- Data for Supporting Report E -

Data ED 1 : Cost Estimates for Alignment Alternative on Nali River

1) ALTERNATIVE ALIGNMENT - A

i) Foundation Treatment (Below E.1 + 3.0 m) :

- Weighted Average Height, $H = \frac{4.5 \times 0.26 + 6.48 \times 0.98 + 7.43 \times 1.54 + 8.38 \times 0.86 + 7.73 \times 0.30}{0.26 + 0.98 + 1.54 + 0.86 + 0.30}$

$= 7.23$ m

- Base width , $l = (4 + 5 + 3 + 3) + 7.23 \times (3+3) = 58.38$ m

- No. of sand piles $= (0.26 + 0.98 + 1.54 + 0.86 + 0.30) \times 1000 \text{ m} \times 58.38 \text{ m} \times \frac{1}{2.5\text{m}} \times \frac{1}{2.5\text{m}}$

$= 36803$ Nos

- Total length of sand piles = 36803 Nos. x 10 m /No = 368030 m

- Cost of sand piling (Foundation treatment) = 368030 m x 626 Tk / m = 230.39×10^6 Taka

ii) Embankment Construction :

- Volume of Earth Work = $868 \times 10^3 m^3$
- Cost of Embankment Construction = $868 \times 10^3 m^3 \times 530$ TK / m^3

$= 460.04 \times 10^6$ Taka

iii) Sluice Gate :

A = 49.3 m^2 (ref. Master Plan)

Construction Cost : 116.8×10^6 Taka

iv) Land Acquisition :

- Area of land = $366 \times 10^3 m^2$

- Cost of land = $366 \times 10^3 m^2 \times 250$ TK/m^2 = 91.5×10^6 Taka

Total cost (i-iv)= $230.39 \times 10^6 + 460.04 \times 10^6 + 116.8 \times 106 + 91.5 \times 10^6 = 898.733 \times 10^6$ Taka

Say, 899 million Taka.

2) ALTERNATIVE ALIGNMENT - B

i) Foundation Treatment (Below El. + 3.00 m) :

Reach F	Distance d (Km)	Height H (m)	dXH (m x Km)
F-1	0.10	6.44	0.644
F-2	0.38	7.40	2.812
F-3	0.15	6.38	0.957
F-4	0.70	6.95	4.865
	1.33		9.278

- Weighted Height = 9.278 ÷ 1.33 = 6.98 m

- Base width of Embankment, l = (4 + 5 + 3 + 3) + 6.98 (3+3) = 56.88 m

- No of sand piles = 1.33 x 1000 m x 56.88 m x $\frac{1}{2.5\ m}$ x $\frac{1}{2.5\ m}$ = 12104 Nos

- Total length of sand piles = 12104 Nos x 10 m /No = 121040 m

Cost of sand piling (Foundation treatment) =

12040 m x 626 TK/m = 75.77 x 10^6 Taka

ii) Embankment Construction :

- Volume of Earth work = 553 x $10^3 m^3$

- Cost of Embankment Construction = 553 x $10^3 m^3$ x 530 TK/m^3

= 293.09 x 10^6 Taka

iii) Sluice Gate :

A = 49.3 m^2 (ref. Master Plan)

Construction Cost : 116.8 x 10^6 Taka

iv) Land Acquisition :

- Area of land = 345 x $10^3 m^2$

- Cost of land = 345 x $10^3 m^2$ x 250 TK/m^2 = 86.25 x 10^6 Taka

Total Cost (i-iv) = 75.77 x 10^6 + 293.09 x 10^6 +116.8 x 106 + 86.25 x 10^6 =571.91 x 10^6 Taka

Say, 572 million Taka

3) Cost Comparison :

Alternative A = 899 million Taka

Alternative B = 572 million Taka

Difference C = Cost A - Cost B

= (899 - 572) million Taka

= 327 million Taka

The land area in between Alignment A and B = 215 ha. = 2150000 m^2

The cost of land for Retarding Basin, P = 2150000m^2 x 250 TK/m^2

= 537.5 x 10^6 Taka

= 537.5 million Taka

P > C (= A - B)

Therefore the alignment Alternative "B" is more feasible than the Alignment Alternative-A.

Table ED 1: BQ of Alignment Alternatives

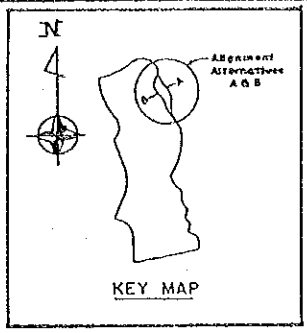
ALIGNMENT ALTERNATIVE - A

Reach No.	Distance (Km)	Height-H (m)	VA (m3)	V (x 103 m3)	L (m)	LA (x 103m2)
R'-1	6.80 ~ 7.06 = 0.26	9.50 - 5.00 = 4.50	84	22	67	18
R'-2	7.06 ~ 8.04 = 0.98	9.48 - 3.00 = 6.48	174	171	83	81
R'-3	8.04 ~ 9.58 = 1.54	9.43 - 2.00 = 7.43	224	345	88	136
R'-4	9.58 ~ 10.44 = 0.86	9.38 - 1.00 = 8.38	280	241	96	83
R'-5	10.44 ~ 10.78 = 0.34	9.35 - 5.60 = 3.75	60	21	60	21
R'-6	10.78 ~ 11.08 = 0.30	9.33 - 1.60 = 7.73	226	68	90	27
		TOTAL		868		366

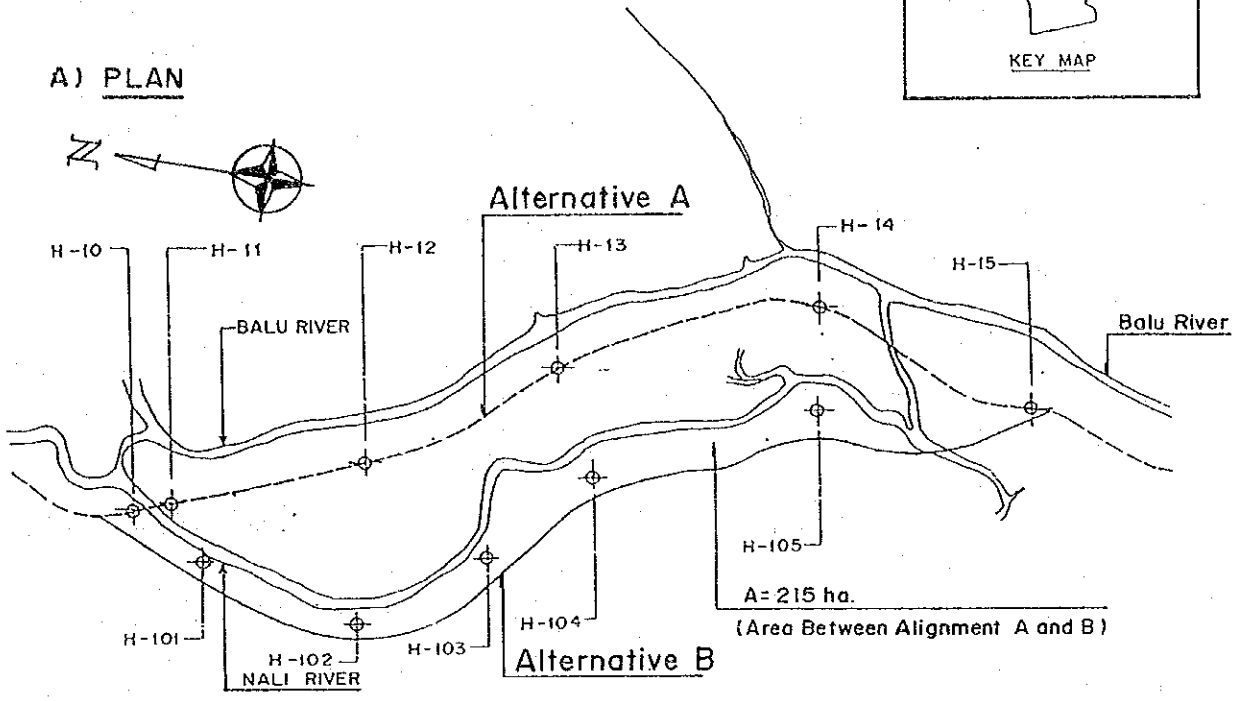
ALIGNMENT ALTERNATIVE - B

Reach No.	Distance (Km)	Height-H (m)	VA (m3)	V (x 103 m3	L (m)	LA (x 103m2
R-1	6.80 ~ 8.50 = 1.70	9.47 - 4.00 = 5.47	122	207	75	128
R-2	8.50 ~ 9.22 = 0.72	9.42 - 5.00 = 4.42	80	58	67	48
R-3	9.22 ~ 9.54 = 0.32	9.40 - 2.00 = 7.40	224	72	88	28
R-4	9.54 ~ 10.32 = 0.78	9.38 - 4.80 = 4.58	88	69	68	53
R-5	10.32 ~ 11.02 = 0.70	9.35 - 2.40 = 6.95	200	140	85	60
R-6	11.02 ~ 11.22 = 0.20	9.33 - 6.40 = 2.93	36	7	55	28
		TOTAL		553		345

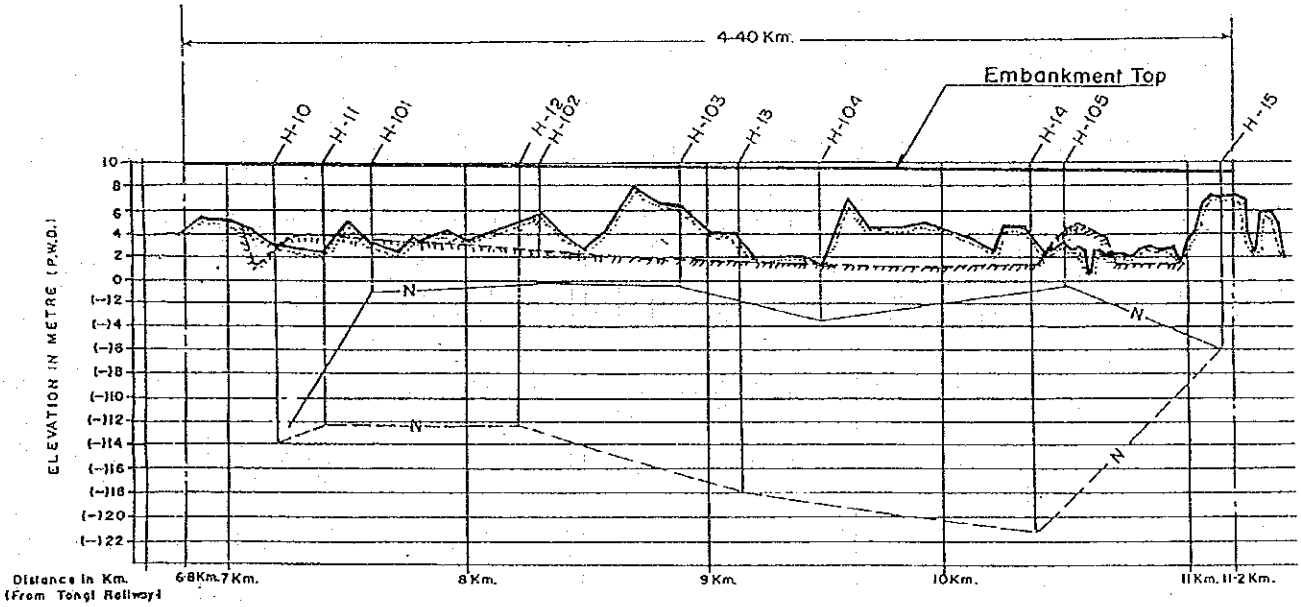
Embankment Alignment of Nali River Portion



