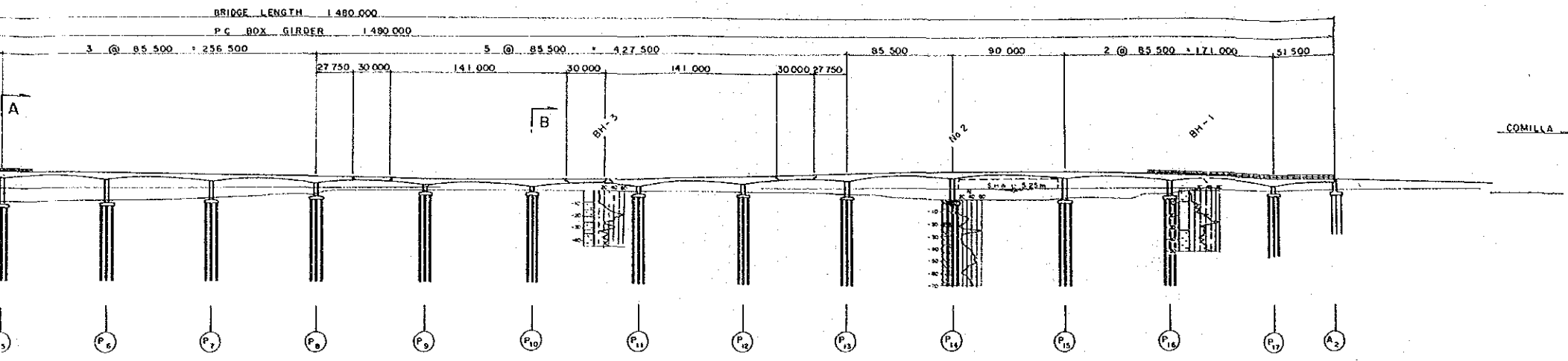


PROFILE
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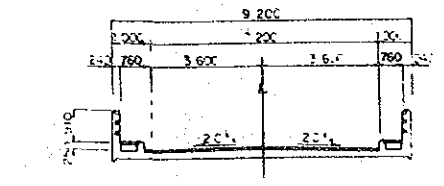


PLAN
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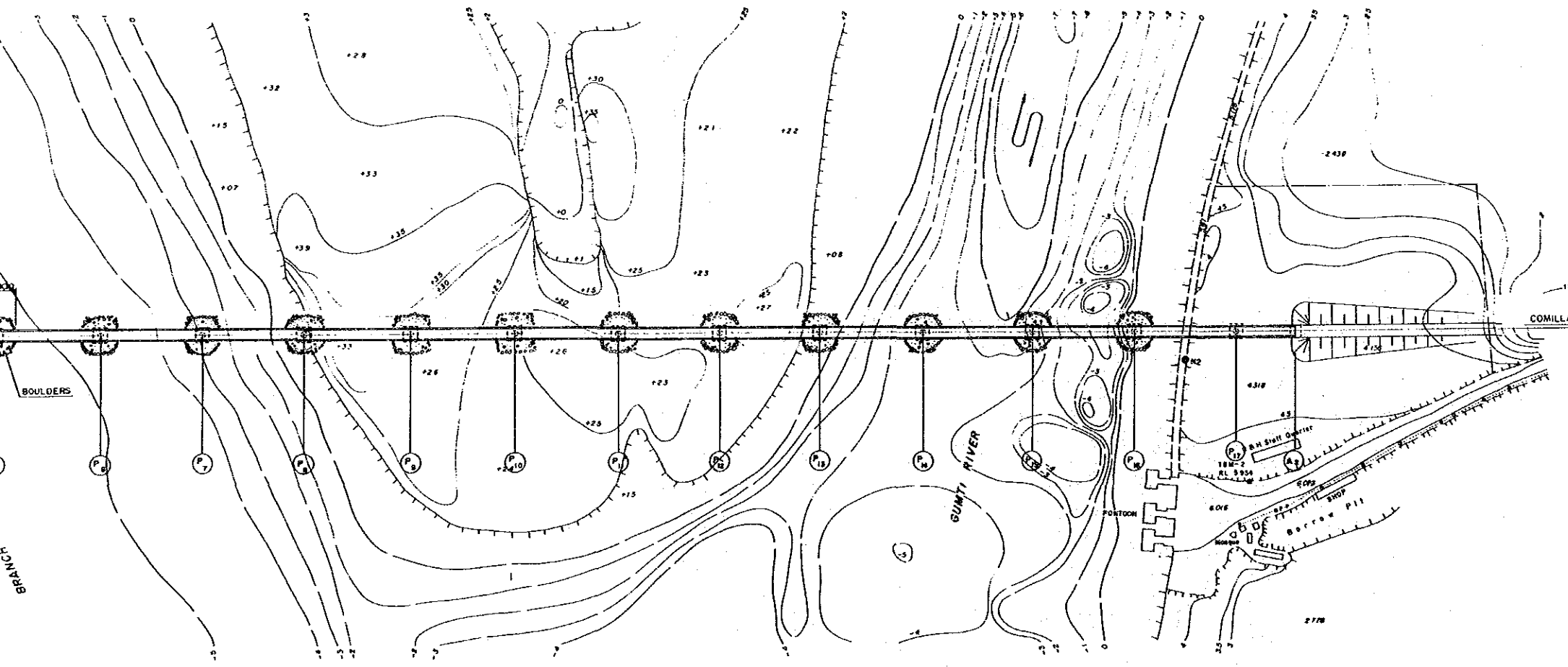




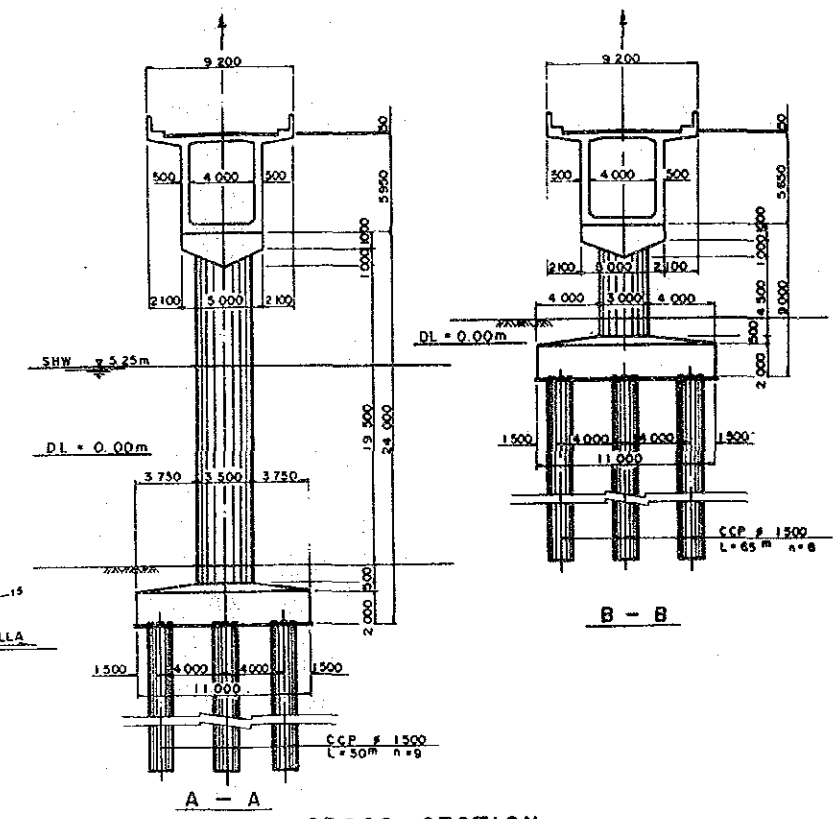
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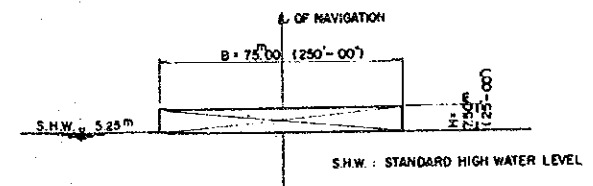
TYPICAL CROSS SECTION OF BRIDGE DECK
SCALE 1:200