A) PLAN



B) LONGITUDINAL SECTIONS



LEGEND

Alignment Alternative - A :-

Alignment Alternative - B :-

Soil Bore Hole Point :- H-10, H-101

Level of SPT N-Value 4 & Above:-

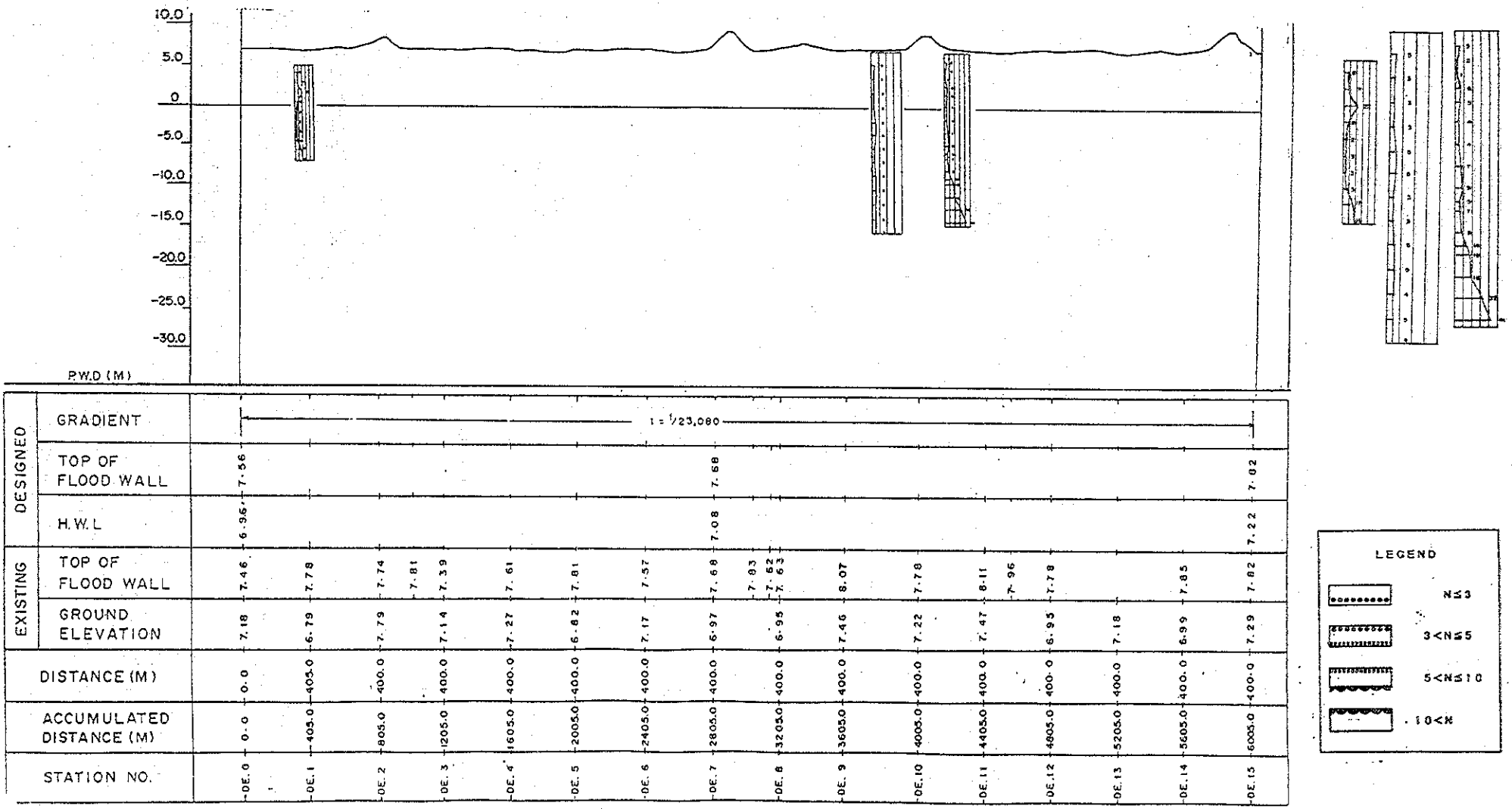
- For Alignment Alternative - A :-
- For Alignment Alternative - B :-

FIG. ED 1 Embankment Alignment of Nali River Portion

GREATER DHAKA PROTECTION PROJECT (STUDY IN DHAKA METROLOLITAN AREA) OF BANGLADESH FLOOD ACTION PLAN NO.8A IN THE PEOPLE'S REPUBLIC OF BANGLADESH

JICA

Data ED 2 : Geological Data of DND and N. West

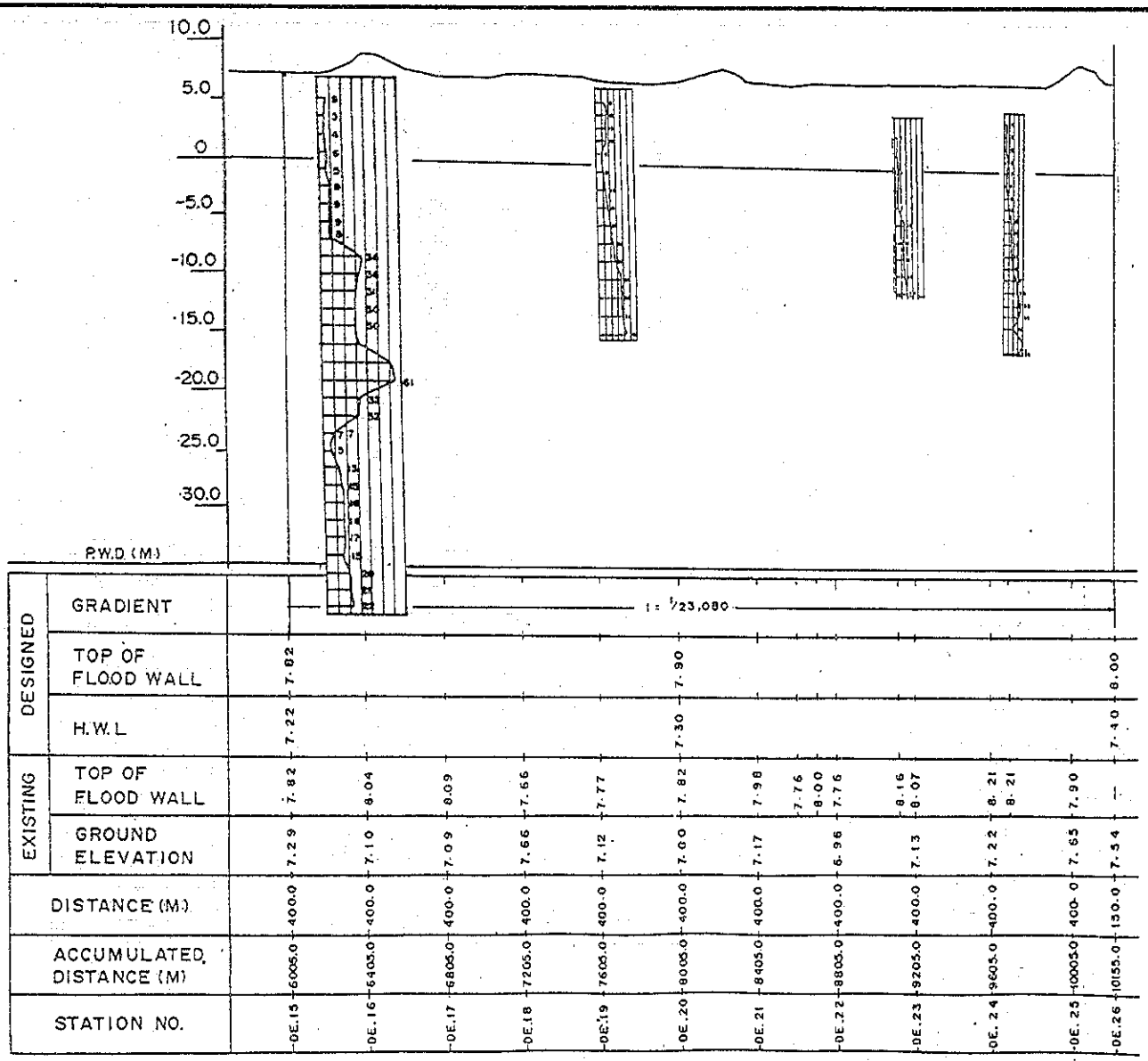


		DE.0	DE.1	DE.2	DE.3	DE.4	DE.5	DE.6	DE.7	DE.8	DE.9	DE.10	DE.11	DE.12	DE.13	DE.14	DE.15
DESIGNED	GRADIENT																
	TOP OF FLOOD WALL	7.56							7.68								7.82
	H.W.L	6.96							7.08								7.22
EXISTING	TOP OF FLOOD WALL	7.46	7.78	7.74	7.81	7.39	7.61	7.81	7.57	7.68	7.93	7.62	8.07	7.78	8.11	7.96	7.78	7.85	7.82
	GROUND ELEVATION	7.18	6.79	7.79	7.14	7.27	6.82	7.17	6.97	6.95	7.46	7.22	7.47	6.95	7.18	6.99	7.29
DISTANCE (M)		0.0	405.0	400.0	400.0	400.0	400.0	400.0	400.0	400.0	400.0	400.0	400.0	400.0	400.0	400.0	400.0
ACCUMULATED DISTANCE (M)		0.0	405.0	805.0	1205.0	1605.0	2005.0	2405.0	2805.0	3205.0	3605.0	4005.0	4405.0	4805.0	5205.0	5605.0	6005.0
STATION NO.																	