PLAN
SCALE 1:4,000

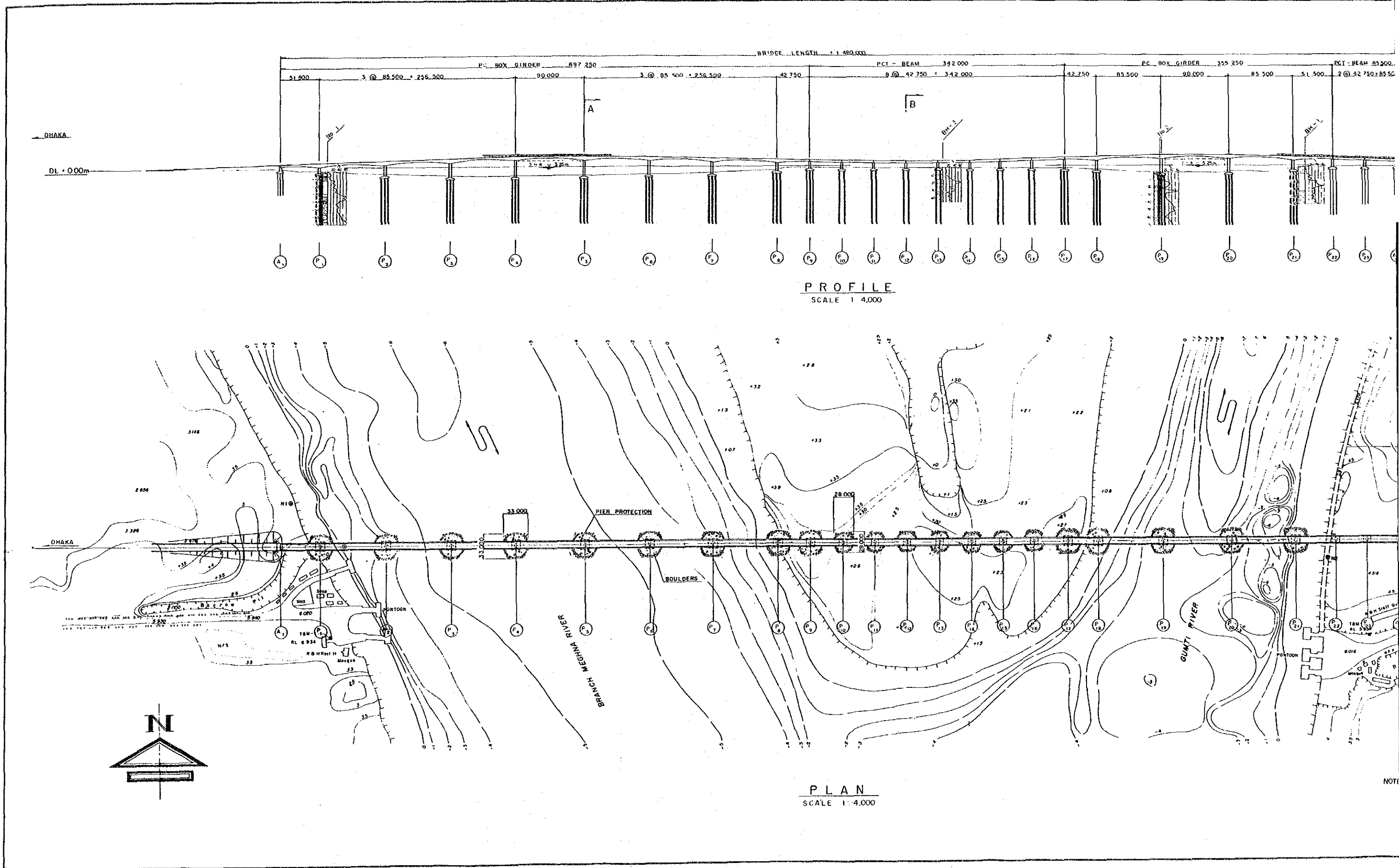


CROSS SECTION
SCALE 1:400



NAVIGATION CLEARANCE
SCALE 1:2,000

NOTE: ALL DIMENSIONS ARE SHOWN IN MILLIMETERS
UNLESS OTHERWISE INDICATED



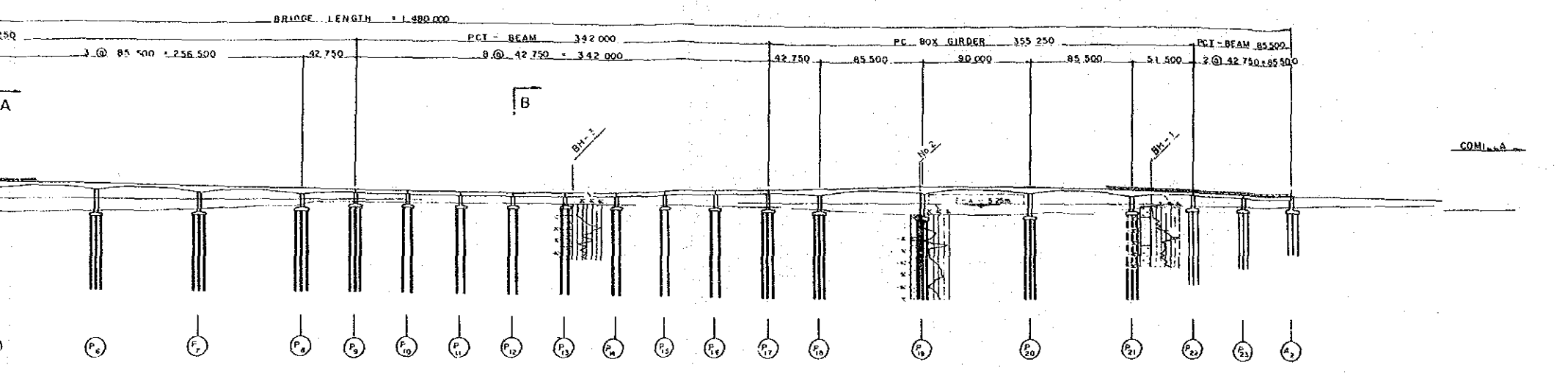
PROFILE
SCALE 1:4,000

PLAN
SCALE 1:4,000

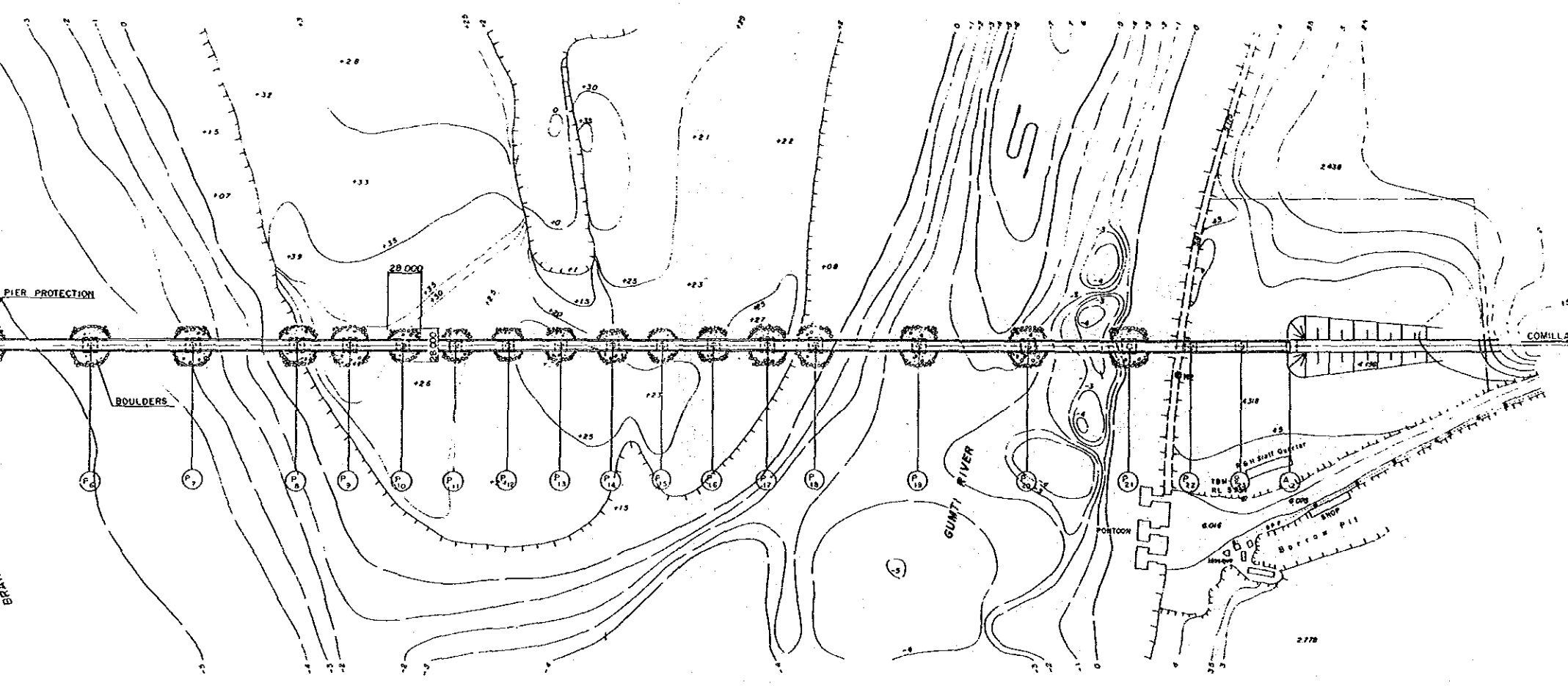
NOTE

AP.FIG. 7-7

GENERAL VIEW
ALTERNATIVE CASE - C

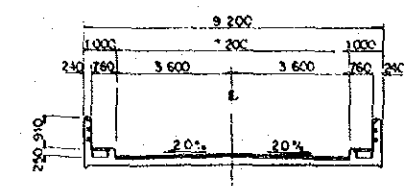


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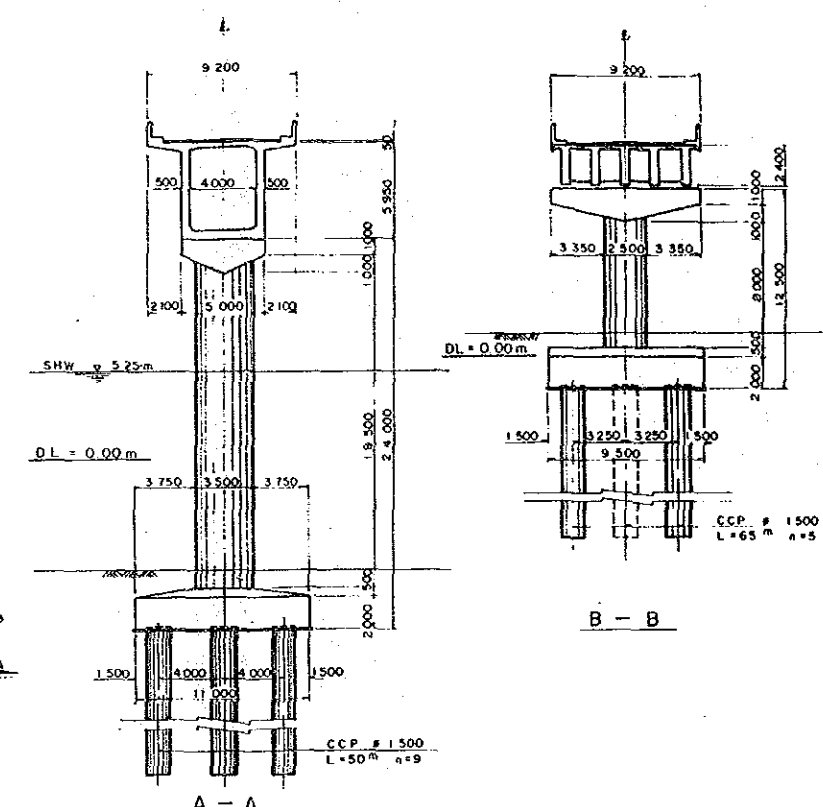


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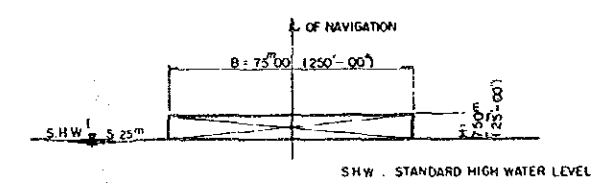
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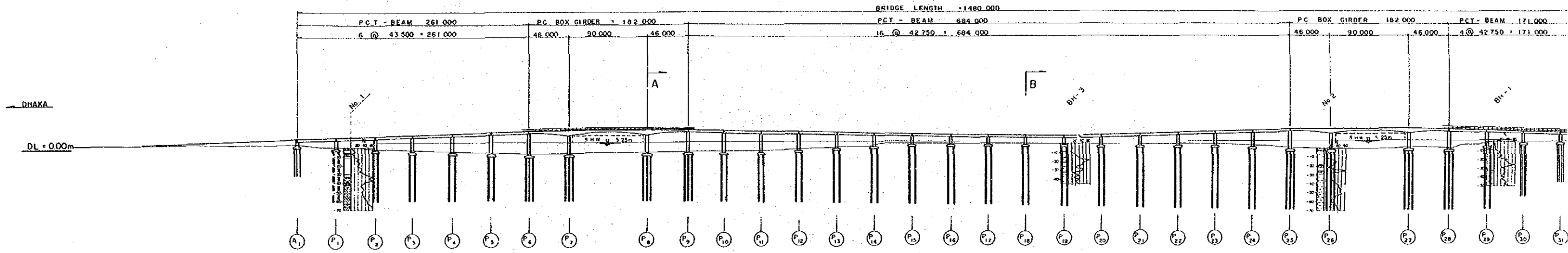
TYPICAL CROSS SECTION OF BRIDGE DECK
SCALE 1 200



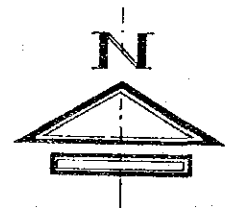
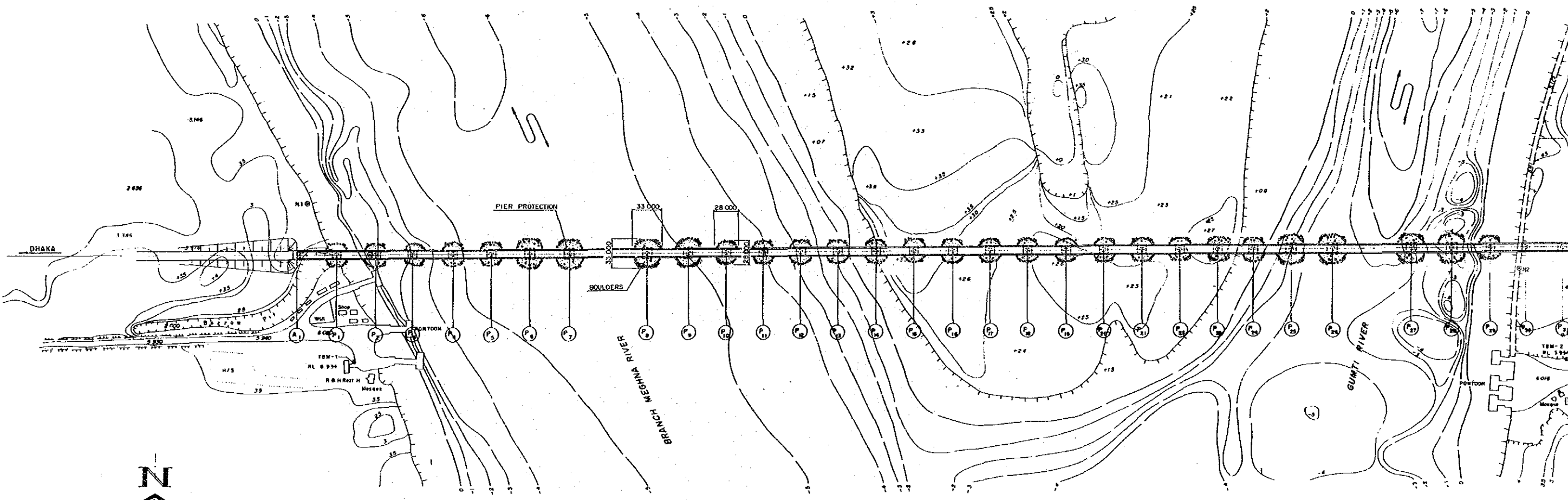
CROSS SECTION
SCALE 1 400



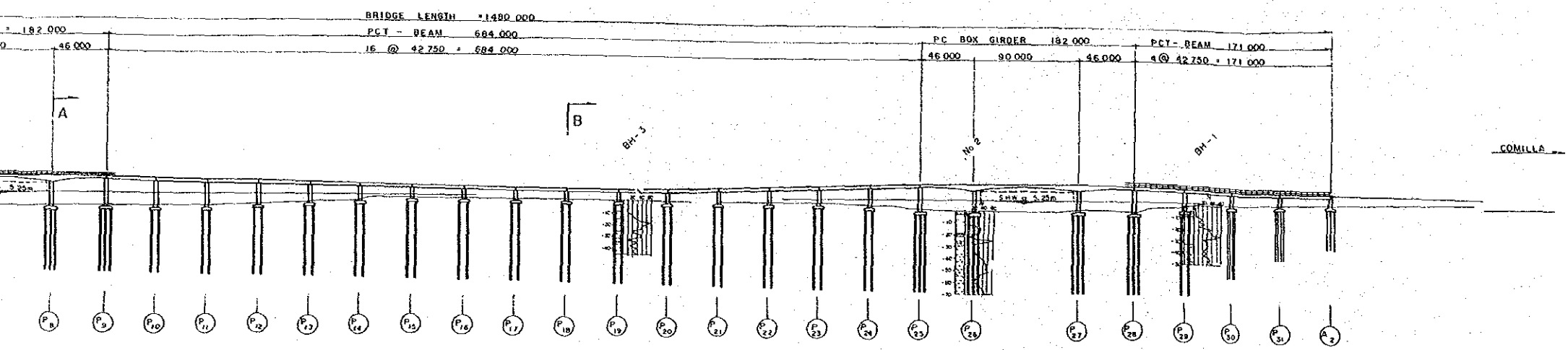
NAVIGATION CLEARANCE
SCALE 1 2,000



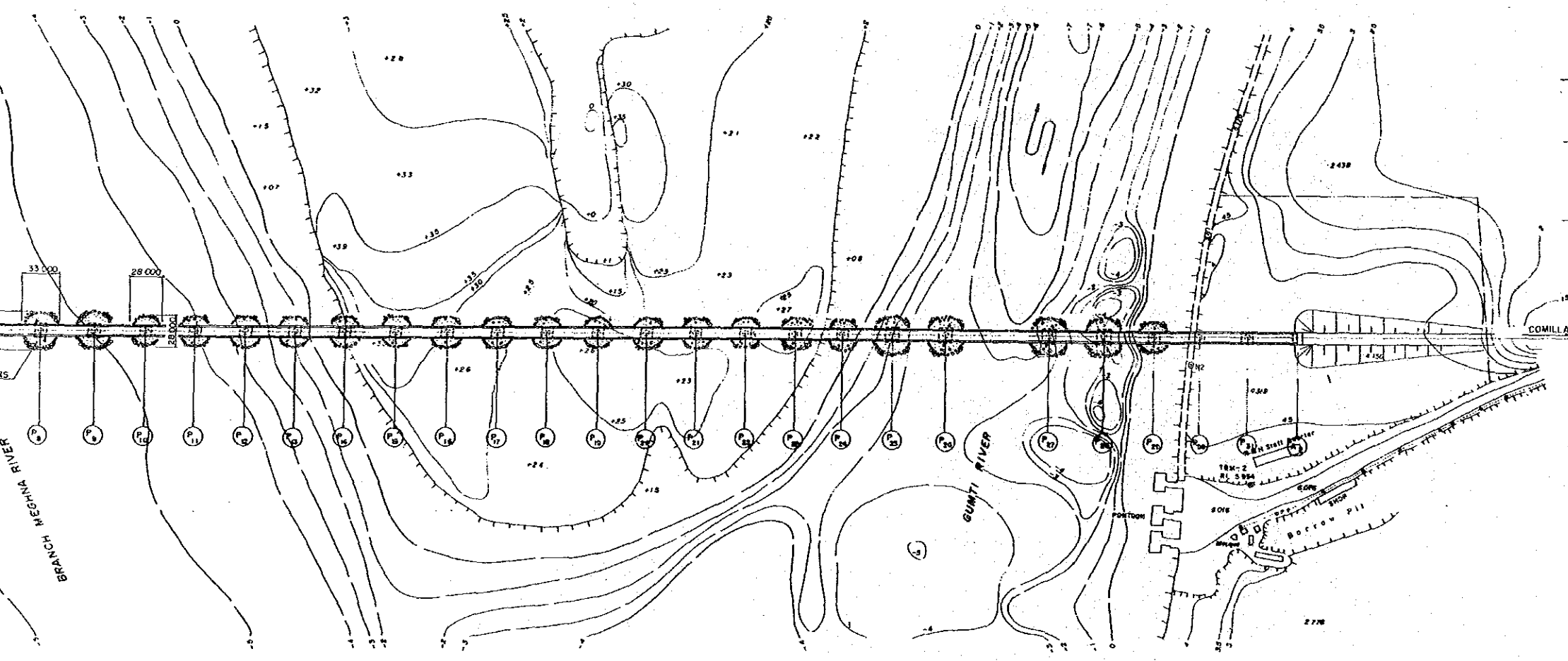
PROFILE
SCALE 1:4,000



PLAN
SCALE 1:4,000

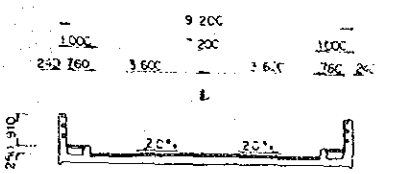


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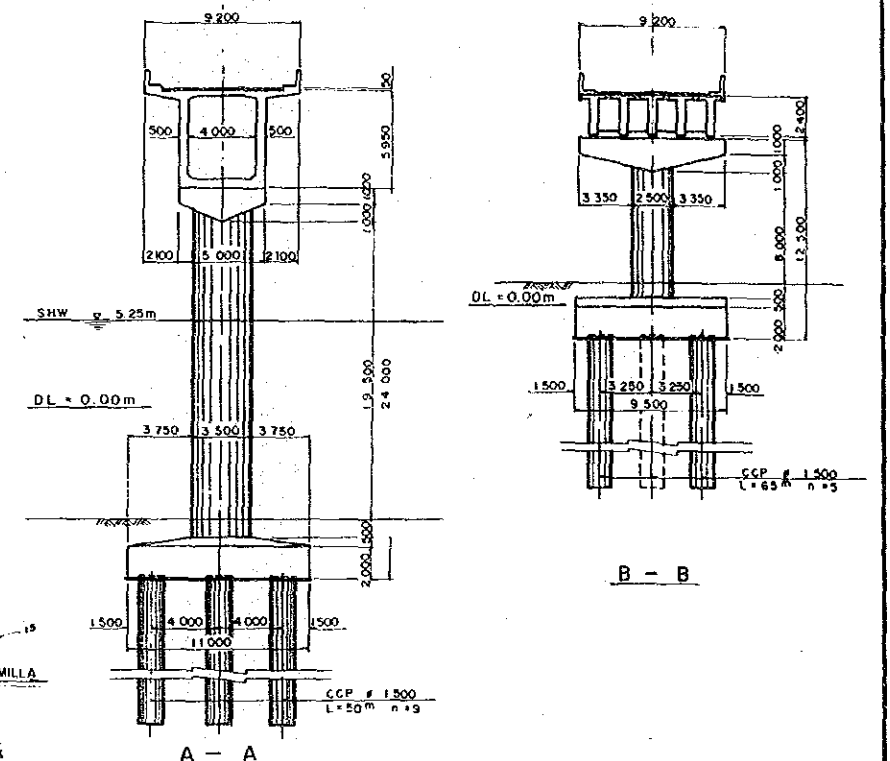