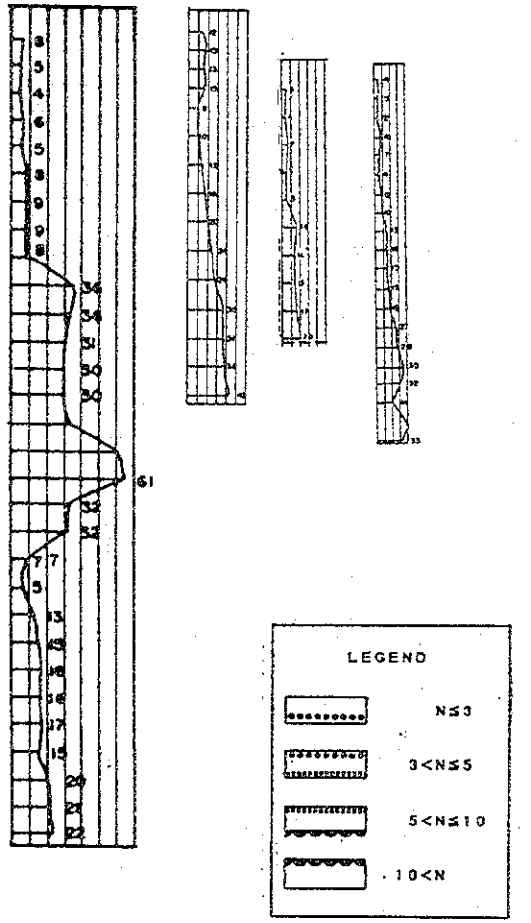
FIG. ED 2.1(1) Geological Data along Flood Wall : DND (DE)

GREATER DHAKA PROTECTION PROJECT (STUDY IN DHAKA METROPOLITAN AREA) OF BANGLADESH FLOOD ACTION PLAN NO.8A IN THE PEOPLE'S REPUBLIC OF BANGLADESH

JICA



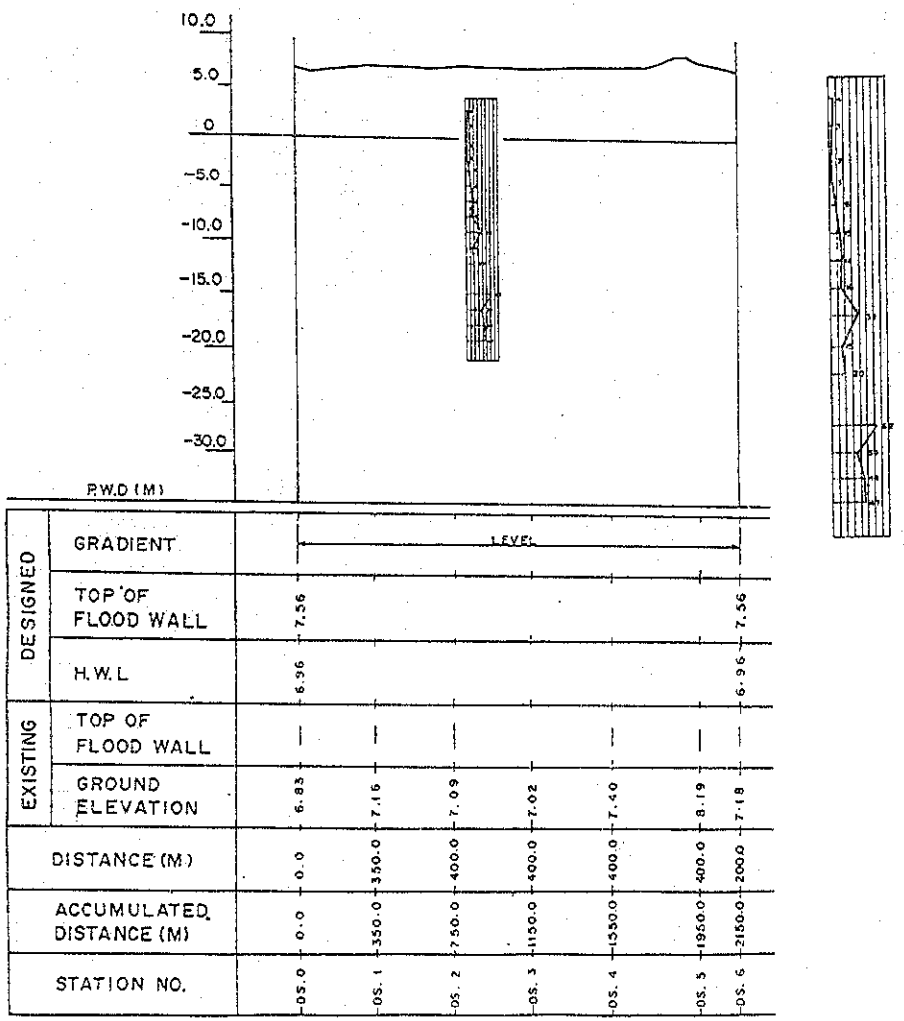
DESIGNED	GRADIENT																								
	TOP OF FLOOD WALL	7.82						7.90																8.00	
	H.W.L	7.22						7.30																7.40	
EXISTING	TOP OF FLOOD WALL	7.82	8.04	8.09	7.66	7.77	7.82	7.98	7.76	8.00	7.76	8.16	8.07	8.21	8.21	7.90	—								
	GROUND ELEVATION	7.29	7.10	7.09	7.66	7.12	7.00	7.17		6.96		7.13		7.22		7.65	7.54								
DISTANCE (M)		400.0	400.0	400.0	400.0	400.0	400.0	400.0		400.0		400.0		400.0		400.0	130.0								
ACCUMULATED DISTANCE (M)		6005.0	6405.0	6805.0	7205.0	7605.0	8005.0	8405.0		8805.0		9205.0		9605.0		10005.0	10155.0								
STATION NO.		DE.15	DE.16	DE.17	DE.18	DE.19	DE.20	DE.21		DE.22		DE.23		DE.24		DE.25	DE.26								



ED- 7

FIG. ED 2.1(2) Geological Data along Flood Wall : DND (DE)

GREATER DHAKA PROTECTION PROJECT (STUDY IN DHAKA METROPOLITAN AREA) OF BANGLADESH FLOOD ACTION PLAN NO.8A IN THE PEOPLE'S REPUBLIC OF BANGLADESH



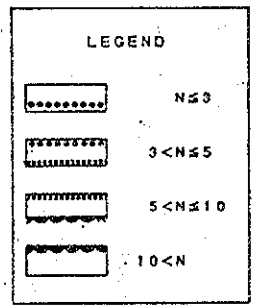
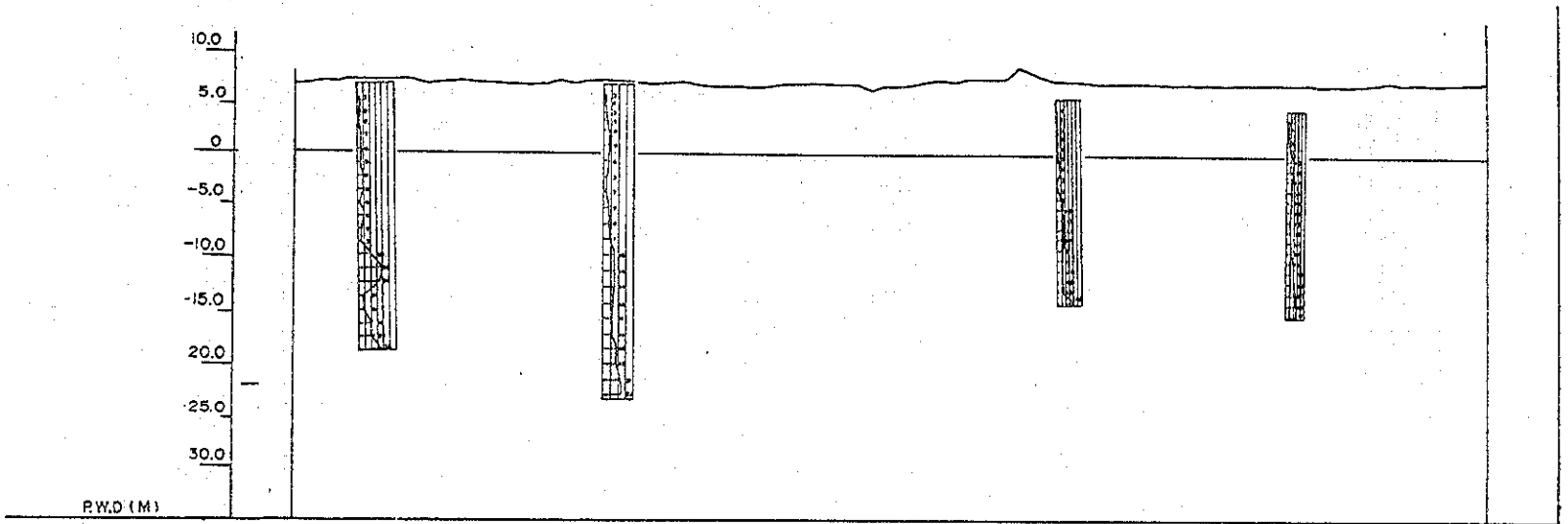
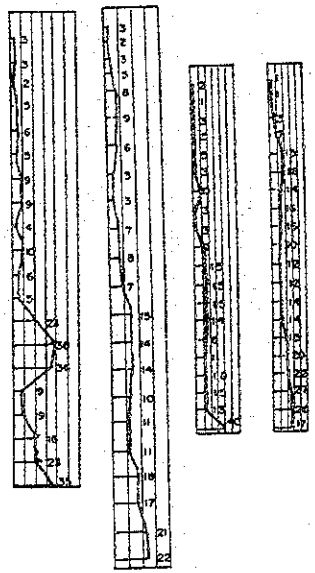


FIG. ED 2.2 Geological Data along Flood Wall : DND (DS)

GREATER DHAKA PROTECTION PROJECT (STUDY IN DHAKA METROPOLITAN AREA) OF BANGLADESH FLOOD ACTION PLAN NO.8A IN THE PEOPLE'S REPUBLIC OF BANGLADESH

JICA





DESIGNED	GRADIENT											I = 1/10,420																I = 1/13,540			
	TOP OF FLOOD WALL	7.56										7.80	7.81		7.839		7.868										7.986				8.05
	H.W.L	6.96										7.20																			7.45
EXISTING	TOP OF FLOOD WALL	-	8.17		8.17		8.00		7.93		8.15		8.28		8.07		7.69		8.64		8.08		7.97		8.12		7.93		8.37		8.46
	GROUND ELEVATION	6.82	7.46		7.03		7.14		7.42		7.42		7.05		7.33		7.36		7.67		7.26		6.89		7.20		6.89		7.07		7.33
DISTANCE (M)		0.0	300.0		400.0		400.0		400.0		400.0		400.0		200.0		200.0		400.0		400.0		400.0		400.0		400.0		400.0		400.0
ACCUMULATED DISTANCE (M)		0.0	300.0		700.0		1100.0		1500.0		1900.0		2300.0		2500.0		2700.0		3100.0		3500.0		3900.0		4300.0		4700.0		5100.0		5500.0		5900.0
STATION NO.		DW. 0	DW. 1		DW. 2		DW. 3		DW. 4		DW. 5		DW. 6		DW. 7		DW. 8		DW. 9		DW. 10		DW. 11		DW. 12		DW. 13		DW. 14		DW. 15