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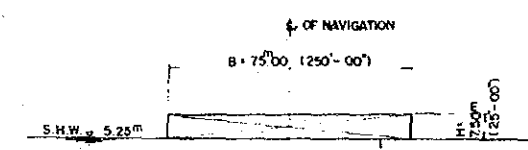
NOTE: ALL DIMENSIONS ARE SHOWN IN MILLIMETERS
UNLESS OTHERWISE INDICATED



TYPICAL CROSS SECTION OF BRIDGE DECK
SCALE 1:200



CROSS SECTION
SCALE 1:400



NAVIGATION CLEARANCE
SCALE 1:2,000

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 ϕ 1.5 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 ϕ 1.5 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 ϕ 1.5 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

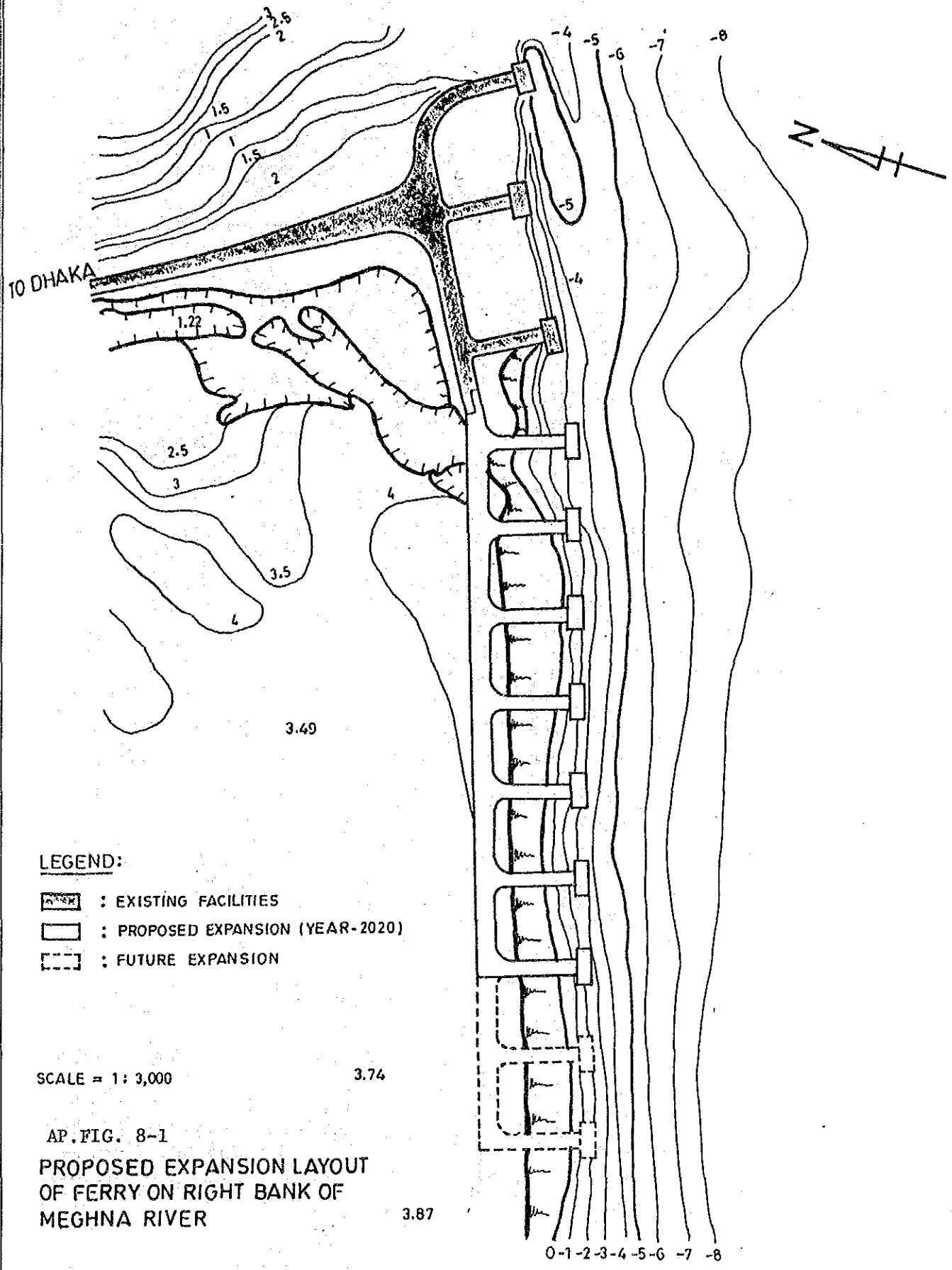
Source: The Study Team

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 ϕ 1.5 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

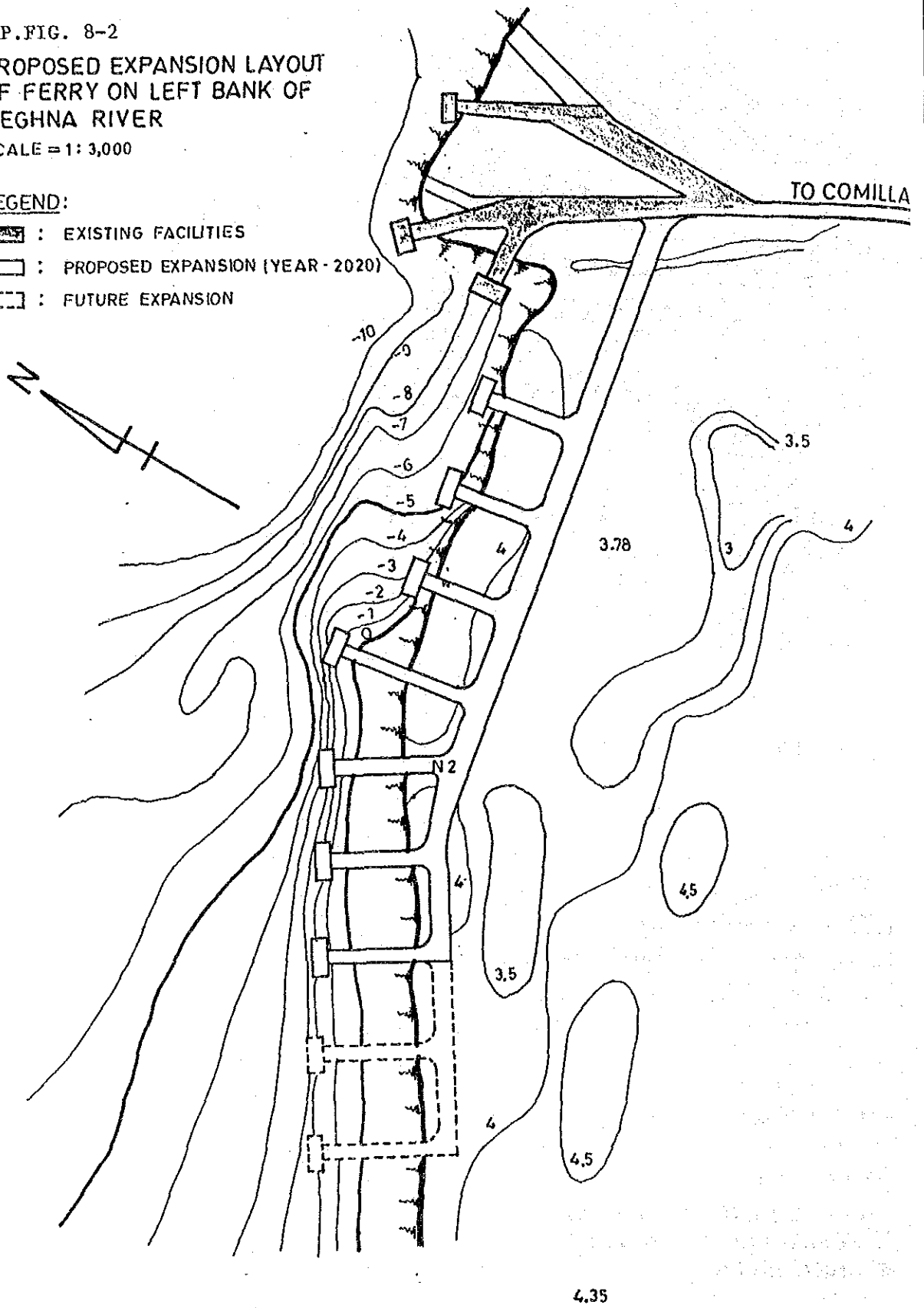
Source: The Study Team

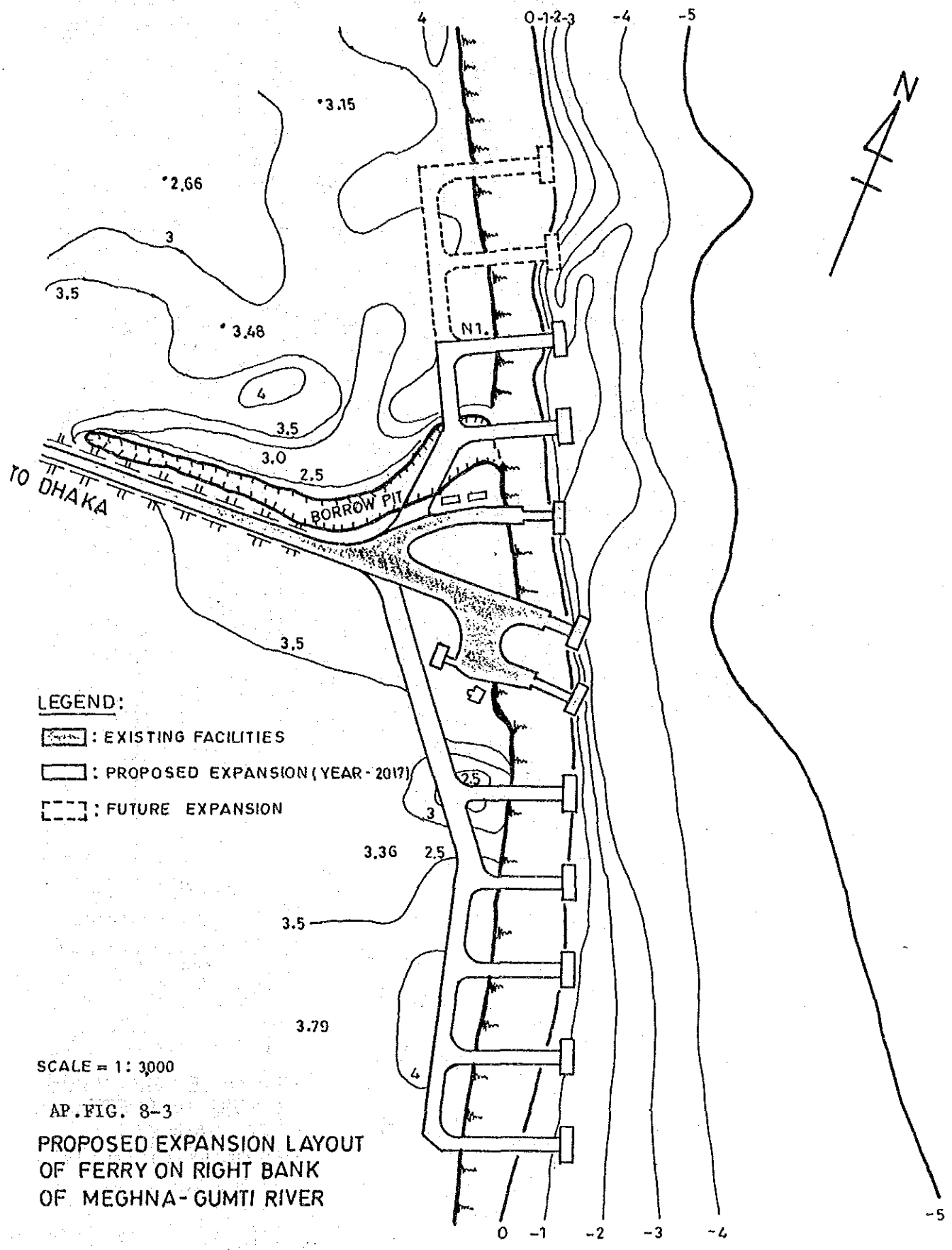


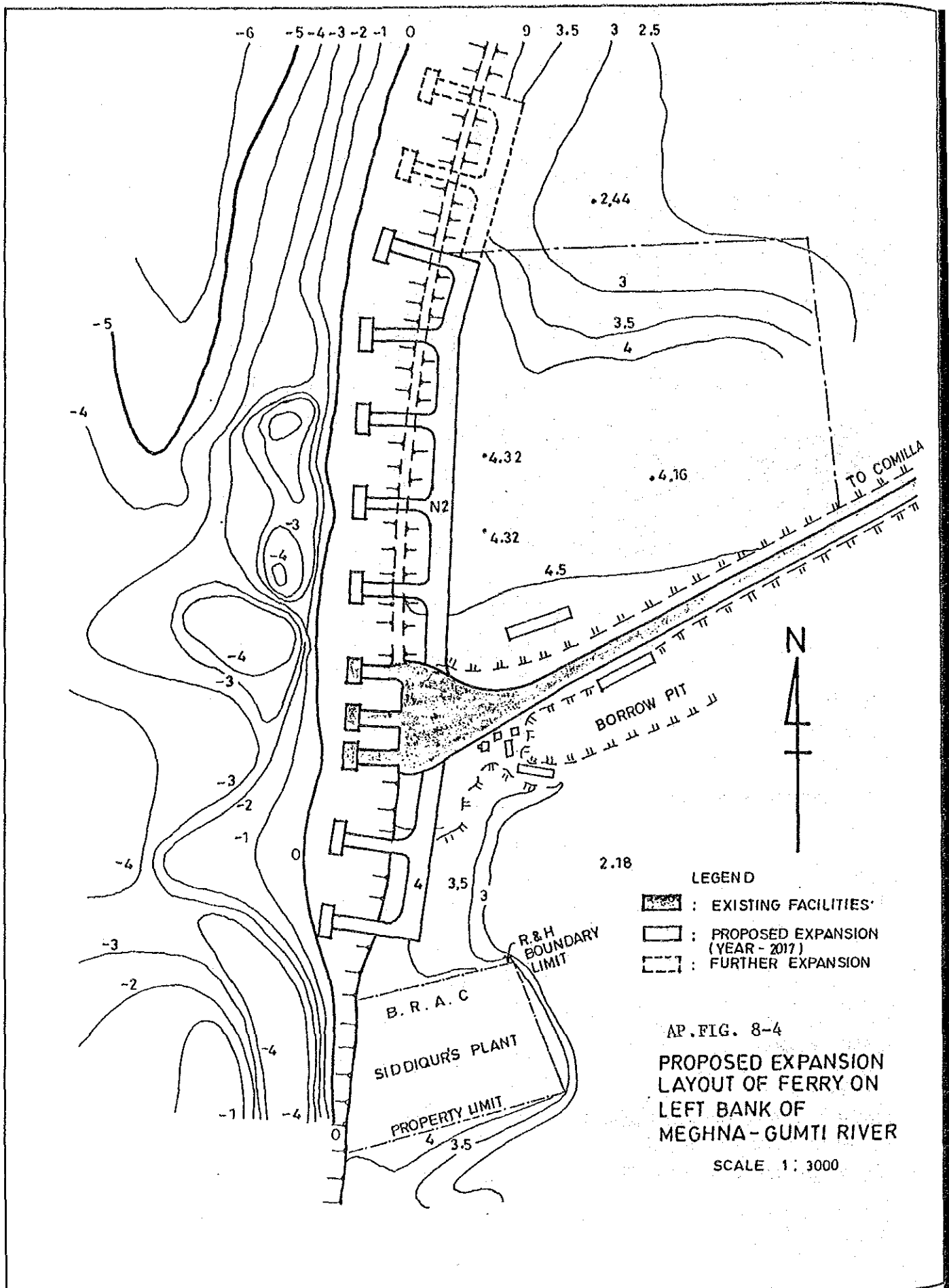
AP.FIG. 8-2
 PROPOSED EXPANSION LAYOUT
 OF FERRY ON LEFT BANK OF
 MEGHNA RIVER
 SCALE = 1: 3,000

LEGEND:

-  : EXISTING FACILITIES
-  : PROPOSED EXPANSION (YEAR - 2020)
-  : FUTURE EXPANSION

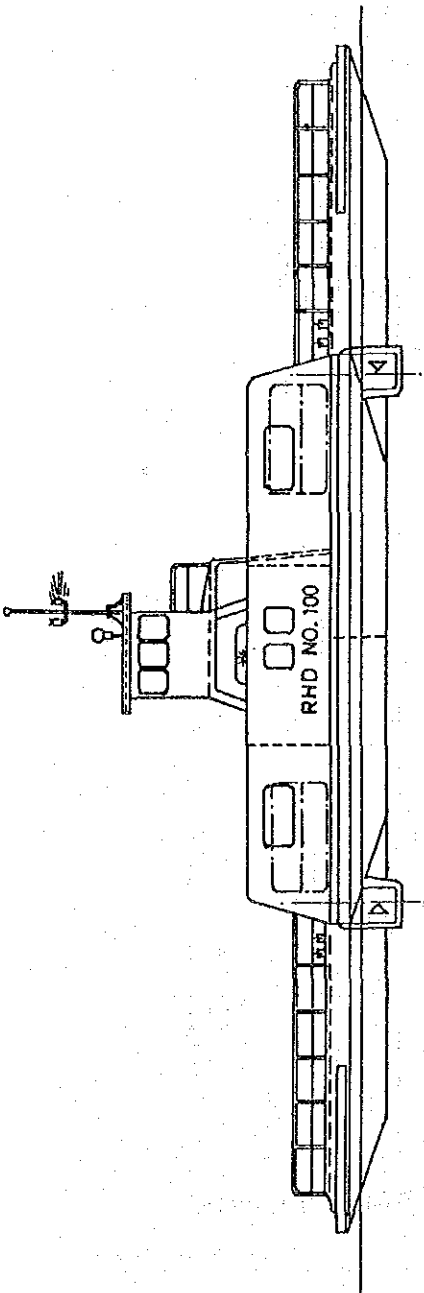
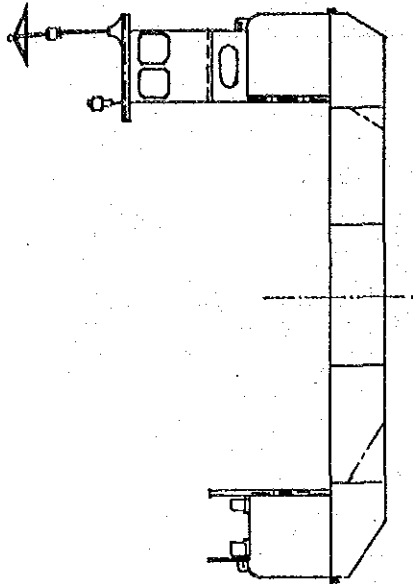






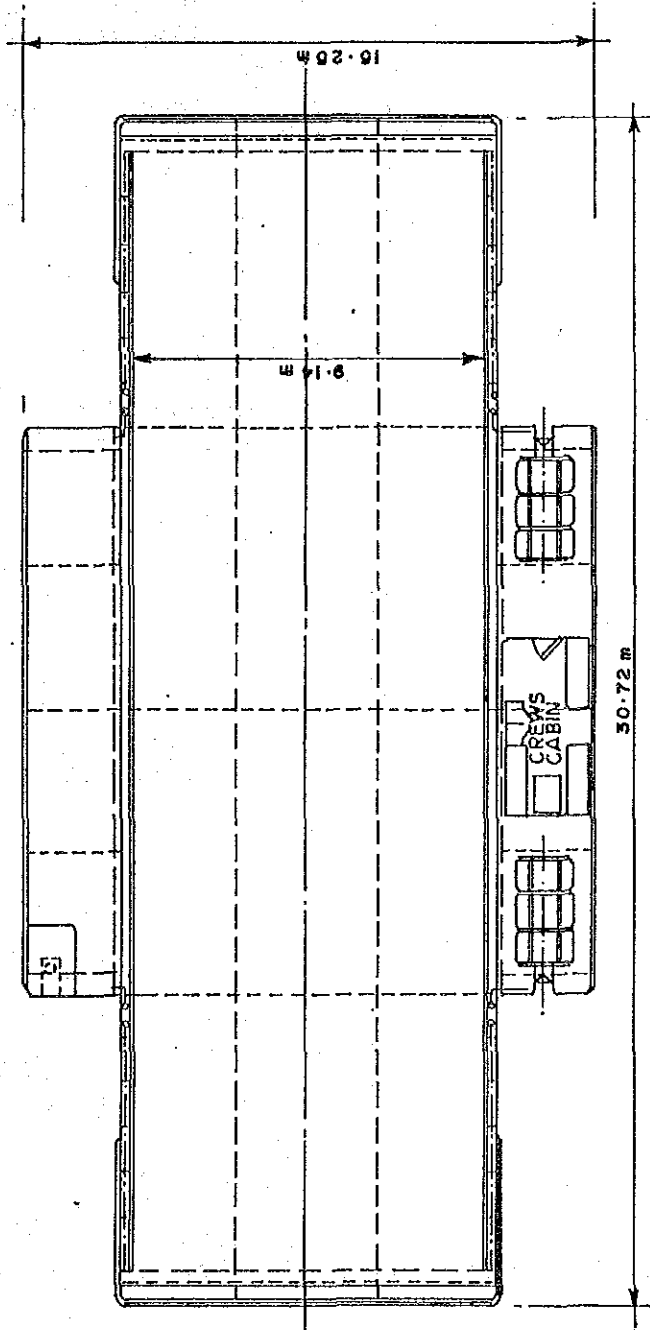
AP.FIG. 8-4
**PROPOSED EXPANSION
 LAYOUT OF FERRY ON
 LEFT BANK OF
 MEGHNA-GUMTI RIVER**

SCALE 1: 3000



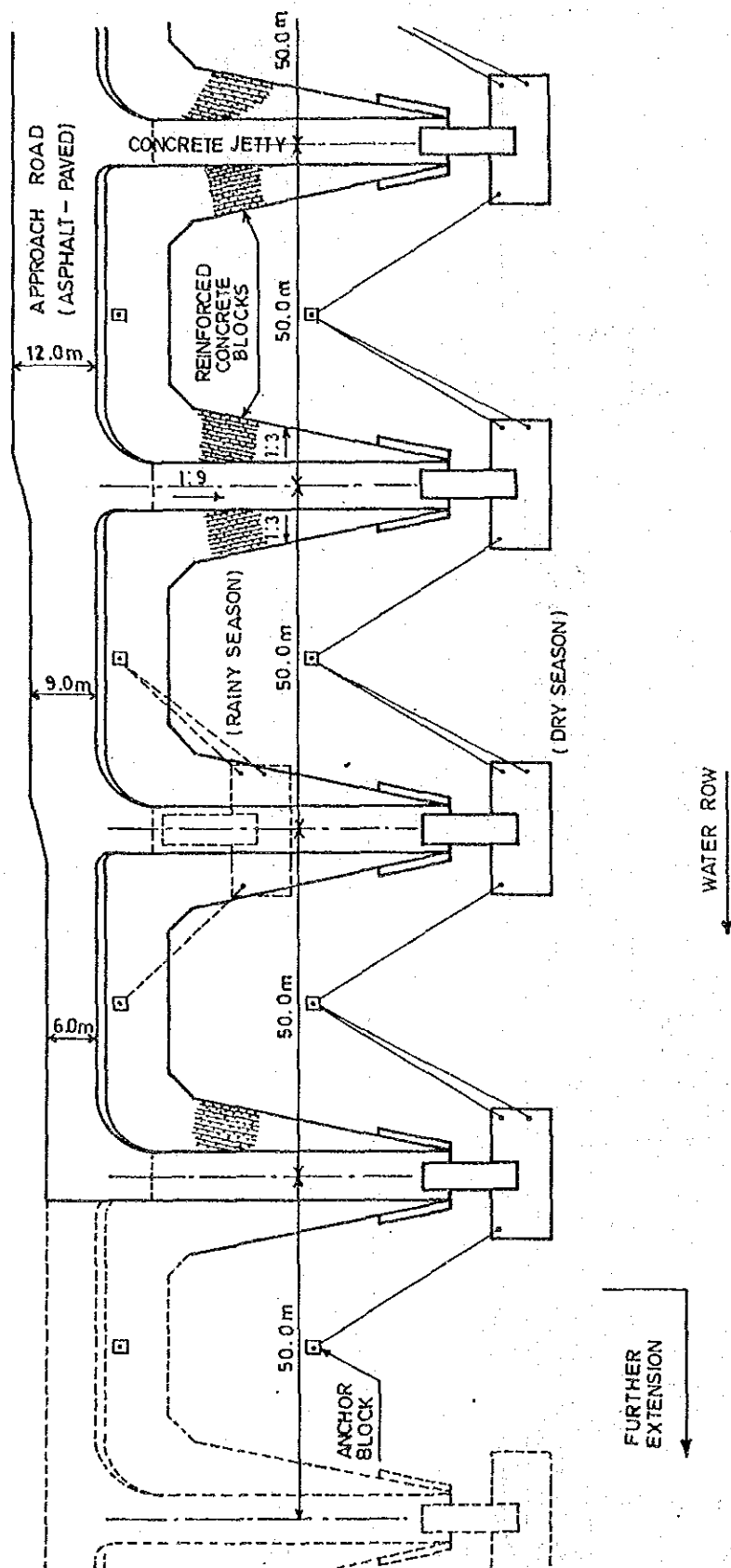
PRINCIPAL DIMENSION :