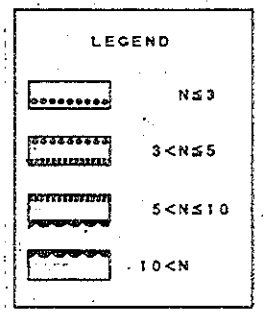
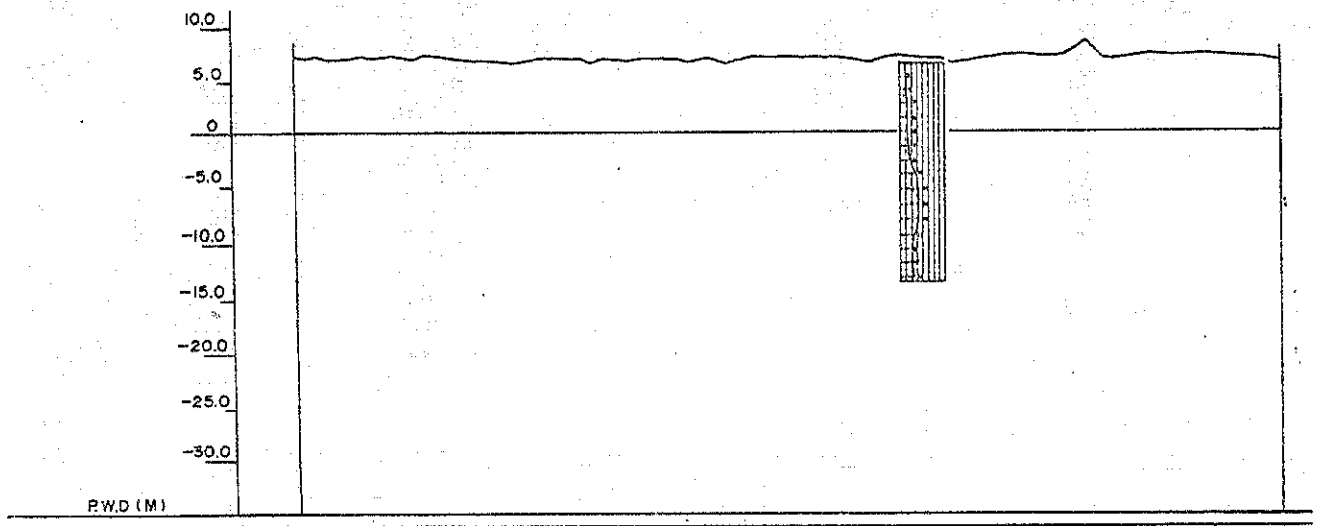
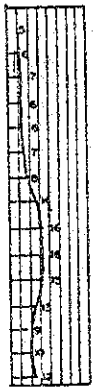


FIG. ED 2.3(1) Geological Data along Flood Wall : DND (DW)

GREATER DHAKA PROTECTION PROJECT (STUDY IN DHAKA METROPOLITAN AREA) OF BANGLADESH FLOOD ACTION PLAN NO.8A IN THE PEOPLE'S REPUBLIC OF BANGLADESH





DESIGNED	GRADIENT	1 in 13,540													
	TOP OF FLOOD WALL	8.05					8.198	8.227	8.256	8.286	8.355	8.345	8.37	8.40	
	H.W.L	7.45												7.60	
EXISTING	TOP OF FLOOD WALL	8.46	8.24	8.28	8.40	8.22	8.26	8.20	8.22	8.44	8.27	8.10	8.31		
	GROUND ELEVATION	7.35	7.26	6.93	7.08	6.81	6.85	7.11	6.89	6.93	7.24	8.10	7.26	6.84	
DISTANCE (M)		400.0	400.0	400.0	400.0	400.0	400.0	400.0	450.0	350.0	400.0	717		325.0	
ACCUMULATED DISTANCE (M)		5900.0	6300.0	6700.0	7100.0	7500.0	7900.0	8300.0	8750.0	9150.0	9500.0	9900.0	10300.0	10625.0	
STATION NO.		DW. 15	DW. 16	DW. 17	DW. 18	DW. 19	DW. 20	DW. 21	DW. 22	DW. 23	DW. 24	DW. 25	DW. 26	DW. 27	

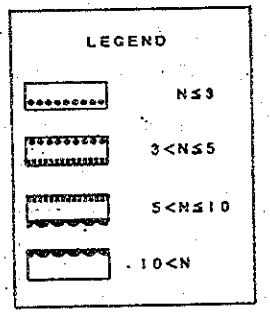


FIG. ED 2.3(2) Geological Data along Flood Wall : DND (DW)

GREATER DHAKA PROTECTION PROJECT (STUDY IN DHAKA METROPOLITAN AREA) OF BANGLADESH FLOOD ACTION PLAN NO.8A IN THE PEOPLE'S REPUBLIC OF BANGLADESH

JICA

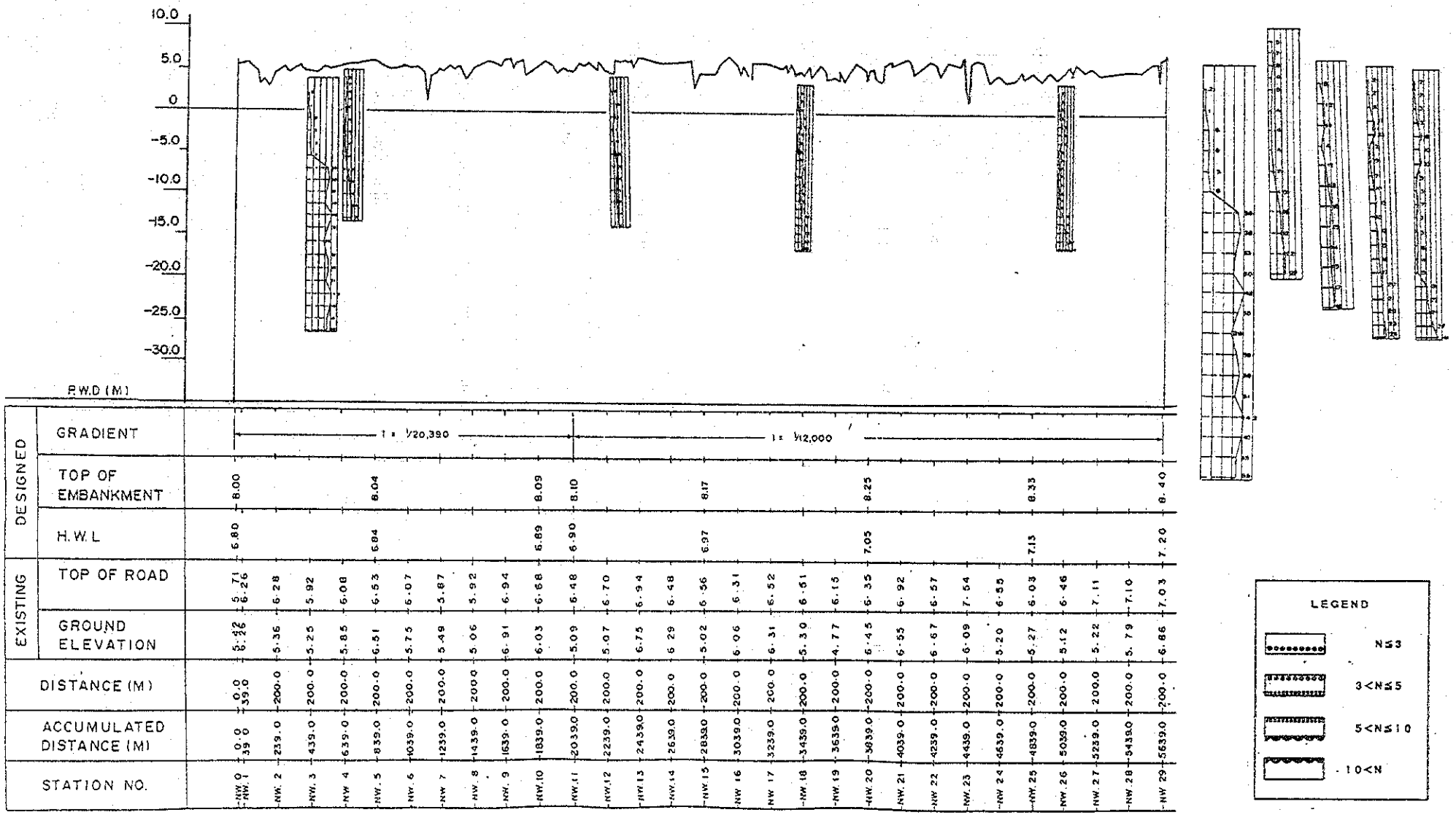


FIG. ED 2.4 Geological Data along Flood Wall : N. WEST (NW)

GREATER DHAKA PROTECTION PROJECT (STUDY IN DHAKA METROPOLITAN AREA) OF BANGLADESH FLOOD ACTION PLAN NO.8A IN THE PEOPLE'S REPUBLIC OF BANGLADESH

Data ED 3 : Cost Estimate of Alternative of Begunbali Khal

1 .Cost Estimate of Alternative A.and B

1.1 Alternative A:Lock Gate

1).Construction Cost

A.Dimensions :See Fig E.D1 and E.D.2

B.Construction Cost

Items	Unit	Unit Cost	Quantity	Cost(10^6)	Remarks
1.Temporary Work	L.S		1	83.39	
2.Const.Works					
1) Concrete Work	m3	4,800	18620	89.38	
2) Foundation Pile	m	3,300	6820	22.51	
3).S.Sheet Pile	m2	7,750	6485	50.26	
4).Steel Gate	m2	660,000	406	267.96	
5).Operation Bridge	m2	65,400	88	5.76	
6). Miscellaneous	L.S		1	43.59	
Sub Total				479.44	
3. Pump Equipment	L.S		2.55	76.5	
Total (1+2+3)				639.33	

Note:
Pump Capacity : Based on the following assumption
1).Size of Lock Yard:20mx100m
2).Operation Time :12 times Per Day (Entrance)
3).Maximum Wsater Head:4.6m (7.6m H.W.L-3.0m W.L)
4). Inflow Water Volume :110400 m3 (4.6x20mx100mx12)

Qp=110400/(12x60x60)=2.55 m3/sec

Cost :2.55m3/S x30 million Tk =76.5 Million TK

2). O/M Cost
Assumed at 9.6 Million TK /year (1.5% of the Construction Cost

1.2 Alternative B :Road Construction

1).Construction Cost

A. Dimension:
1.Crest Width:7.0m
2. Bank Slope:1V:3 H
3.Berm :3m (Both Sides)
4.Road Distance:6.31 km

B.Construction Cost

Items	Unit	Unit Cost	Quantity	Cost(10^6)	Remarks
1.Preparatry Work				74.87	
2. Const.Work					
1).Road Pavement	m2	1580	44,170	69.79	
2). Banking	m3	510	369,171	188.28	H=4m
3).Sodding	m2	60	195,610	11.74	
4).Foundation	m2	1130	162,800	183.96	L=4400 m
5).Miscellaneous	L.S		1	45.38	
Sub Total				499.14	
3. Land Acquisition	m2	280	233,470	65.37	
Total				639.39	

2).O/M Cost
Assumed at3.2 Million TK/Year (0.5% of the construction Cost)

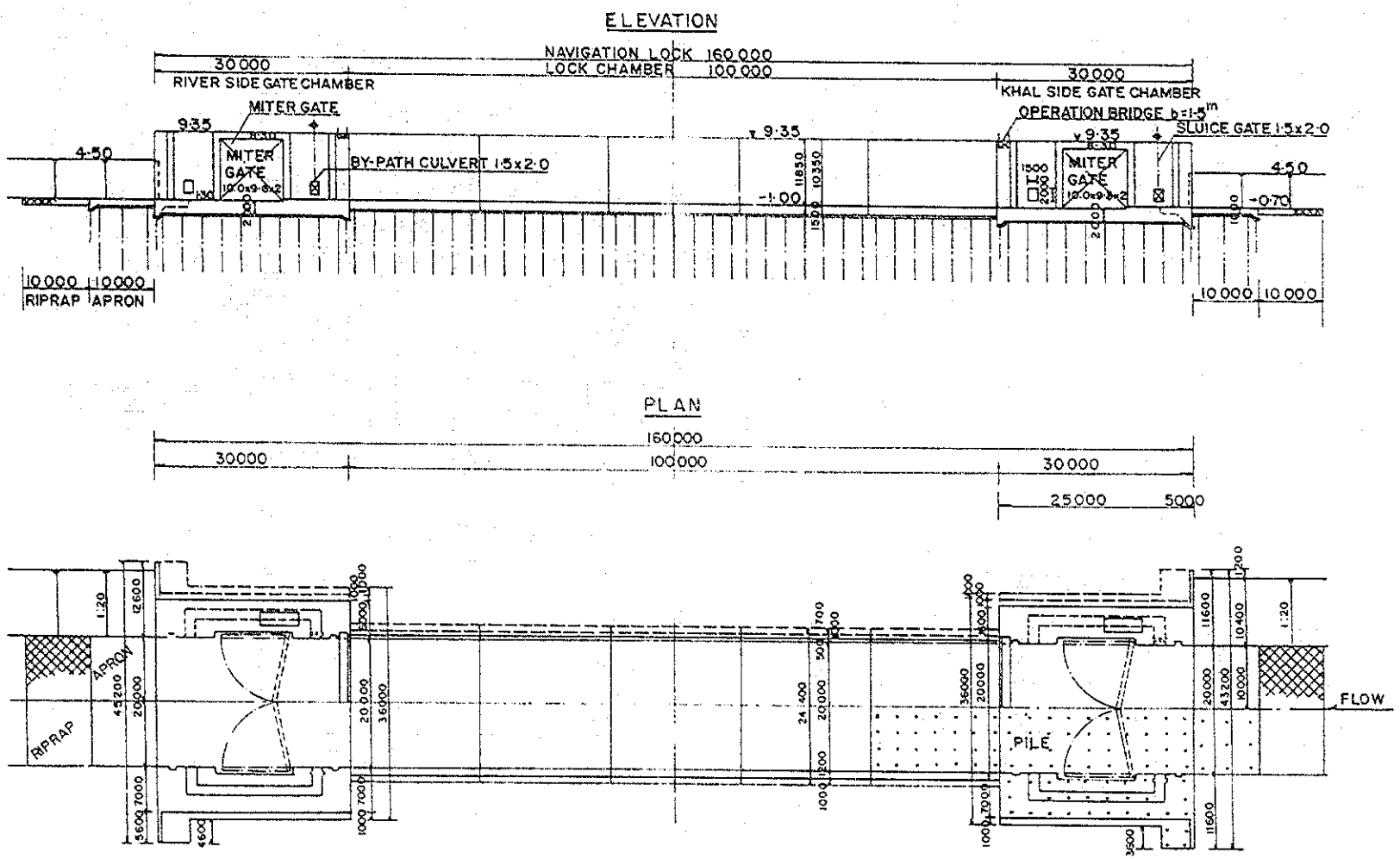
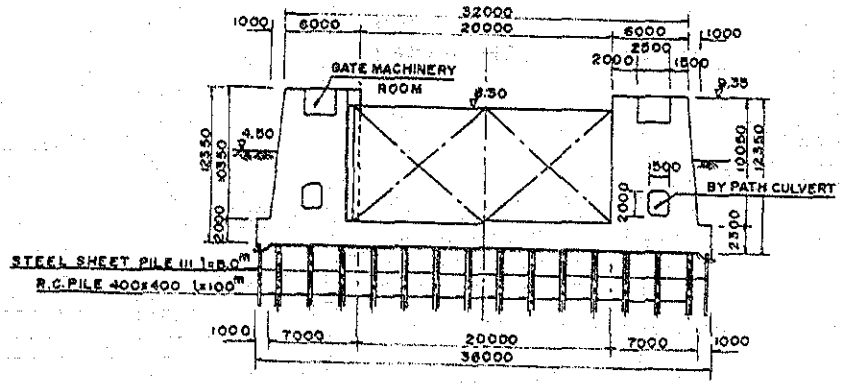


FIG. HD 3(1)	Elevation and Plan of Lock Gate - Alternative

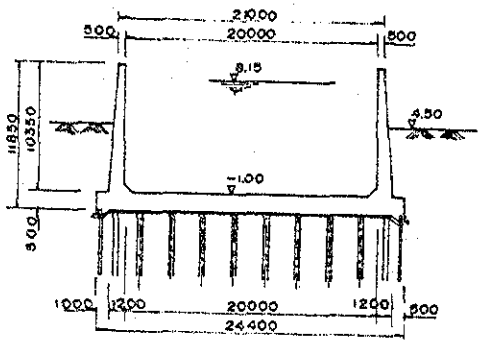
GREATER DHAKA PROTECTION PROJECT (STUDY IN DHAKA METROPOLITAN AREA) OF BANGLADESH FLOOD ACTION PLAN NO.8A IN THE PEOPLE'S REPUBLIC OF BANGLADESH

JICA

GATE CHAMBER



CROSS SECTION OF LOCK CHAMBER



DIMENSION OF KHAL
Scale:- 1:150

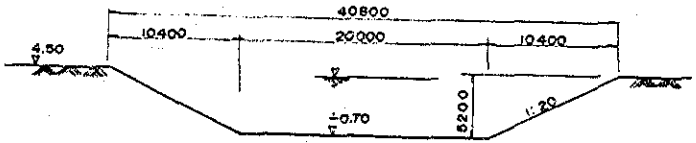


FIG. HD 3(2) Cross Sections of Lock Gate - Alternative

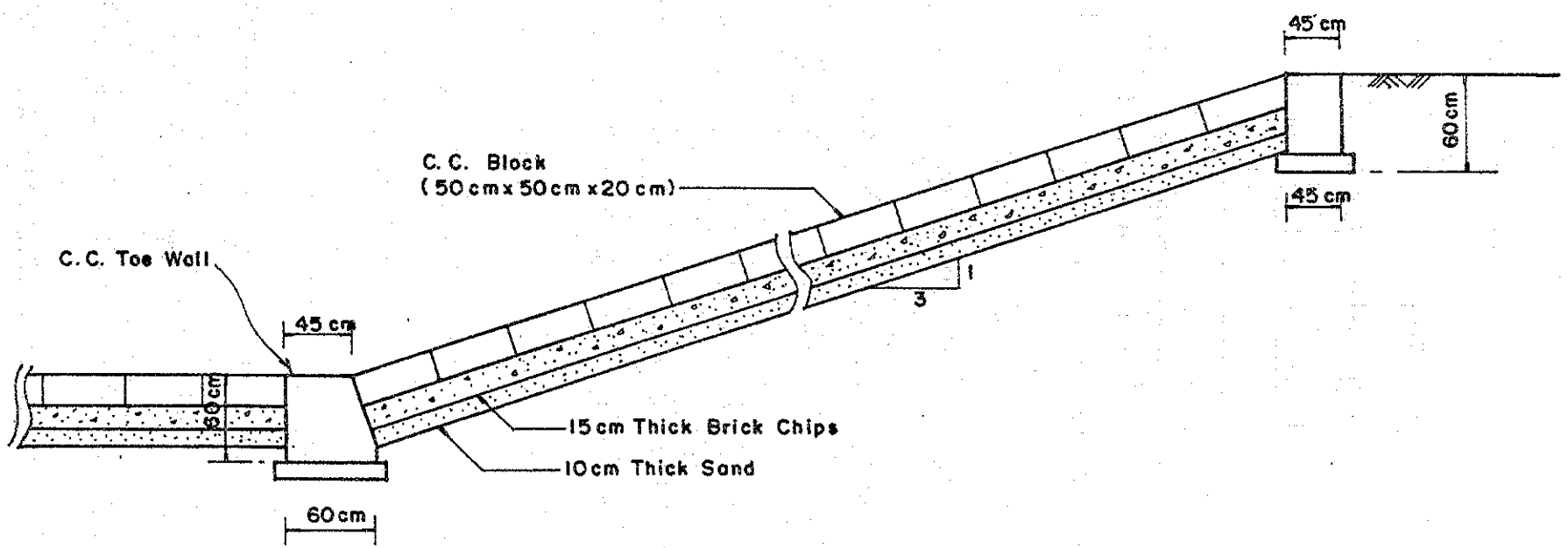
GREATER DHAKA PROTECTION PROJECT (STUDY IN DHAKA METROPOLITAN AREA) OF BANGLADESH FLOOD ACTION PLAN NO.8A IN THE PEOPLE'S REPUBLIC OF BANGLADESH