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



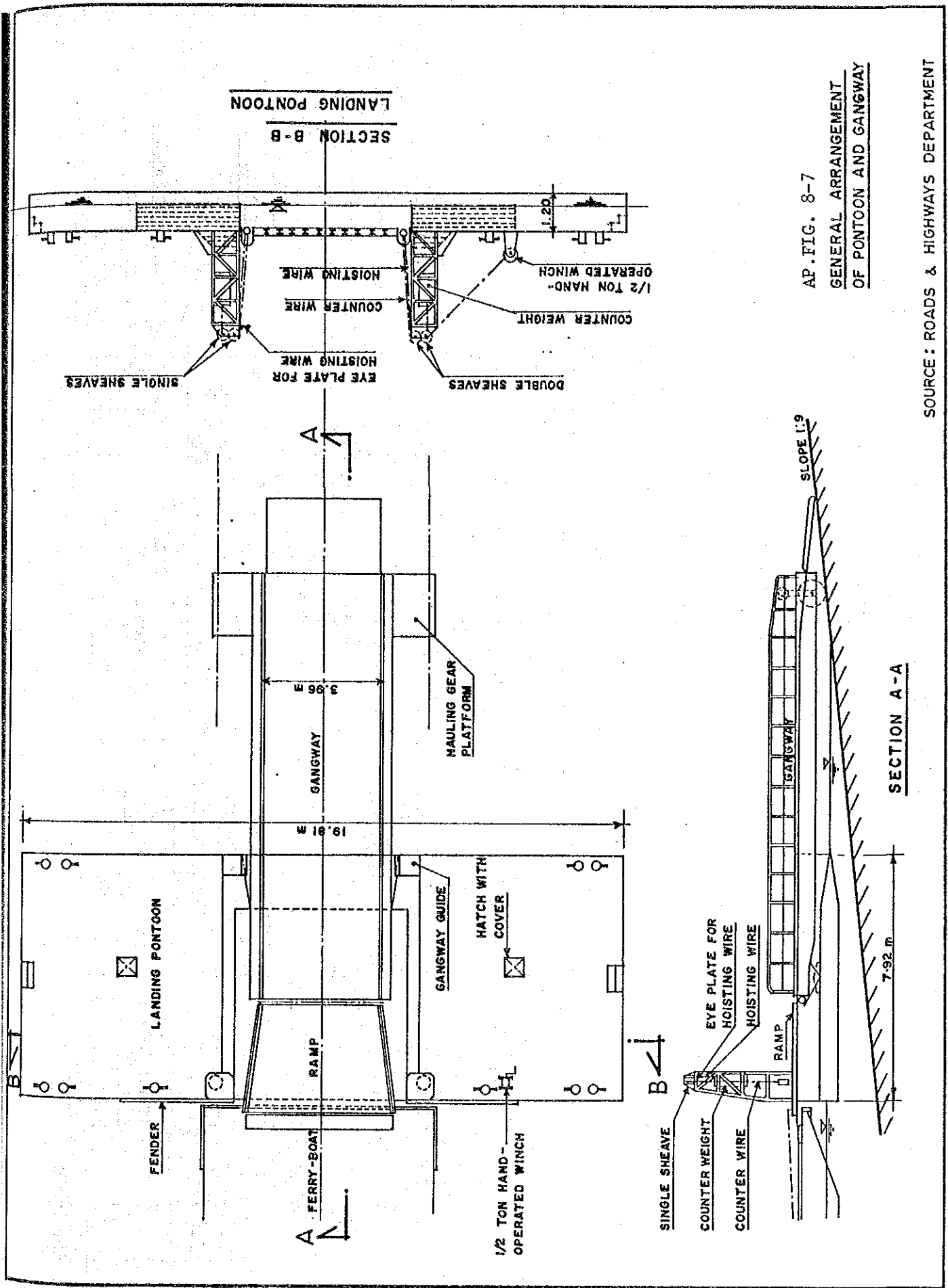
AP.FIG. 8-5

UTILITY - FERRY, TYPE I
 FOR DHAKA - CHITTAGONG HIGHWAY



AP.FIG. 8-6

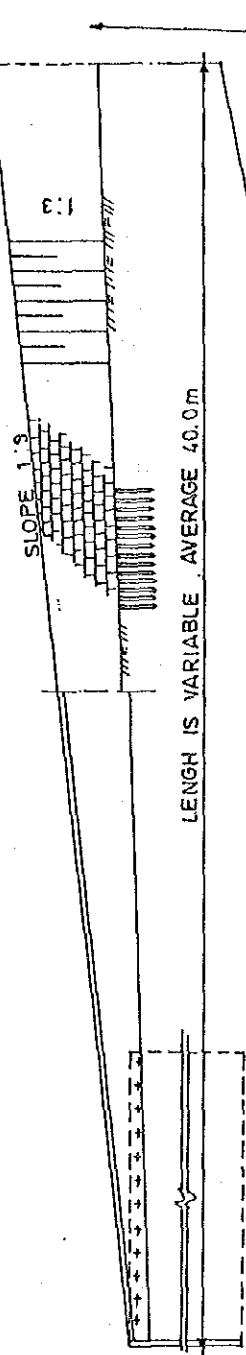
STANDARD ARRANGEMENT OF FERRY TERMINAL



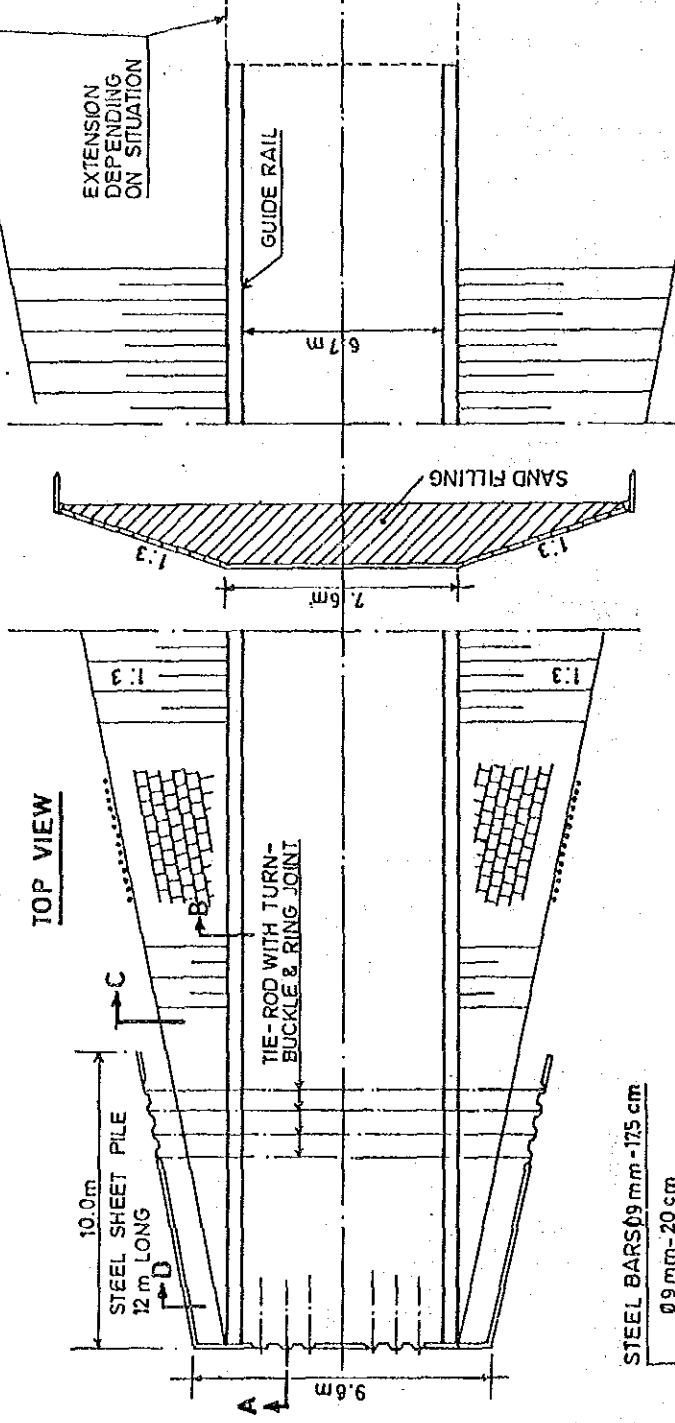
AP. FIG. 8-7
 GENERAL ARRANGEMENT
 OF PONTOON AND GANGWAY

SOURCE: ROADS & HIGHWAYS DEPARTMENT

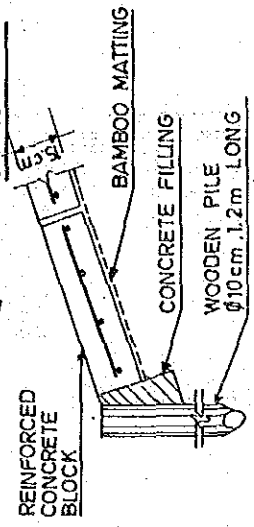
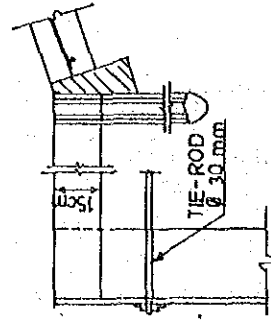
LONGITUDINAL SECTION AND SIDE VIEW



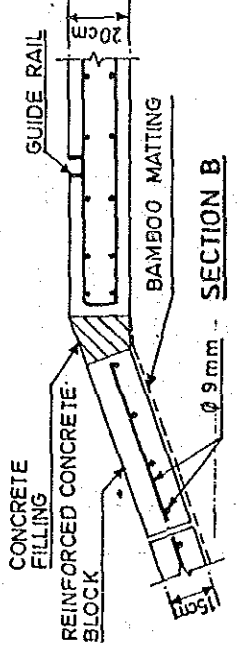
TOP VIEW



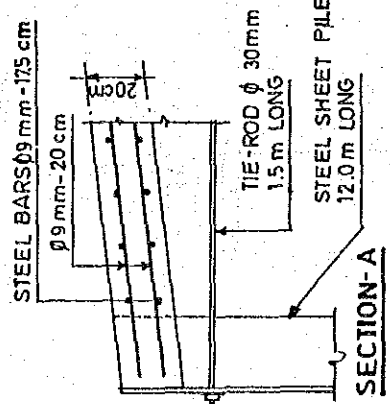
SECTION - D



SECTION B



SECTION - A



AP. FIG. 8-8 GENERAL ARRANGEMENT OF JETTY

AP. TABLE 3-1

CONSTRUCTION COST OF JETTY FOR MEGHNA FERRY

ONE JETTY ON DHAKA SIDE							Unit : Taka
Work Item	Unit	Quantity	Foreign Amount	Local Amount	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	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	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	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	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	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

Material Items	Unit	Financial Cost	1984 June Price		Tax
			Foreign Portion	Local Portion	
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, ϕ 32	Ton	67,000.00	31,905.00	-	35,095.00
* High Tensile Wire, ϕ 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
U1/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

<u>Locally-made Item</u>	<u>Excise Tax</u>
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 Tariff¹¹

AP. TABLE 9-3 DAILY OPERATION COST OF MACHINES

Mark	Machine	(1984 June Price)			(Taka)
		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
Slump	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

Month	Average	(day)									
		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

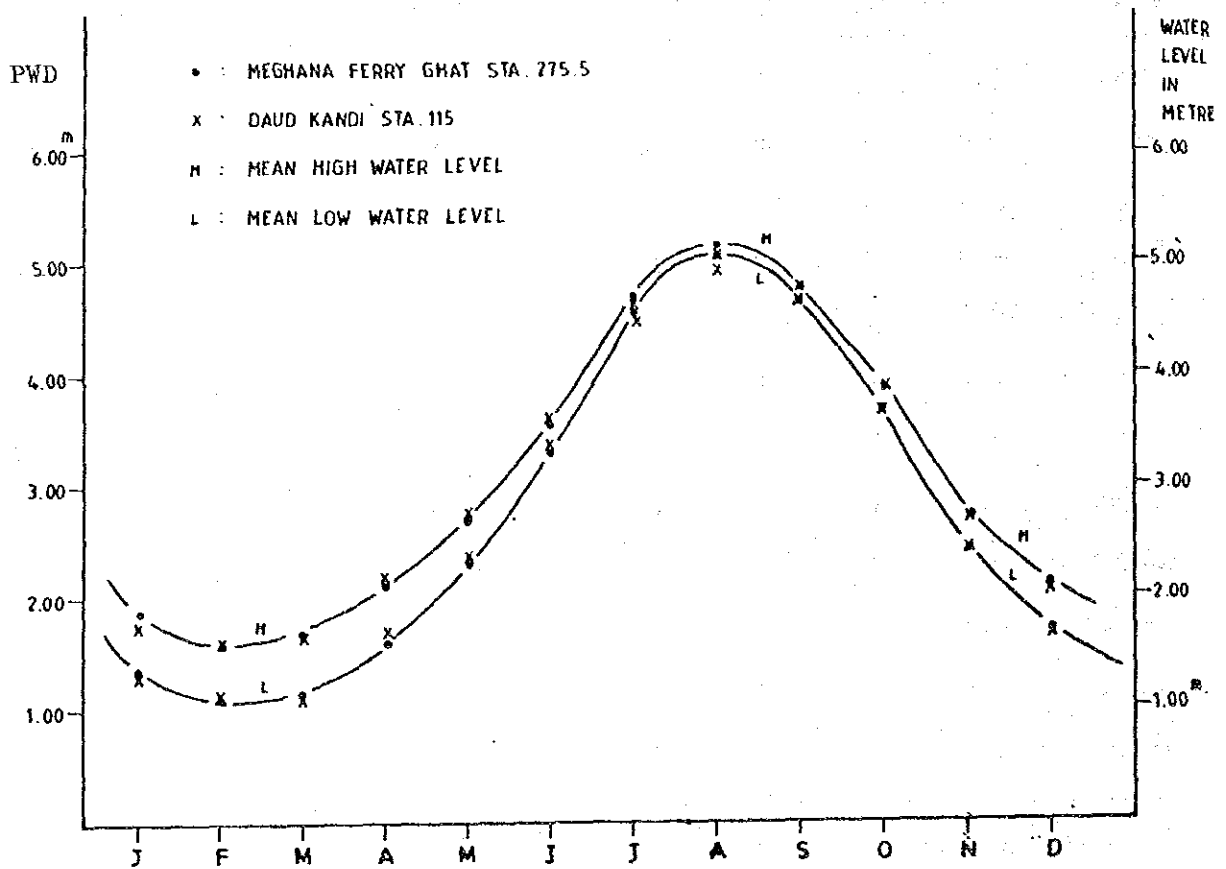
- Note :
1. Rainy days less than 10mm were neglected.
 2. In rainy season from May to September, dry season average and rainy days per month.
 3. National holidays per year and Fridays are 15 days plus 52 days, 67 days in total.

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 :

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



(SOURCE : BWDB)

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

AP. TABLE 9-8 TAXES TABLE CLARIFIED FOR MEGHNA BRIDGE

(In Kg.)

NO.	ITEM	QUANTITY	DIRECT COST			OTHER TAXES	TOTAL TAX AMOUNT ESTIMATED ① + ② + ③ + ④
			OF GOODS & MATERIALS ①	OF TEMPORARY MATERIALS ②	OF MACHINES & PLANTS ③	COST OF RAW MATERIALS EXCISE & INCOME TAX ④	
(1) Approach Roads							
101	Road Embankment	229,200m ³				451,000	451,000
102	Sub-base Course	4,100m ³				5,000	5,000
103	Base Course	2,300m ³				3,000	3,000
104	Asphalt Surface	2,560t				385,000	385,000
105	Bridge Surface	810t				122,000	122,000
106	Replacement of Sotfall	10,000m ³				46,000	46,000
107	Sodding	81,000m ²				14,000	14,000
108	Box Culvert (5.5x4.0)	82m				371,000	371,000
* 109	Guard Rail	1,390m	1,038,000			2,000	1,040,000
110	Slope Protection	1,750m ³				78,000	78,000
111	Back Abutment Slab	2 nos				28,000	28,000
112	Drainage, etc.	1 LS				44,000	44,000
	Sub total of (1)		1,038,000			1,349,000	2,587,000
(2) Main Span Bridge							
* 201	R.C.D Piles #1.5m	4,070m		13,605,000		2,027,000	18,632,000
* 202	Excavation in River	10,100m ³		60,572,000		143,000	60,715,000
203	Seal Concrete (X)	1,350m ³				298,000	298,000
204	Footing Concrete (A)	2,770m ³				577,000	577,000
205	Pier Concrete (A)	3,740m ³				2,313,000	2,313,000
206	TORSTEEL Bar	600t				1,700,000	1,700,000
207	PC Box Concrete (P)	7,070m ³				6,040,000	6,040,000
* 208	Deformed Bar	810t	9,780,000			537,000	10,317,000
* 209	PC Cable Stressing	420t	18,638,000			80,000	18,638,000
210	Rolling	1,780m				239,000	239,000
* 211	Expansion Joint	11 nos	1,687,000			2,000	1,689,000
212	Foot path & Kerb	1,780m				468,000	468,000
* 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	2,560m				396,000	396,000
302	Footing Concrete (A)	240m ³				52,000	52,000
303	Pier & Abut Concrete (A)	760m ³				880,000	880,000
304	TORSTEEL Bar	92t				261,000	261,000
305	PC Girder Concrete (P)	220m ³				129,000	129,000
* 306	Deformed Bar	27t	326,000			17,000	343,000
* 307	PC Cable Stressing	9t	638,000			5,000	643,000
310	Rolling	100m				14,000	14,000
312	Footpath & Kerb	100m				26,000	26,000
* 313	Bearing Shoe	20 nos	998,000			2,000	998,000
* 314	Expansion Joint	2 nos	289,000				289,000
	Sub total of (3)		2,249,000			1,582,000	3,831,000
(4) Temporary Works							
* 401	Temporary Staging	3,800m ²		26,011,000		107,000	26,118,000
402	Work Site Reclamation	110,000m ³				150,000	150,000
* 403	Temporary Quay	180m	17,419,000			39,000	17,454,000
	Sub total of (4)		17,419,000	26,011,000		296,000	43,722,000
(5) Ancillary Works							
501	Stones Placing	11,400m ³				2,000	2,000
* 502	Sheet Piling	60m	9,376,000			15,000	9,391,000
503	Gablon Placing	9,300m ³				37,000	37,000
* 504	Pier Protection	4 nos	437,000			37,000	484,000
	Sub total of (5)		9,813,000			81,000	9,894,000
600	(6) Traffic Maintenance	1 LS				3,385,000	3,385,000
* 700	(7) Seawater Transport	1 LS		35,873,000			35,873,000
800	(8) Inland Transport	1 LS				48,000	48,000
* 900	(9) Engineers Office	1 LS	1,972,000			519,000	2,491,000
(A) DIRECT COST TOTAL			65,409,000	100,388,000	35,873,000	21,586,000	223,556,000
(B) OVER HEAD (2%)			-	-	-	13,417,000	13,417,000
(A+B) INITIAL CONST COST			65,409,000	100,388,000	35,873,000	35,503,000	236,873,000
(C) CONTINGENCY (7.5%)			4,906,000	7,629,000	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 :
- Items with mark * include Impbried goods, materials and machines.
 - 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. 13,605,000
202	TK. 66,531,740	x (1-0.3) = TK. 60,572,000
401	TK. 37,158,800	x (1-0.3) = TK. 26,011,000
 - CDST of machines and plants was estimated by depreciation rate of 35%.