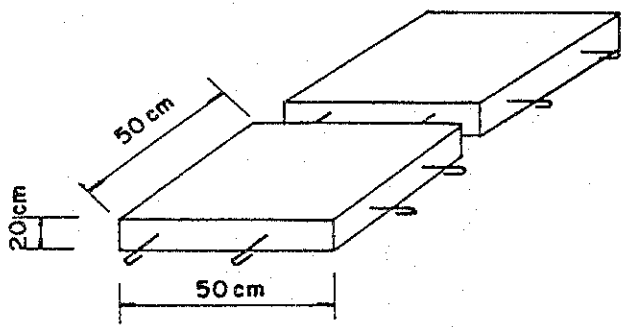
ED-15

JICA

Data ED 4 : Detailed Cross Sections of Revetment and Brick Soiling

C. C. Crest Wall



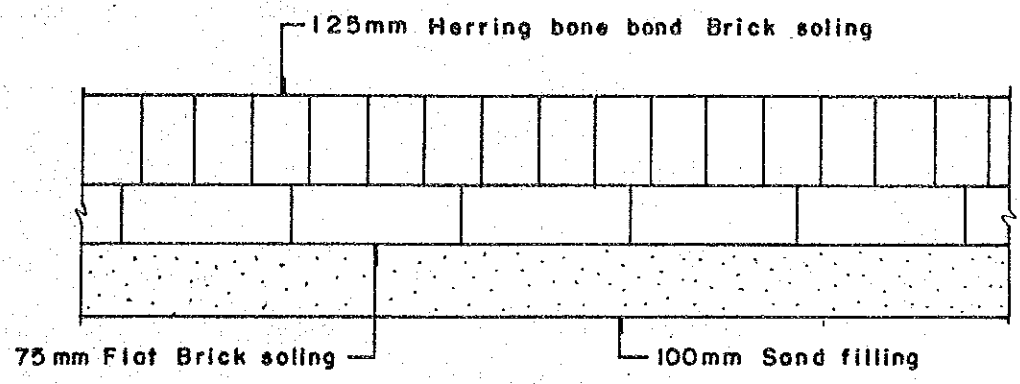


C. C. Block with steel anchorage

FIG. ED 4(1)	Details of Revetment

GREATER DHAKA PROTECTION PROJECT (STUDY IN DHAKA METROPOLITAN AREA) OF BANGLADESH FLOOD ACTION PLAN NO.8A IN THE PEOPLE'S REPUBLIC OF BANGLADESH

JICA



SECTION A—A

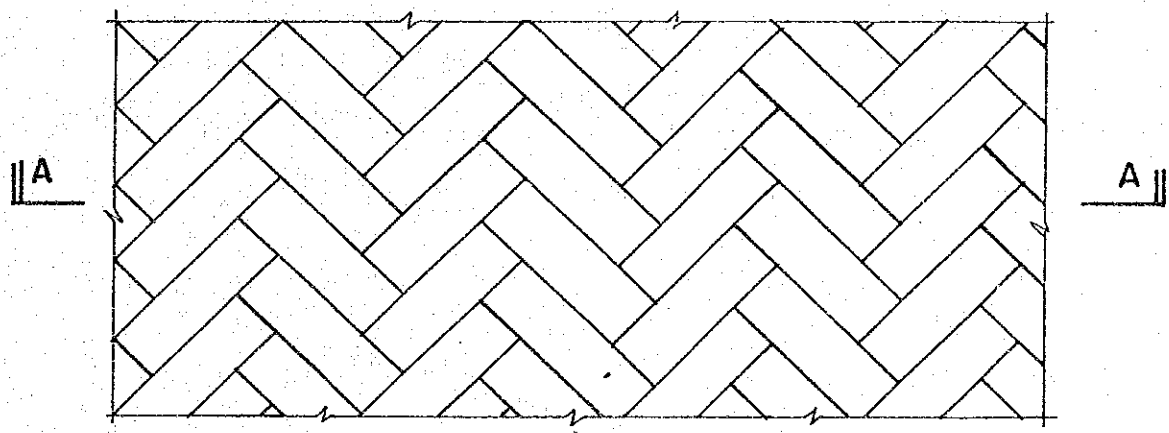


FIG. ED 4(2) | Details of Brick Solling

GREATER DHAKA PROTECTION PROJECT (STUDY IN DHAKA METROLOLITAN AREA) OF BANGLADESH FLOOD ACTION PLAN NO.8A IN THE PEOPLE'S REPUBLIC OF BANGLADESH

JICA

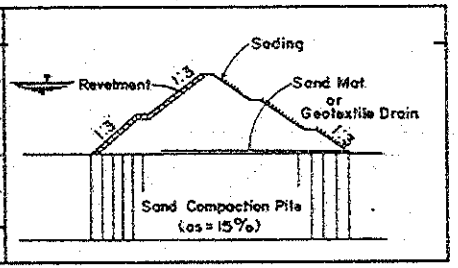
- Data for Supporting Report F -

Data FD 1 : Selection of Embankment Type

1.Comparison of Construction Cost of Embankment Alternatives

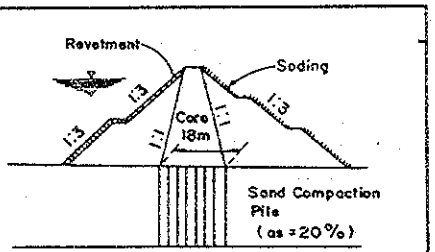
Alternative 1 :Homogeneous Embankment with Sand Compaction Unit :TK/m

Work Items	Unit	Quantity		Unit Cost	Cost	Remarks
1.Banking	m3	200		510	102,000	H=7m
2.S.C.P (As=15%)	m2	54	*	5,650	305,100	*=1130x(15%/3%)
3.Revetment	m2	25		1,635	40,875	
4.Sodding	m2	27		60	1,620	
5.Land Acquisition	m2	84		280	23,520	
Total					473,115	



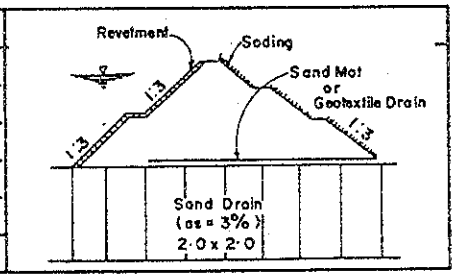
Alternative 1 :Homogeneous Embankment with Sand Compaction

Work Items	Unit	Quantity		Unit Cost	Cost	Remarks
1.Banking	m3	123		510	62,730	
2.Core	m3	77	* *	765	58,905	**=510x1.5
3.S.C.P (As=20%)	m2	18	*	7,530	135,540	*=1130x(20%/3%)
4.Revetment	m2	25		1,635	40,875	
5.Sodding	m2	27		60	1,620	
6.Land Acquisition	m2	84		280	23,520	
Total					323,190	



Alternative 1 :Homogeneous Embankment with Sand Compaction

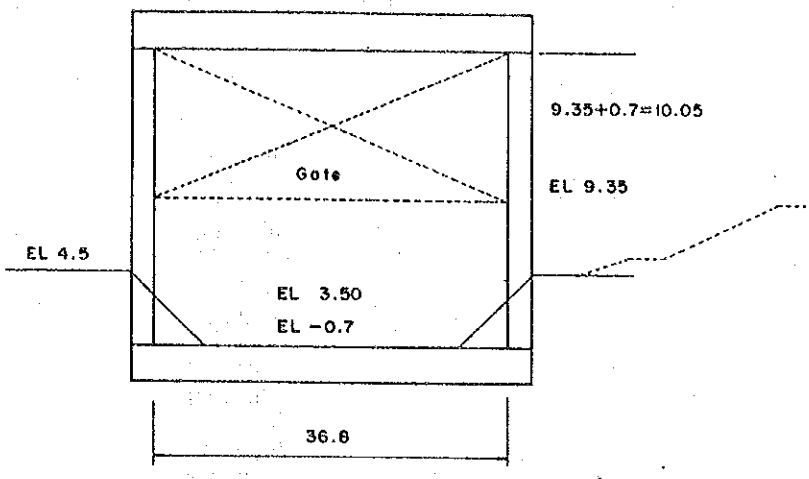
Work Items	Unit	Quantity		Unit Cost	Cost	Remarks
1.Banking	m3	200		510	102,000	
2.S.D (As=3%)	m2	54		1,130	61,020	
3.Revetment	m2	25		1,635	40,875	
4.Sodding	m2	27		60	1,620	
5.Land Acquisition	m2	84		280	23,520	
Total					229,035	



Data FD 2 : Selection of Sluice Gate Type

1 .Coat Estimsate of Sluice Gate (Gate at Begunbari Khal)

A. Open Type
1).Dimensions



2). Cost Estimate

Unit :Million TK

Items	Dimensions	Unit	Quantity	Unit Cost	Cost (x10^6)	Remarks
1.Pier	2.5x20x10.05x2+1.5x6x10.05x2	m3	1,186	12,000	14.23	
2.Bottom Slub	41.8x20x2	m3	1,672	12,000	20.06	
3.Side Wall	40x10.05x1x2	m3	804	12,000	9.65	
4.Bed Protection	10x20x1x2	m3	400	7,200	2.88	
5.R.C Pile	41.8x20/4/4x10	m	523	3,300	1.73	
6. S.Sheet Pile	38.8x10	m2	388	6,200	2.41	
7. Gate Leaf	36.8x10.05	m2	370	660,000	244.20	
8. Operation Bridge	41.8x6	m2	251	65,400	16.42	
9. Miscellaneous		L.S	1		16	
Total					327.15	

B. Box Culvert Type (Ref.Gate No.18B :Supporting Report H)

1).Dimensions of Box Culvert
Width(B) :3.0m
Height (H) :3.0m
Length (L) :43.5 m
Lane :6

2) Cost Estimate :79.80 Millon (See Report H)

C. Result
Open Type :327.15 Million TK > Box Culvert Type :79.80 Million TK

Data FD 3 : Stability Analysis of Embankment

Case 1 :

1) Equation

F = [C·L+(W·cos{-U·L-K·W·sin{)·tan}]/[W·sin{+K·W·cos}]

2) Coordination

NO.	X (m)	Y (m)
1	0.000	2.000
2	47.000	2.000
3	59.000	6.000
4	62.000	6.000
5	74.000	10.000
6	78.000	10.000
7	85.000	6.500
8	90.000	6.500
9	103.000	2.000
10	153.000	2.000
11	0.000	-20.000
12	153.000	-20.000

3) Soil Characteristics

NO.	I	J	@(t/m3)	}(deg)	C(t/m2)	Alp	LST
1	11	12	1.85	0.00	3.500	0.00	1
2	1	10	1.75	0.00	3.500	0.00	0

4) Ground Water (Assumed for Safety Side)