700	TK. 102,493,123	x 0.35 = TK. 35,873,000
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AP. TABLE 9-9 TAXES TABLE CLARIFIED FOR MEGHNA-GUMTI BRIDGE (To Ka)

NO.	ITEM	QUANTITY	DIRECT CDST			OTHER TAXES	TOTAL TAX AMOUNT ESTIMATED ①+②+③+④
			OF GOODS & MATERIALS ①	OF TEMPORARY MATERIALS ②	OF MACHINES & PLANTS ③	CDST OF RAW MATERIALS EXCISE & INCOM TAX ④	
(1) Approach Roads							
101(G)	Road Embankment	85,700m ³				99,000	99,000
102	Sub base Course	2,850m ²				3,000	3,000
103	Base Course	1,560m ²				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	4,000m ³				10,000	10,000
107	Sodding	44,600m ²				8,000	8,000
108	Box Culvert (5.5x4.0)	20m				143,000	143,000
* 109	Guard Rdll	400m	299,000			1,000	300,000
110	Slope Protection	1,750m ²				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 ø1.5m	9,100m		37,148,000		12,309,000	49,457,000
* 202(G)	Excavation in River	10,540m ³		64,832,000		273,000	65,105,000
203(G)	Seal Concrete (X)	2,180m ²				488,000	488,000
204(G)	Footing Concrete (A)	5,300m ³				1,115,000	1,115,000
205(G)	Pier Concrete (A)	2,190m ³				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)	12,930m ³				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)	220m ³				48,000	48,000
303	Abutment Concrete (A)	265m ³				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) Temporary Works							
* 401(G)	Temporary Staging	3,700m ²		36,803,000		126,000	36,929,000
402(G)	Work Site Reclamation	270,000m ²				262,000	262,000
* 403	Temporary Quay	200m		16,254,000		52,000	16,306,000
(5) Ancillary Works							
501	Stone Placing	17,500m ³				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		498,000	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			64,788,000		64,788,000
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	64,788,000	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	64,788,000	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	69,647,000	59,252,000	363,077,000

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

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

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

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

700	TK. 117,793,412 x 0.55 = TK. 64,788,000
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AP. TABLE 9-10

LAND ACQUISITION AND COMPENSATION COST

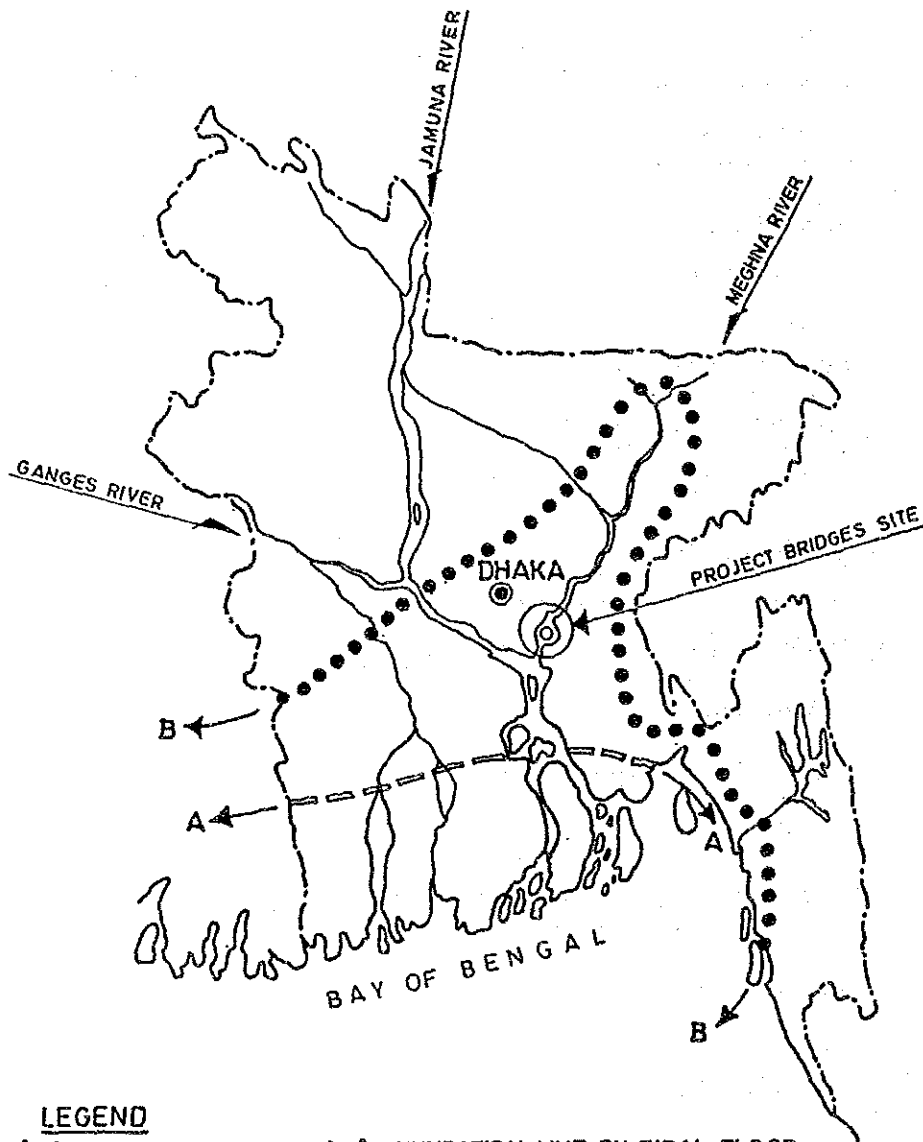
Unit : Taka per Sq.m.

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-II COST BREAKDOWN OF MEGHNA BRIDGE

1984 June Prices

(Taka)

NO.	Work Item	Unit	Q'ty	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	51,640.20	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	748.03	1,040,000	2,340,000
110	Slope protection	S.M	1,750	170.56	298,000	755.37	1,322,000	446.4	78,000	1,698,000
111	Back abutment slab	Each	2	51,958.63	104,000	56,895.46	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	43949.30	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 ϕ1.5m	L.M	4,070	10,551.46	42,944,000	3,059.47	12,450,000	3889.97	15,832,000	71,226,000
202	Excavation in river	C.M	10,100	6,853.28	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	2,832.74	1,790,000	13,309,000
207	PC Box concrete (P)	C.M	7,070	2,791.25	19,734,000	1,210.59	8,559,000	834.29	6,040,000	34,333,000
208	Deformed bar	Ton	810	16,479.92	13,349,000	4,452.08	3,606,000	12,757.19	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	463.13	816,000	677.32	1,192,000	133.93	239,000	2,257,000
211	Expansion joint	Each	11	105,695.33	1,163,000	4,075.89	45,000	144,422.26	1,790,000	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	78,978.38	1,421,000	2,449.24	44,000	149,618.68	2,693,000	4,158,000
214	Bearing shoe ISO	Each	4	38,397.48	153,000	2,611.23	10,000	72031.57	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	855.28	680,000	2,573,000
304	TORSTEEL bar	Ton	92	9,944.74	915,000	9,403.57	865,000	2,832.74	261,000	2,041,000
305	PC beam concrete (P)	C.M	220	2,527.51	556,000	4,814.47	1,059,000	565.55	129,000	1,744,000
306	Deformed bar	Ton	27	9,299.01	251,000	4,293.26	116,000	12,703.79	343,000	710,000
307	PC cable stressing	Ton	9	66,800.04	601,000	6,375.77	57,000	71,476.39	643,000	1,301,000
210	Railing	L.M	100	463.13	470,000	677.32	68,000	133.93	14,000	129,000
212	Foot path & Kerb	L.M	100	328.77	330,000	239.95	24,000	264.61	26,000	83,000
307	Bearing shoe 30t	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	1,349.87	4,725,000	10,647.45	26,118,000	64,471,000
402	Work site reclamation	C.M	110,000	9.93	1,092,000	81.74	8,991,000	126	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	120,697.05	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	-	7,461,000	-	3,508,000	-	3,384,000	14,353,000
700	Seasurface Transport	L.S	1	-	11,706,000	-	-	-	33,873,000	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					283,059,000		164,270,000		223,556,000	670,885,000
B. OVER HEAD					50,947,000		89,545,000		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

AP. TABLE 9-12 COST BREAKDOWN OF MEGHNA-GUMTI BRIDGE

1984 June Prices

(Taka)

NO.	Work Item	Unit	Qty	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	59.06	5,062,000	1.18	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	816.96	1,805,000	150.56	333,000	3,277,000
105(G)	Bridge surface	Ton	1,290	513.48	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	58,995.46	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 1.5m	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 river	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	223.15	480,000	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	33,544,000	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	10,857,000	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	Rolling	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	144,922.26	2,600,000	4,575,000
212	Foot path B 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	7,395,000
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	49,000	668,000
303	Abutment concrete (A)	C.M	265	1,424.19	377,000	1,066.63	283,000	893.28	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	1,084,000
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	9,980.92	36,929,000	83,395,000
402(G)	Work site reclamation	C.M	270,000	7.84	2,117,000	54.69	14,765,000	0.97	262,000	17,145,000
403	Temporary quay	M	200	93,016.90	18,603,000	6,882.97	1,377,000	81,929.92	16,306,000	38,286,000
SUB TOTAL					61,921,000		21,408,000		53,497,000	136,826,000
500	Ancillary Works									
501	Stones placing	C.M	17,500	-	-	902.13	15,787,000	0.17	3,000	15,790,000
504	Pier protection	Each	8	173,947.32	1,392,000	43,896.85	351,000	120,997.05	967,000	2,710,000
SUB TOTAL					1,392,000		16,139,000		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)	Seasonal Transport	L.S	1	-	6,821,000	-	-	-	64,788,000	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					518,160,000		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.

f.c. - factor cost

*Revised

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.)

Agriculture

1. Dhaka District

Dhaka is a typical agricultural district. 73% of the total land of the district is under the operational control of the farm holdings against 62% in the entire country. 50% people of the district are directly dependent on agriculture for their livelihood against 64% in Bangladesh. The location of the capital city is one of the factors for such deviation. 33% of the total household report of agricultural operation against 45% in the country as a whole.

a) Crops

Rice, jute, pulses, oil seeds, wheat and sugarcane are the important crops of the district. 62% of the cropped area is under paddy in the district against 69% in Bangladesh. 9% of the cropped area is under jute in Dhaka against 6% in the whole country. 1% of the cropped area is under pulses of various kinds in the district against 10% in Bangladesh. 5% of the cropped area is under oil seeds against 4% in the country. About 3% of the cropped area is under wheat in the district against 2% in Bangladesh. Only 1% of the cropped area is under sugarcane in the district as is the country as a whole.

Intensity of cropping in the district is 176% against 165% nationally. Modern techniques for better production are being used. 29% of the farm holdings in the district apply irrigation in the fields against 30%. 14% of the net sown area in the district is treated with irrigation against 22% in the country. 68% of the farm holdings use chemical fertiliser in the district against 56%, and 42% of the net sown area of the district is treated with chemical irrigation against 33% in the country as a whole.

b) Livestock

The position of livestock resources in the district is equivalent to the average of the country. 85% of the agricultural holdings possess cattle in the district which holds good for the country as a whole. The average number of cattle per holding in the district is 2.7 against 3 in Bangladesh, however the buffalo is rare in the district.

18% of the agricultural holdings in the district possess goats against 40% in Bangladesh. 4% agricultural holdings of the district keep sheep against 2%. 71% of the agricultural holdings of Dhaka district, the same as the entire country keep chickens. The number of fowls per holding in the district is 6.2. 4% of the agricultural holdings keep ducks against 3.9 in Bangladesh. The number of ducks per holding in the district is one against two nationally.

c) Forestry

The forest area of the district is significantly small. 3% of the total physical area of the district is under reserved forest against 15% in the whole of Bangladesh. If forest area in farm holding is added the percentage becomes 4.9% against 16.8% of Bangladesh.

d) Fishery.

The position in Dhaka district in respect of fishery resources is quite good. 1.5%, 0.8% and 7% of the physical area are under beels/haors, ponds/tanks and rivers/canals respectively against 2%, 1% and 6% nationally.

2. Chittagong District

a) Crops

Throughout the district the soil within the reach of the tidal water consists of fertile mixture of sand and clay and is in every way adaptable to paddy cultivation. Most of the soil is hard, and the loamy soils of the interior, locally known as doash, grow two and sometimes three crops of rice and irrigated cold-weather vegetables such as tobacco, jute, betel leaves, etc. 41% of the total land of the district is under the operational control of the farm holdings against 62% in the entire country.

Out of the total land area of 7,000 sq.km in the district during 1980-81, 18.50% was not available for cultivation, 30.66% was forest area, 2.18% cultivable waste, 8.62% currently fallow, 20.98% single cropped area, 15.19% double cropped area and 3.87% was triple cropped area.

The principal crops in order of importance are rice, jute, tobacco, mustard, melons, vegetables, sugarcane and betel leaves. Other food grains including pulses are grown as well. 89% of the cropped area is under paddy in the district against 69% in Bangla-

desh. About 3% of the cropped area is under oil seeds against 4% in the country. 5% of the cropped area is under other crops of the district.

Intensity of cropping in the district is 153%, same as the average for Bangladesh. For the improvement of agricultural production different types of irrigation are practised in the district. 74% of the farm holdings in the district apply irrigation against 30% in the country. 37% of the net sown area is under irrigation against 21% in the country. 97% of the farm holdings use chemical fertiliser in the district against 56% in Bangladesh and 78% of the net sown area of the district is treated with chemical fertiliser against 33% in the country as a whole.

b) Tea

Out of 153 tea estates of Bangladesh 20 are located in different parts of the district. The total estate area under tea is 3,060 hectares. The total production of tea in the district during 1980 was about 90,260 kg which represents about 4% of the total tea production of Bangladesh.

c) Livestock

Buffalo, cow, goat, sheep, etc. comprise livestock population of the district of Chittagong. 92% of the agricultural holdings possess cattle in the district against 85% in the country. Cattle per agricultural holding in the district is 3 which equals the average of the country. 2% of the agricultural holdings possess buffalos against the same 2% in Bangladesh. 31% agricultural holdings possess goats against 40% in the country. Sheep are rare in the district. Like other districts of the country 76% of the agricultural holdings keep chickens. The share of chickens per holding in the district is 8.32% of the agricultural holdings which also keep ducks in the district against 38% in Bangladesh. The number of ducks per agricultural holding is one against 2 in the country.

d) Forestry

Forestry is an important source of wealth for the district. Forest area extends over 2,130 sq. km. 31% of the total area of the district is under forest against 15% for the country. Garjan, gamar, teak, boilam, etc. are among the principal timbers found in the forests of the district. Other forest products are bamboo, sungrass, canes, etc.

e) Fishery

Chittagong is famous for its fishing industry. Sea-going fishing trawlers are also in use here. The fish of Chittagong are specially numerous as the district is bounded through its length by sea and contains various rivers and marshes. The continental shelf of Chittagong is a favourable fishing ground for Bangladesh, the availability of food brought down by the rivers and the favourable climate, various types of sea fish are available here. Out of the 7,000 sq. km of total physical area of the district 3.5% are under beels/haors against 2% of the country. Roughly 1% of the total area of the district is under ponds/tanks against 1% of Bangladesh and 3% area of the district is under rivers/canals against 6% of the country.

f) Sea Salt

The salt industry is growing into a significant cottage industry in the district in recent years. The small producers use either the simple evaporation method by bringing the salt water during the dry months through small canals joining the fields with the sea or boiling salt water in shallow tin pans. It is estimated that in 1981-82 nearly 1,450 tons of salt was produced by small producers in the district.

3. Comilla District

a) Crops

As a dominant subsector, cropping contributes 33.9% of the gross district income. About 4.2 million persons accounting 61.05% of the total population of the district is recorded as agricultural population that depends directly on agriculture compared to 64% for the whole country. According to the Agricultural Census 1977, a total of 74% land of the district is under the operational control of farm holding against 62% for the country as a whole. The main crop varieties of the district are rice, wheat, jute, sugarcane and potato. The net cropped area of the district is 519,600 hectares while the gross cropped area is 847,400 hectares with an intensity of cropping of 153%. About 136,000 hectares (26.10%) of the net cropped area apply irrigation in the district against 1,725,500 hectares (20.10%) in Bangladesh. In the district of Comilla 75,300 hectares of land which accounts 14.45% of net cropped area uses plant protection materials and 84% farm holdings in the district use chemical fertiliser against 26% for the country as a whole.

In Comilla district 74% of gross cropped area reported growing rice in 1981-82 against 79% for Bangladesh. Besides, wheat cultivation has been reported in 8.93% of gross cropped area against 4.04% for the whole country. Cultivation of jute has been reported in 3.8% of gross cropped area against 4.3% for Bangladesh for the same period of 1981-82.

b) Livestock

According to the Agricultural Census 1977 a total of 74% agricultural holdings possess cattle against 85% for Bangladesh. The average number of cattle per holding is 3 which is also the national average. 32% of the agricultural holdings reported goats against 31% for the whole country. The average number of goats per holding is 2.4 against 2.1 for Bangladesh. Ducks and fowls have been reported in 55% and 80% of agricultural holdings respectively against 29% and 71% for the entire country. Average number of ducks and fowls per holding in the district are 4.2 and 8.5 against 2 and 6 for Bangladesh. The contribution of livestock subsector to the gross district product is around 5.17% against 4.8% nationally.

c) Forestry

The contribution of the forestry subsector to the gross district income is negligible. It contributes only 0.07% of the gross district product against 2.11% for the country as a whole. The total area of the district under reserve forest is small, only 768.9 hectares, or 0.12% of the total physical area.

d) Fishery

The fishery subsector of the district provides 5.19% of gross district income against 3% for Bangladesh. Only 497 sq. km, about 7.4% of the total physical area is riverine.

4. Noakhali District

a) Crops

The crop subsector is the dominant productive sector contributing about 38% of gross district income. 65% of the district population directly depend on it for their livelihood. 50% of the total households in the district report farming operations against 45% in the whole country. The main crop varieties of the district are paddy,

wheat, jute, sugarcane, chillies, coconut, betelnut, etc. About 76% of the total land of the district is the operation control of farm holding against 62% in the whole country. The net cropped area of the district is 344 thousand hectares while the gross cropped area is 522 thousand hectares with an intensity of cropping of 152%. 39% of the farm holdings in the district apply irrigation against 56% in Bangladesh. 77% of the farm holdings use chemical fertiliser against 56% in the country.

b) Livestock

According to the Agricultural Census 1977, 74% of the agricultural holdings of the district possess cattle against 85% of Bangladesh. The average number of cattle per holding is 2.9 against 3 in Bangladesh. Only 1% of the agricultural holdings keep buffaloes against 2.3% in Bangladesh. 26% of the agricultural holdings keep goats against 40%. The number of goats per holding is 2 against 3 in Bangladesh. 82% of the agricultural holdings keep fowls against 71%. Number of fowls per holding is 9.6 against 8.6 for Bangladesh. Number of ducks per holding is 4.8 against 4.6. The contribution of the livestock subsector to the gross district product is 7.4% against 4.7% nationally.

c) Forestry

The forest area of the district is 134.60 sq. km, about 2.56% of the total physical area of the district against 16.8% on average. There is a possibility of increase of forest area in the coastal belts if the implementation of afforestation projects are completed. The contribution of the forestry subsector to the gross district income is less than one percent.

d) Fishery

The fishery subsector of the district provides 2.0% of the gross district income against about 3% in Bangladesh. The district is richer in fish resources because of the flow of the Bay of Bengal and its various tributaries along the south and the west coasts of the district. About 7.2% of rivers and canals, 10.0% of ponds and tanks and 12% of beels and haors of the country are located in the district.

Industry

1. Dhaka District

Dhaka district has a tradition of weaving industries. At present 27% of the handloom establishments and the same percentage of looms of the country are working in the district. 47% of the handloom products of the whole country are produced in the district by 36% of the total persons employed in the industry. 38% of the jute mills of the country are located in the district employing 49% of the total jute mill labourers, 55% of the textile mills in the country are located in Dhaka district wherein a similar percentage of textile goods are manufactured. 31% of the registered factories by major industrial groups in the country are located in Dhaka district alone. 40% of the cold storages of the country are located in the district, most of which are meant for preserving potatoes. The district is substantially rich in industry of all categories.

2. Chittagong District

Industrially Chittagong is a relatively developed area in Bangladesh. Due to the proximity to the principal seaport of the country it was naturally chosen as the site for heavy, medium and light industries. Among the important industries jute, cotton, general and electrical, engineering chemicals, matches, cigarettes, plywood, sawmills, tanneries are worth mentioning. The only refinery and the only steel mill of Bangladesh are located in Chittagong. At present 3% of the total handloom establishments of the country are working in this district, which produce about 1% of all handloom products by 75% of the total persons employed in the handloom industry in Bangladesh.

3. Comilla District

The industry sector of Comilla district contributes about 7.14% of the gross district product against 9.7% for the country as a whole. There are 13 thousand cottage industry units located in the district which accounts for 4.72% of the national total. 37 thousand persons are engaged in the cottage industries. There are 6 cotton textile industries and 3 jute mills in Comilla district which account for 10.72% and 4.29% of the country total. Among the registered factories by major industrial groups, there are 41 food manufacturing, 5 tobacco, 12 textile, 6 chemical products and 12 drugs and pharmaceutical products factories located in the district.

4. Noakhali District

The level of industrial activities in the district is low. Presently there are 7 thousand cottage industries and 8 thousand handloom establishments in the district accounting for about 3% and 4% of the national total, respectively. About 11 thousand people work in the handloom industry while the number of persons employed in the small and cottage industries are 21 thousand, about 2% and 4% of the national total. Besides, there are 3 jute textiles, 2 cotton textiles, 8 steel and engineering workshops, 12 aluminium utensil workshops and 8 automatic rice mills in the district. The contribution of the industrial sector to the gross district income is 5% against 8% for the country.

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

1) Meghna-Dhonagoda Project:

The project, located about 50 km southeast of Dhaka, covers a gross area of 19,030 ha. The project will provide flood control and drainage to 17,510 ha of land and irrigation to 14,375 ha, by lift-cum-gravity.

The implementation of the project which is in an advanced stage, is scheduled for completion by June 30, 1985.

At full development of the project, there will be an annual incremental production of 113,000 metric tons of rice and 1,000 metric tons of wheat. Input requirement of rice and wheat and particularly chemical fertilisers is estimated to be 18,550 tons each years.

Investment cost is US\$27.0 million.

2) Chandpur Irrigation Project:

The project completed in 1978 provides flood control and drainage to 53,850 ha of land and irrigation to a net area of 30,365 ha.

The project is planned to provide a net incremental production of 109,000 tons of rice and 18,000 tons of wheat a year. The chemical fertilisers requirement is about 19,600 tons a year.

The cost of the project was US\$366.52 million.

3) Muhuri Irrigation Project:

This project will provide irrigation facilities and reduce the extent, depth and duration of flooding during the wet season. Its description is as follows:

Investment cost	: US\$592.48 million
Gross area	: 27,120 ha.
Flood protection	: —
Irrigation area	: 20,240 ha.
Incremental food grain	: 64,680 metric tons

4) Narayananj-Narsingang Irrigation Project:

This project is to demonstrate applicable intensive agricultural practices and to stimulate farmers involved in similar irrigation development schemes. Its description is as follows:

Investment cost	: US\$40.15 million
Gross area	: 1,300 ha.
Net area	: 1,000 ha.
Incremental food grain	: 6.79 metric tons of rice and 0.18 metric tons of wheat

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)	4.25-7 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 2.00 1.00 1.00 2.00	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 wagons	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. Jamaipur	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 5. Others	
*** Number of Passengers in the Vehicle		
Article of Cargo (as detail as possible)		
**** Cargo Tonnage (Truck only) tons full, $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$ or	

* 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.

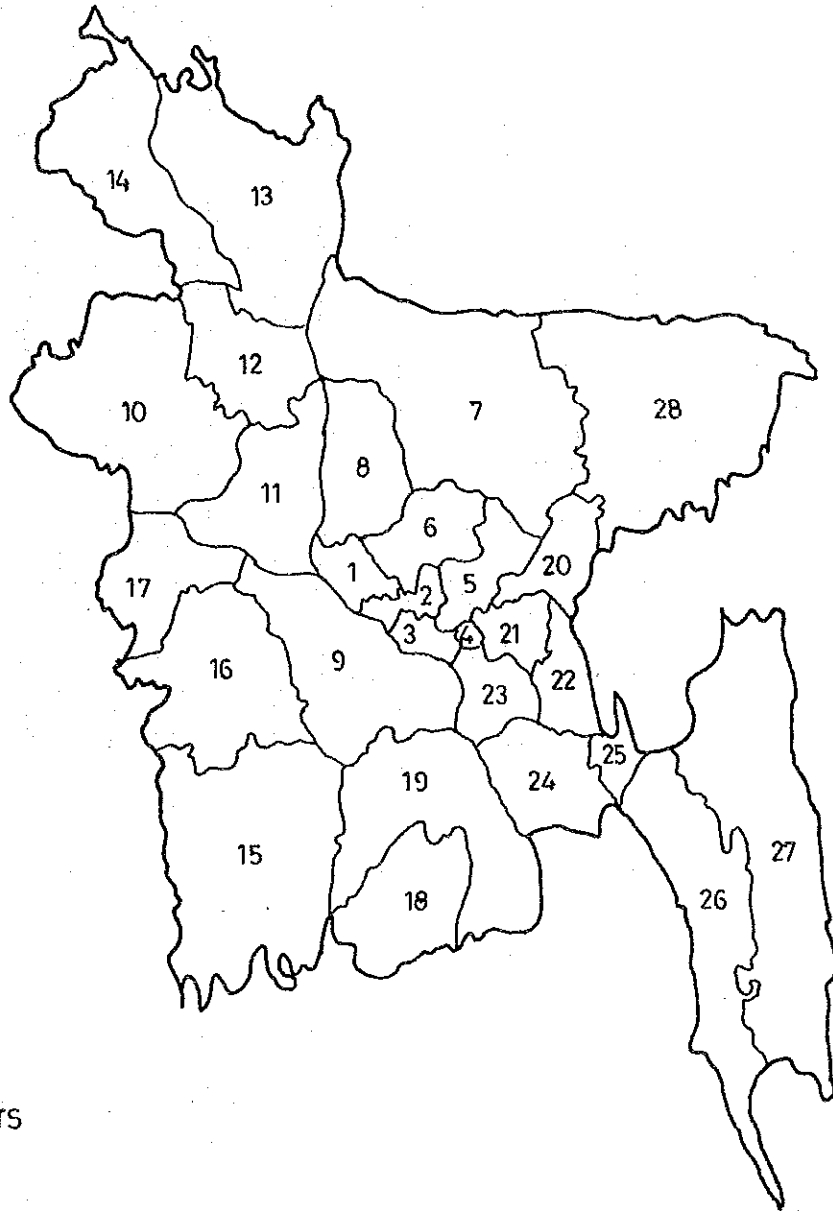
** Not required for bus and truck

*** 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	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
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 surveyor

PARTICULARS	ENTRY SPACE	CODING SPACE
PLATE NO.		
JOINING TIME TO THE QUEUE 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)

EAST OF MEGHNA RIVER	WEST OF MEGHNA RIVER										TOTAL:
	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	
1. MANIKGANJ											
2. SADAR SOUTH DHAKA	5	3	5	27	11	11	428	3	30		523
3. 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							10				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)

EAST OF MEGHNA RIVER	WEST OF MEGHNA RIVER										TOTAL:
	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	
1. MANIKGANJ											
2. SADAR SOUTH DHAKA	24	11	75	130	81	2	116				439
3. 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

EAST OF MEGHNA RIVER		WEST OF MEGHNA RIVER									TOTAL:										
		1. MANIKGANJ	2. SADAR SOUTH DHAKA	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:
20	BRAHMANBARIA																				
21	SADAR NORTH COMILLA																				
22	SADAR SOUTH COMILLA		1																		
23	CHANDPUR		33																		
24	SADAR NOAKHALI		44																		
25	FENI		1																		
26	CHITTAGONG		6																		
27	CHITTAGONG HILL TRACTS																				
28	SYLHET																				
4	GAZARIA																				85
TOTAL:																					85

Source: O-D Interview Survey, June 1984

AP. TABLE 11-7 CAR TRAFFIC MATRIX

EAST OF MEGHNA RIVER		WEST OF MEGHNA RIVER									TOTAL:										
		1. MANIKGANJ	2. SADAR SOUTH DHAKA	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:
20	BRAHMANBARIA																				
21	SADAR NORTH COMILLA		2																		
22	SADAR SOUTH COMILLA		2																		
23	CHANDPUR		49				3														
24	SADAR NOAKHALI		9																		
25	FENI																				
26	CHITTAGONG		37																		
27	CHITTAGONG HILL TRACTS																				
28	SYLHET																				
4	GAZARIA																				2
TOTAL:																					104

Source: O-D Interview Survey, June 1984

AP. TABLE 11-8 OTHER VEHICLES TRAFFIC MATRIX

EAST OF MEGHNA RIVER WEST OF MEGHNA RIVER		(Unit: Vehicles / day)										
		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	1	4	1				29
3. 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	4	18	1	1	1	4	1				29

Source: O-D Interview Survey, June 1984

AP. TABLE 11-9 TRAFFIC MATRIX FOR ALL VEHICLES

EAST OF MEGHNA RIVER WEST OF MEGHNA RIVER		(Unit: Vehicles / day)										
		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. EXCEPT GAZARIA								3			3	
4. GAZARIA												
5. NARAYANGANJ				3	5	3	111				122	
6. SADAR NORTH DHAKA		3	5		14		41	3			52	
7. MYMENSINGH							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	1458	

Source: O-D Interview Survey, June 1984

AP. NOTE 11-1 POPULATION FORECAST BY ZONES

The population by zone was estimated through the following procedure:

Step 1:

Zonal population was projected by using zonal parameters which were obtained through the regression analysis; and

Step 2:

The aggregate of the zonal populations estimated was adjusted to the national total for the respective years.

The above procedure can be expressed through the following equations:

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

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

A_i, B_i = parameters 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

The parameters of each zone were obtained through regression analysis.

AP. NOTE 11-2 FORECASTING OF VEHICLES ON ROAD

1) Estimation of Future GDP

The future population was predicted by the Government as mentioned in Subsection 11-4-2, while no information on estimated GDP was available. The past trend of GDP was used. The GDP in the period 1971 through 1977 which showed abrupt changes seemed to be in a state of recovery after the liberation war. The growth rate in the GDP in the recent years between 1978 and 1983 was calculated at 3.4% per annum.

The future GDP was estimated through the following equation:

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

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

$$GDP_{1982} = \text{GDP in 1983}$$

$$r = \text{annual growth rate in GDP (= 0.034)}$$

$$y = \text{year}$$

2) Trucks

For the prediction of number of trucks on the road it is necessary to estimate road freight transportation because both are closely associated with each other. The transportation is also associated with the GDP.

Therefore, the following estimate was made for the future road freight transportation.