: NO.	X (m)	Y (m)
1	0.000	-20.000
2	153.000	-20.000

5) Calculation

: NO.	Xl(m)	Yl(m)	Xr(m)	Yr(m)
1	0.000	6.000	153.000	6.000
2	0.000	4.000	153.000	4.000
3	0.000	2.000	153.000	2.000
4	0.000	0.000	153.000	0.000
5	0.000	-2.000	153.000	-2.000
6	0.000	-4.000	153.000	-4.000
7	0.000	-6.000	153.000	-6.000
8	0.000	-8.000	153.000	-8.000
9	0.000	-10.000	153.000	-10.000
10	0.000	-12.000	153.000	-12.000

6) Out Put

MRc = 202.93 MRw = 0.00
MSw = 123.46 MSk = 0.00

Ix	Iy	No	X(m)	Y(m)	R(m)	Sr(t)	Ss(t)	F
2	2	0	57.50	15.00	25.00	202.93	123.46	1.64

Case 2 :

1) Equation

F = [C·L+(W·cos{-U·L-K·W·sin{)·tan}]/[W·sin{+K·W·cos}]

2) Coordination

NO.	X (m)	Y (m)
1	0.000	2.000
2	47.000	2.000
3	59.000	6.000
4	62.000	6.000
5	74.000	10.000
6	78.000	10.000
7	85.000	6.500
8	90.000	6.500
9	103.000	2.000
10	153.000	2.000
11	0.000	-20.000
12	153.000	-20.000

3) Soil Characteristics

NO.	I	J	@(t/m3)	}(deg)	C(t/m2)	Alp	LST
1	11	12	1.85	0.00	3.500	0.00	1
2	1	10	1.75	0.00	3.500	0.00	0

4) Ground Water (Assumed for Safety Side)

: NO.	X (m)	Y (m)
1	0.000	-20.000
2	153.000	-20.000

5) Calculation

: NO.	Xl(m)	Yl(m)	Xr(m)	Yr(m)
1	0.000	2.000	153.000	2.000
2	0.000	3.000	153.000	3.000
3	0.000	4.000	153.000	4.000
4	0.000	5.000	153.000	5.000
5	0.000	6.000	153.000	6.000
6	0.000	7.000	153.000	7.000
7	0.000	8.000	153.000	8.000
8	0.000	9.000	153.000	9.000

6) Out Put

MRc = 100.13 MRw = 0.00
MSw = 35.42 MSk = 0.00

Ix	Iy	No	X(m)	Y(m)	R(m)	Sr(t)	Ss(t)	F
2	2	0	62.50	25.00	23.00	100.13	35.42	2.83

Case 3 :

1) Equation

F = [C·L+(W·cos{-U·L-K·W·sin{)·tan}]/[W·sin{+K·W·cos}]

2) Coordination

NO.	X (m)	Y (m)
1	0.000	0.000
2	47.000	0.000
3	51.000	2.000
4	63.000	6.000
5	66.000	6.000
6	78.000	10.000
7	82.000	10.000
8	89.000	6.500
9	94.000	6.500
10	107.000	2.000
11	111.000	0.000
12	161.000	0.000
13	0.000	-20.000
14	161.000	-20.000

3) Soil Characteristics

NO.	I	J	@(t/m3)	}(deg)	C(t/m2)	Alp	LST
1	13	14	1.85	0.00	3.500	0.00	1
2	3	10	1.75	0.00	3.500	0.00	0

4) Ground Water (Assumed for Safety Side)

: NO.	X (m)	Y (m)
1	0.000	2.000
2	161.000	2.000

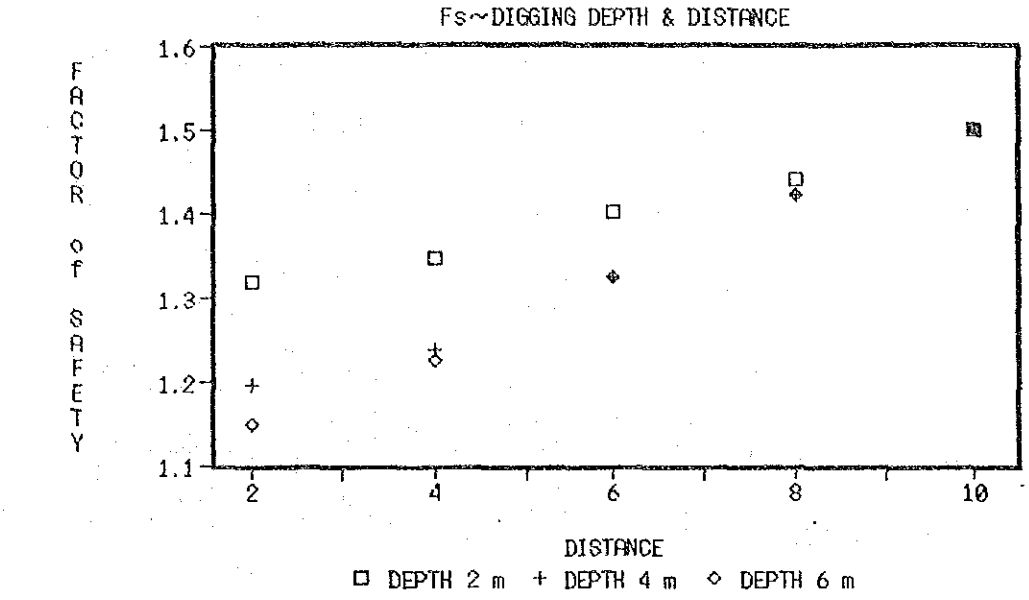
5) Calculation

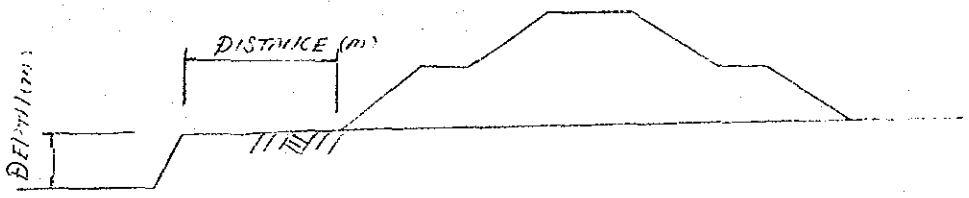
: NO.	Xl(m)	Yl(m)	Xr(m)	Yr(m)
1	0.000	0.500	161.000	0.500
2	0.000	0.000	161.000	0.000
3	0.000	-0.500	161.000	-0.500
4	0.000	-1.000	161.000	-1.000
5	0.000	-1.500	161.000	-1.500
6	0.000	-2.000	161.000	-2.000
7	0.000	-2.500	161.000	-2.500
8	0.000	-3.000	161.000	-3.000
9	0.000	-3.500	161.000	-3.500

6) Out Put

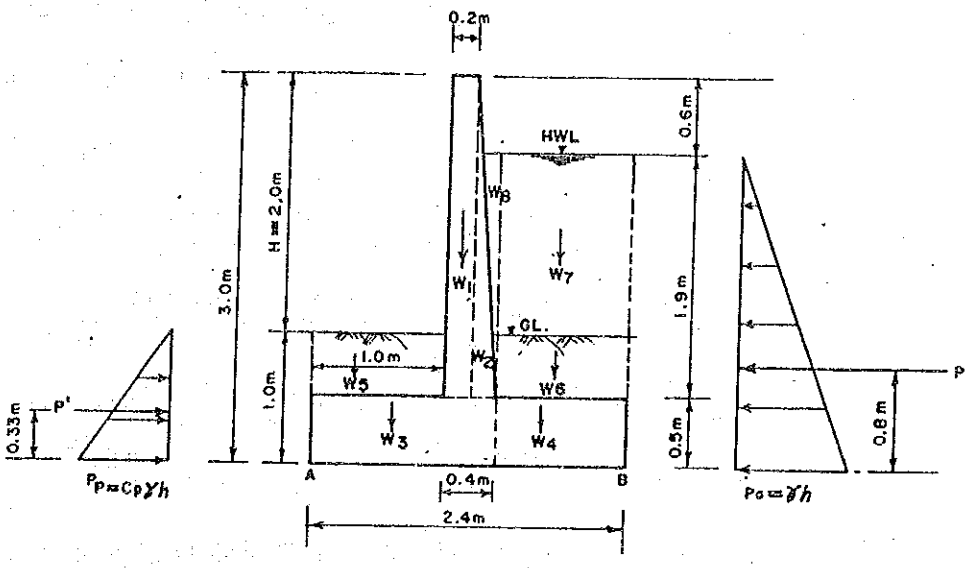
MRc = 153.76 MRw = 0.00
MSw = 95.24 MSk = 0.00

Ix	Iy	No	X(m)	Y(m)	R(m)	Sr(t)	Ss(t)	F
2	2	0	60.00	25.00	29.00	153.76	95.24	1.61


Fs~DIGGING DEPTH & DISTANCE
FACTOR of SAFETY
1.6
1.5
1.4
1.3
1.2
1.1
2
4
6
8
10
DISTANCE
□ DEPTH 2 m + DEPTH 4 m ◇ DEPTH 6 m


DISTANCE (m)
DEPTH (m)

Data FD 4 : Stability Analysis of Flood Wall



F. WALL (T-TYPE)

Weight Component	Weight in Ton	Moment arm m	Moment in m - t
$W_1 = 0'2m \times 2.5m \times 2.4T/m^3$	1.2^T	1.10m	1.32^{m-T}
$W_2 = 0.2m \times 2.5m \times \frac{1}{2} \times 2.4T/m^3$	0.6^T	1.26m	0.756^{m-T}
$W_3 = 1.4m \times 0.5m \times 2.4T/m^3$	1.68^T	0.70m	1.176^{m-T}
$W_4 = 1.0m \times 0.5m \times 1.4T/m^3$	0.70^T	1.90m	1.33^{m-T}
$W_5 = 1.0m \times 0.5m \times 1.9T/m^3$	0.95^T	0.50m	0.475^{m-T}
$W_6 = 1.0m \times 0.5m \times 0.9T/m^3$	0.45^T	1.90m	0.855^{m-T}
$W_7 = 1.0m \times 1.9m \times 1.0T/m^3$	1.9^T	1.90m	3.610^{m-T}
$W_8 = 0.2m \times 1.9m \times \frac{1}{2} \times 1.0T/m^3$	0.19^T	1.33m	$0.253M^{m-T}$
	$W = 7.67^T$		$M2 = 9.775^{m-T}$

Sliding Force $= \frac{1}{2}\gamma h^2 = \frac{1}{2} \times 1.0^{T/m3} \times (2.4m)^2 \times 1.0m = 2.88^T$

Resisting Force Agains Sliding

Passive Pressure :

$P_P = Cp\gamma h$

Resisting Force $= F = \frac{1}{2} Cp\gamma h^2 = \frac{1}{2} \times 3 \times 1.90 \times 1^2 = 2.85^T$