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

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

A_0, A_1 = parameters by the regression analysis

Assumption was made that the number of trucks depends on the freight transportation obtained through the previous equation. Therefore, the estimate is as follows:

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

where TRK_t = number of trucks in year t

3) Buses

The number of buses bears a positive relationship with population and GDP. The following equation was used for the estimate of the number of buses:

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

where BUS_t = number of buses in year t

POP_t = population in year t

4) Cars and Other Vehicles

Numbers of cars and other types of vehicles have a positive relationship with GDP. The following equations were used for the estimate of the number of such vehicles:

For Cars:

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

where PC_t = number of passenger cars in year t

For other types of vehicles:

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

where MV_t = number of other types of vehicles

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

1) Estimation of Trip Generation

$$FE_{tki} = f(FE_{tk}, FE_{ti}, PE_{ki})$$

$$FE_{tk} = PE_k \cdot VGF_{tk}, \text{ and } PE_{ti} = PE_i \cdot PGF_{ti}$$

where PE_{tki} = generated trips of vehicle type k in zone i in year t

FE_{tk} = generated trips of vehicle type k in year t (in control total)

FE_{ti} = generated trips in zone i in year t

PE_{ki} = generated trips of vehicle type k in zone i in present year (present pattern)

PE_k = generated trips of vehicles type k in present year

VGF_{tk} = growth factor of vehicle type k in year t

PE_i = generated trips in zone i in present year

PGF_{ti} = growth factor of zone i in year t

2) Estimation of Normal Traffic Crossing the Rivers

$$Q_{tkij} = f(E_{tki}, E_{tkj}, P_{kij})$$

where Q_{tkij} = traffic of type k between zones i and j in year t

E_{tki} = generated trips of vehicle type k in zone i in year t (in control total)

E_{tkj} = generated trips of vehicle type k in zone j in year t (in control total)

P_{kij} = 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)

EAST OF MEGHNA RIVER WEST OF MEGHNA RIVER		EAST OF MEGHNA RIVER									TOTAL:	
		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
1. MANIKGANJ												
2. SADAR SOUTH DHAKA	7	5	8	41	18	16	644	4	43		786	
3. MURSHIGANJ EXCEPT GAZARIA								4			4	
4. GAZARIA												
5. NARAYANGANJ					8	4	155				167	
6. SADAR NORTH DHAKA		4	7				59	4	4		75	
7. MYMENSINGH					20		4				24	
8. TANGAIL							7	4	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)

EAST OF MEGHNA RIVER WEST OF MEGHNA RIVER		EAST OF MEGHNA RIVER									TOTAL:
		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	
1. MANIKGANJ											
2. SADAR SOUTH DHAKA	12	7	13	64	32	24	1063	7	66		1288
3. MURSHIGANJ 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 MECHNA RIVER	WEST OF MECHNA RIVER	20	21	22	23	24	25	26	27	28	4	TOTAL:	
		20	21	22	23	24	25	26	27	28	4	1988	
	1. MANIKGANJ											9	
	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 MECHNA RIVER	WEST OF MECHNA RIVER	20	21	22	23	24	25	26	27	28	4	TOTAL:
		20	21	22	23	24	25	26	27	28	4	3000
	1. MANIKGANJ											12
	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 11-16 BUS TRAFFIC MATRIX FOR 2010

(Unit: Vehicles/day)

		20	21	22	23	24	25	26	27	28	4	TOTAL:
EAST OF MEGHNA RIVER												
WEST OF MEGHNA RIVER												
1. MANIKGANJ												
2. SADAR SOUTH DHAKA	68	29	242	381	250	5	333					1308
3. 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)

		20	21	22	23	24	25	26	27	28	4	TOTAL:
EAST OF MEGHNA RIVER												
WEST OF MEGHNA RIVER												
1. MANIKGANJ												
2. SADAR SOUTH DHAKA	96	39	360	519	363	6	448					1831
3. 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)

		20	21	22	23	24	25	26	27	28	4	TOTAL:
EAST OF MEGHNA RIVER												
WEST OF MEGHNA RIVER												
	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. MYAENSINGH											
	8. TANGAIL											
	9. FARIDPUR											
	10. NAUSHARI											
	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)

		20	21	22	23	24	25	26	27	28	4	TOTAL:
EAST OF MEGHNA RIVER												
WEST OF MEGHNA RIVER												
	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. MYAENSINGH											
	8. TANGAIL											
	9. FARIDPUR											
	10. NAUSHARI											
	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

EAST OF MEGHNA RIVER		WEST OF MEGHNA RIVER									TOTAL:										
		1. MANIKGANJ	2. SADAR SOUTH DHAKA	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:
20	20. BRAHMANBARIA																				
21	21. SADAR NORTH COMILLA																				
22	22. SADAR SOUTH COMILLA		3																		3
23	23. CHANPUR				97																97
24	24. SADAR NDAKHALI																				136
25	25. FEMI																				2
26	26. CHITTAGONG																				16
27	27. CHITTAGONG HILL TRACTS																				
28	28. SYLHET																				
4	4. GAZARIA																				
TOTAL:							254														254

(Unit: Vehicles/day)

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

EAST OF MEGHNA RIVER		WEST OF MEGHNA RIVER									TOTAL:										
		1. MANIKGANJ	2. SADAR SOUTH DHAKA	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:
20	20. BRAHMANBARIA																				
21	21. SADAR NORTH COMILLA																				
22	22. SADAR SOUTH COMILLA			4																	4
23	23. CHANPUR																				
24	24. SADAR NDAKHALI																				192
25	25. FEMI																				3
26	26. CHITTAGONG																				22
27	27. CHITTAGONG HILL TRACTS																				
28	28. SYLHET																				
4	4. GAZARIA																				
TOTAL:							355														355

AP TABLE 11-22 CAR TRAFFIC MATRIX FOR 1990

(Unit: Vehicles/day)

EAST OF MEGHNA RIVER		WEST OF MEGHNA RIVER													TOTAL:									
		1. MANIKGANJ	2. SADAR SOUTH DHAKA	MUNSHIGANJ	3. EXCEPT GAZARIA	4. GAZARIA	5. NARAYANGANJ	SADAR NORTH	6. 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		
20. BRAHMANSARIA	21. SADAR NORTH COMILLA	22. SADAR SOUTH COMILLA	23. CHANDPUR	24. SADAR NDAKHALI	25. FENI	26. CHITTAGONG	27. CHITTAGONG HILL TRACTS	28. SYLHET	4. GAZARIA	TOTAL:	5	5	139	26	102							7	7	284

AP TABLE 11-23 CAR TRAFFIC MATRIX FOR 2000

(Unit: Vehicles/day)

EAST OF MEGHNA RIVER		WEST OF MEGHNA RIVER													TOTAL:										
		1. MANIKGANJ	2. SADAR SOUTH DHAKA	MUNSHIGANJ	3. EXCEPT GAZARIA	4. GAZARIA	5. NARAYANGANJ	SADAR NORTH	6. 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			
20. BRAHMANSARIA	21. SADAR NORTH COMILLA	22. SADAR SOUTH COMILLA	23. CHANDPUR	24. SADAR NDAKHALI	25. FENI	26. CHITTAGONG	27. CHITTAGONG HILL TRACTS	28. SYLHET	4. GAZARIA	TOTAL:	12	15	339	60	236								17	17	672

AP. TABLE 11-24 CAR TRAFFIC MATRIX FOR 2010

		(Unit: Vehicles/day)										
		20	21	22	23	24	25	26	27	28	4	TOTAL:
EAST OF MEGHNA RIVER	WEST OF MEGHNA RIVER	20	21	22	23	24	25	26	27	28	4	TOTAL:
		1. MANIKGANJ										
2. SADAR SOUTH DHAKA		25	28	649	119		484				19	1324
3. 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)										
		20	21	22	23	24	25	26	27	28	4	TOTAL:
EAST OF MEGHNA RIVER	WEST OF MEGHNA RIVER	20	21	22	23	24	25	26	27	28	4	TOTAL:
		1. MANIKGANJ										
2. SADAR SOUTH DHAKA		41	52	1162	215		872				33	2375
3. 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 11-27 OTHER VEHICLES TRAFFIC MATRIX FOR 2000
(Unit: Vehicles/day)

		20	21	22	23	24	25	26	27	28	4	TOTAL:
EAST OF MEGHNA RIVER												
WEST OF MEGHNA RIVER												
	1. MANIKGANJ											
	2. SADAR SOUTH DHAKA	9				2	2	9		2		64
	3. EXCEPT GAZARIA MUNSHIGANJ											
	4. GAZARIA											
	5. NARAYANGANJ											
	6. SADAR NORTH DHAKA											
	7. NYMENSINGH											
	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	9		40	2	2	9		2		64

AP. TABLE 11-26 OTHER VEHICLES TRAFFIC MATRIX FOR 1990
(Unit: Vehicles/day)

		20	21	22	23	24	25	26	27	28	4	TOTAL:
EAST OF MEGHNA RIVER												
WEST OF MEGHNA RIVER												
	1. MANIKGANJ											
	2. SADAR SOUTH DHAKA	6				2	1	6		1		40
	3. EXCEPT GAZARIA MUNSHIGANJ											
	4. GAZARIA											
	5. NARAYANGANJ											
	6. SADAR NORTH DHAKA											
	7. NYMENSINGH											
	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	6		24	2	1	6		1		40

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

		(Unit: Vehicles/day)											
		20	21	22	23	24	25	26	27	28	4	TOTAL:	
EAST OF MEGHNA RIVER	WEST OF MEGHNA RIVER	1. MANIKGANJ											
		2. SADAR SOUTH DHAKA											
		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)											
		20	21	22	23	24	25	26	27	28	4	TOTAL:	
EAST OF MEGHNA RIVER	WEST OF MEGHNA RIVER	1. MANIKGANJ											
		2. SADAR SOUTH DHAKA											
		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 MECHNA RIVER	WEST OF MECHNA RIVER										TOTAL:
	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	
1. MANIKGANJ											
2. SADAR SOUTH DHAKA	39	30	119	425	220	21	914	4	44	7	1823
3. 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. RAJSHAMI							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 MECHNA RIVER	WEST OF MECHNA RIVER										TOTAL:
	20 BRAHMANBARIA	21 SADAR NORTH COMILLA	22 SADAR SOUTH COMILLA	25 CHANDPUR	24 SADAR NOAKHALI	25 FENI	26 CHITTAGONG	27 CHITTAGONG HILL TRACTS	28 SYLHET	4 GAZARIA	
1. MANIKGANJ											
2. SADAR SOUTH DHAKA	60	49	191	783	358	32	1551	7	68	10	3109
3. 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. RAJSHAMI							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	101	811	408	38	2091	13	87	10	3765

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

(Unit: Vehicles/day)

EAST OF MEGHNA RIVER	WEST OF MEGHNA RIVER										TOTAL:
	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	
1. MANIKGANJ											9
2. SADAR SOUTH DHAKA	87	78	293	1287	561	47	2498	11	101	19	4982
3. EXCEPT GAZARIA								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. TABLE 11-33 ALL VEHICLES TRAFFIC MATRIX FOR 2020

(Unit: Vehicles/day)

EAST OF MEGHNA RIVER	WEST OF MEGHNA RIVER										TOTAL:
	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	
1. MANIKGANJ											12
2. SADAR SOUTH DHAKA	124	115	447	2055	858	66	3845	17	146	33	7706
3. EXCEPT GAZARIA								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

Induced traffic resulting from the time saving of vehicles running between zones was estimated on two bases: one after the completion of the proposed Meghna Bridge and the other after completion of both bridges. To estimate inducing rates by type of vehicle the following calculations were made:

1) Time from Without-Project:

$$WOT_{ki} = L_i \cdot (60/V_k) + WOM_k + JTi$$

where WOT_{ki} = required time (in minutes) of vehicle type k in zone-pair i

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

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

WOM_k = 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) Time from With-Project:

$$WT_{ki} = L_i \cdot (60/V_k) + WM_k + JTi$$

where WT_{ki} = required time of vehicle type k in zone-pair i

WM_k = 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 crossing time (minutes) on
Meghna-Gumti Ferry, for truck, bus and car, respectively.

3) Inducing Rate:

Inducing rates by type of vehicle were calculated:

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

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

β_k = parameter for the gravity model which was obtained from the regression analysis:
 $\beta = 0.41, 0.59$ and 0.81 for truck, bus and passenger car, respectively.

Ap. Table 12-1 Price of Vehicles

(Unit : Taka)

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

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 Profit, 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 (Parts)	0.979	0.847	0.244	0.661	0.905
(Labour)	(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	
<u>Ferry Crew</u>						
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
<u>Subtotal</u>		<u>36</u>	<u>451.9</u>	<u>32</u>	<u>410.7</u>	<u>862.6</u>
<u>Terminal Worker</u>						
Manager	3,500	1	42.0	1	42.0	84.0
Supervisor	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
<u>Subtotal</u>	-	<u>67</u>	<u>903.9</u>	<u>78</u>	<u>970.5</u>	<u>1,874.4</u>
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	$(3 \times 17) + (2 \times 8.5) = 68$	$4 \times 17 = 68$
Meghna-Gumti	$(4 \times 13.5) + (2 \times 65) = 67$	$3 \times 13.5 = 40$

(3) Fuel Oil Consumption per Day

Meghna	$(11.37\ell \times 68) + (10.23\ell \times 68) = 1,469 \ell$
Meghna-Gumti	$(25.01\ell \times 67) + (22.51\ell \times 40) = 2,576 \ell$

(4) Lubricant Oil Consumption per Day

Meghna	$(0.39\ell \times 68) + (0.39\ell \times 68) = 53 \ell$
Meghna-Gumti	$(0.85\ell \times 67) + (0.85\ell \times 40) = 91 \ell$

(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
<u>Imported</u>				
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
<u>Domestic</u>				
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 Labour	Costs Others	Economic cost
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
Supervisor	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
Supervisor	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

	M e g h n a															
	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
Type II & 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)

	M e g h n a															
	1984	1990	1995	2000	2005	2010	2015	2020	1984	1990	1995	2000	2005	2010	2015	2020
Diesel Oil	3,968	6,142	6,009	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	42,799

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

(Unit : 1,000 Taka/Year)

	M e g h n a															
	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	10,280	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)

	M e g h n a																
	1984	1990	1995	2000	2005	2010	2015	2020	1984	1990	1995	2000	2005	2010	2015	2020	
(Number of Ferries and Pontoons)																	
Utility Ferry boats	4	8	9	11	14	17	21	25	4	4	8	10	12	15	19	23	28
Type I																	
Type II & Uni-float	4	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-
Pontoon/Gangways	3	4	5	6	7	9	11	13	3	3	3	4	5	6	7	9	11
(Ferry Boat Maintenance Costs)																	
Regular Maintenance	130	260	293	358	455	553	683	813	130	260	325	390	488	618	748	910	
Type I																	
Type II & Uni-float	80	-	-	-	-	-	-	-	80	-	-	-	-	-	-	-	-
Running Maintenance	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 I																	
Type II & Uni-float	460	-	-	-	-	-	-	-	460	-	-	-	-	-	-	-	-
Overhauling of Engines	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 I																	
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/Gangways	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 Traffic 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	-0.8	-0.4	-0.3	0	-0.1
	Benefits					
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					
	Benefits	-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 Maghna - Case I

(Unit : Million Taka)

Year	Costs			Ferry Cost Svg.		VOC Saving	Time Cost Svg.		Total Benefit	Net Cash Flow
	Const.	Maint.	Total	Invest.	Operat.		Vehicle	Passgr.		
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

IRR=10.22%

B-C

At 10% = Tk. 17.2, million
At 15% = Tk. -207.2, million

B/C

At 10% = 1.03
At 15% = 0.57

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

(Unit : Million Taka)

Year	Costs			Ferry Cost Svg.		VOC Saving	Time Cost Svg.		Total Benefit	Net Cash Flow
	Const.	Maint.	Total	Invest.	Operat.		Vehicle	Passgr.		
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

IRR=10.66%

B-C

At 10% = Tk. 52.2, million
At 15% = Tk. -193.0, million

B/C

At 10% = 1.09
At 15% = 0.60

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

(Unit : Million Taka)

Year	Costs			Ferry Cost Svg.		VDC	Time Cost Svg.		Total	Net Cash Flow
	Const.	Maint.	Total	Invest.	Operat.		Vehicle	Passgr.		
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	481.4

IRR

IRR=14.82%

B-C

At 10% = Tk. 310.0, million
At 15% = Tk. -5.3, million

B/C

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 Saving	Time Cost Svg.		Total Benefit	Net Cash Flow
	Const.	Maint.	Total	Invest.	Operat.		Vehicle	Passgr.		
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

IRR=12.41%

B-C

At 10% = Tk. 362.2, million
At 15% = Tk. -198.2, million

B/C

At 10% = 1.37
At 15% = 0.74