Frictionat Force = Fr = W tan $\phi = 7.67 \times 0.60 = 4.60^T$

$= 7.45^T$

Fs. Against Sliding $= \frac{7.45}{2.88} = 2.58 > 1.5$ OK

Overturning Moment, $M_1 = (\frac{1}{2}\gamma h^2) \times \frac{h}{3} = \frac{1}{6}\gamma h^3 = \frac{1}{6} \times 1.9 \times (2.4)^3 = 4.378^{m-T}$

Resisting Moment, $M_2 = 9.775^{m-T}$

Fs. Against overturning $= \frac{M2}{M1} = \frac{9.775}{4.378} = 2.23 > 2$ OK

Soil Reaction :

$a = \frac{M_2 - M_1}{W} = \frac{9.775 - 4.378}{7.67} = 0.7m$

$d = \frac{L}{2} - a = (\frac{2.4}{2}) - 0.7 = 0.5 > (\frac{L}{6} = \frac{2.4}{6} = 0.4)$

$\therefore P_{max} = \frac{2W}{3\ ab} = \frac{2 \times 7.67}{3 \times 0.7} = 7.3^T/m^2$

- Data for Supporting Report H -

Data HD 1 : Rainfall Data for Construction Planning

Table HD 1 Rainfall Data For construction Planning

		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1980	0 mm	30	24	24	20	8	8	3	8	9	19	30	31
	<5 mm	1	1	4	6	9	11	8	10	10	4	-	-
	5-9	-	-	1	1	1	3	8	3	2	-	-	-
	10-20	-	2	1	1	3	4	7	5	2	4	-	-
	>20	-	-	1	2	10	4	5	5	7	4	-	-
1981	0 mm	28	22	23	17	11	10	8	12	13	28	29	28
	<5 mm	2	2	1	4	6	8	7	7	7	-	-	1
	5-9	1	3	1	-	1	4	6	2	4	1	1	1
	10-20	-	1	5	3	3	4	4	10	1	1	-	-
	>20	-	-	1	6	10	4	6	-	5	1	-	1
1982	0 mm	31	24	27	17	20	10	18	11	14	27	26	31
	<5 mm	-	2	-	3	3	8	3	7	4	1	2	-
	5-9	-	2	1	5	4	2	4	2	2	-	-	-
	10-20	-	-	-	5	1	2	4	1	5	-	1	-
	>20	-	-	3	-	3	8	2	10	5	3	1	-
1983	0 mm	31	24	25	22	15	13	16	11	12	20	30	31
	<5 mm	-	1	3	-	6	6	8	9	4	3	-	-
	5-9	-	2	-	1	-	3	2	3	4	2	-	-
	10-20	-	1	-	3	2	3	1	3	6	3	-	-
	>20	-	1	3	4	8	5	4	5	4	3	-	-
1984	0 mm	28	28	30	23	11	5	2	4	13	22	30	31
	<5 mm	1	1	1	2	3	5	7	11	6	5	-	-
	5-9	2	-	-	2	1	6	2	5	1	2	-	-
	10-20	-	-	-	1	4	5	6	6	3	2	-	-
	>20	-	-	-	2	12	9	14	5	7	-	-	-
1985	0 mm	28	28	25	19	15	6	7	8	10	27	30	30
	<5 mm	3	1	-	2	2	7	10	10	6	1	-	-
	5-9	-	-	2	3	2	3	4	2	6	2	-	-
	10-20	-	-	-	2	4	10	5	6	4	-	-	1
	>20	-	-	4	4	8	4	5	5	4	1	-	-

		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1986	0 mm	29	29	28	16	18	14	10	8	9	20	27	30
	<5 mm	2	-	1	6	2	5	6	10	8	4	-	1
	5-9	-	-	1	1	3	2	4	6	1	1	1	-
	10-20	-	-	1	2	5	5	4	5	3	1	-	-
	>20	-	-	-	5	3	4	7	2	9	5	2	-
1987	0 mm	29	28	27	19	22	15	2	11	12	25	29	29
	<5 mm	2	-	2	2	4	4	7	8	4	3	-	1
	5-9	-	-	-	2	1	3	7	5	6	-	1	-
	10-20	-	-	2	4	3	4	6	1	2	1	-	-
	>20	-	-	-	3	1	4	9	6	6	2	-	1
1988	0 mm	31	25	26	21	11	7	6	12	14	21	27	29
	<5 mm	-	1	1	3	8	4	11	12	5	4	1	2
	5-9	-	2	1	-	3	5	4	2	2	3	-	-
	10-20	-	-	2	1	-	4	6	2	7	1	1	-
	>20	-	1	1	5	9	10	4	3	2	2	1	-
1989	0 mm	31	25	31	26	16	14	9	18	8	22	30	30
	<5 mm	-	1	-	-	5	6	8	8	9	2	-	-
	5-9	-	1	-	1	2	1	6	4	3	2	-	-
	10-20	-	-	-	2	2	2	1	-	5	1	-	1
	>20	-	1	-	1	6	7	7	1	5	4	-	-

Data HD 2 : Water Level Data (Mean Water)

Table HD 2 :Water Level Data

STATION - NARAYANGANJ

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1980	1.55	1.55	1.67	1.78	2.40	3.56	3.90	4.43	4.49	4.02	2.44	1.93
1981	1.55	1.26	1.52	1.93	3.01	3.84	4.56	5.58	5.20	4.12	2.49	2.12
1982	1.42	1.53	1.57	2.33	2.39	3.47	4.53	4.95	4.84	3.42	2.24	1.85
1983	1.31	1.51	1.87	2.09	2.59	3.58	4.58	4.93	4.74	3.28	2.01	2.00
1984	1.79	1.44	1.89	2.21	3.13	4.25	4.97	5.11	5.26	4.16	2.33	1.78
1985	1.58	1.61	1.97	2.15	2.70	3.74	4.71	4.92	4.66	4.10	2.85	2.04
1986	1.48	1.38	1.72	2.18	2.60	2.96	4.28	4.68	4.61	4.07	3.09	2.34
1987	1.89	1.84	1.92	2.39	2.15	2.94	4.44	5.55	5.34	4.07	2.54	1.92
1988	1.43	1.56	1.68	2.10	3.09	4.01	4.82	5.52	5.45	3.85	2.70	1.98
1989	1.39	1.47	1.38	1.72	2.52	3.56	4.36	4.57	4.42	3.86	2.52	1.69

STATION - TONGI

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1980	1.31	1.16	1.37	1.81	2.81	3.78	4.65	5.91	5.66	4.26	2.68	1.78
1981	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1982	0.00	0.00	0.00	1.84	2.34	3.20	4.63	5.23	4.87	3.59	2.10	1.53
1983	1.13	1.15	1.52	1.86	2.69	3.30	4.58	5.19	5.53	5.01	3.08	1.90
1984	1.40	1.27	1.36	1.86	2.98	4.40	5.26	5.65	5.58	4.58	2.52	1.71
1985	1.34	1.26	1.59	1.95	2.43	3.81	4.84	5.18	5.00	4.37	2.83	1.89
1986	1.38	1.17	1.31	1.83	2.33	2.57	4.39	4.84	4.90	4.85	3.17	1.83
1987	1.36	1.23	1.27	1.80	2.23	3.12	4.85	6.35	5.98	4.77	2.77	1.95
1988	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1989	0.00	0.00	0.00	1.74	2.38	3.82	4.82	4.87	4.81	4.54	2.89	1.77

STATION - DEMRA

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1980	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1981	0.00	0.00	0.00	2.19	2.54	3.33	4.82	5.42	5.16	3.64	2.57	1.99
1982	1.57	1.51	1.48	2.13	2.50	3.40	4.69	5.05	4.88	3.40	2.21	1.86
1983	1.66	1.49	1.90	2.15	2.85	3.43	4.57	5.15	5.51	4.76	3.03	2.04
1984	1.74	1.49	1.67	2.16	3.02	4.36	5.20	5.45	5.48	4.43	2.53	1.93
1985	1.56	1.56	1.92	2.23	2.61	3.95	4.88	5.12	4.95	4.32	2.78	2.04
1986	1.64	1.50	1.61	2.06	2.48	2.69	4.39	4.75	4.82	4.57	3.01	1.94
1987	1.53	1.58	1.61	2.12	2.35	3.26	4.84	6.08	5.79	4.60	3.04	2.02

1988	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1989	0.00	0.00	0.00	2.01	2.68	3.81	4.81	4.86	4.80	4.38	2.70	1.86

STATION - HARIHARPARA

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1980	1.37	1.13	1.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1981	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1982	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1983	0.00	0.00	0.00	1.82	2.58	3.04	4.18	4.64	5.12	4.30	2.91	1.77
1984	1.53	1.32	1.44	1.83	2.72	3.95	4.82	5.03	5.12	3.93	2.24	1.73
1985	1.29	1.40	1.77	1.99	2.28	3.55	4.42	4.65	4.52	3.97	2.47	1.92
1986	1.34	1.30	1.39	1.82	2.23	2.50	4.01	4.42	4.39	4.06	2.76	1.79
1987	1.31	1.35	1.29	1.82	2.03	2.86	4.45	5.78	5.45	4.16	2.52	1.89
1988	1.50	1.42	1.52	1.91	2.56	3.72	4.73	5.13	6.04	3.84	2.47	1.86
1989	1.21	1.27	1.25	1.69	2.44	3.35	4.24	4.35	4.26	3.81	2.28	1.46

MEAN WATER LEVEL OF THE STATIONS

Name of Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Narayanganj	1.54	1.52	1.72	2.09	2.66	3.59	4.52	5.02	4.90	3.90	2.52	1.97
Tongi	1.32	1.21	1.40	1.84	2.52	3.50	4.75	5.40	5.29	4.50	2.76	1.80
Demra	1.62	1.52	1.70	2.13	2.63	3.53	4.78	5.24	5.17	4.26	2.73	1.96
Hariharpara	1.36	1.31	1.41	1.84	2.41	3.28	4.41	4.86	4.99	4.01	2.52	1.77

Data HD 3 : Hourly Operation Cost of Equipment

Table HD 3.1 :Hourly Operation Cost of Equipment

No: 1 Backhoe(1.2m3) 85 m3/hr

(Tk.)

Item	Spec.	Unit	Quantity	Unit Price	Cost	Remarks
1.Manpower						
a.Foreman		Man/day	0.12	225	27	
b.Oprater		"	0.6	270	162	
c.Assistant		"	0.21	150	32	
d.Labour		"			0	
Sub-Total					221	
2.Oil		l	26	14.5	377	200ps
Sub-Total					452	*1.2
3.Equipment	1.2m3	Hr	1	3520	3520	
					0	
Sub-Total					3520	
4.Miscellaneous		L.S	1		210	
					0	
5.Total					4403	
6.Unit Cost	per m3				52	52
7.L/C & F/C					6	46
			L/C(%)= 11		F/C(%)= 89	

No: 2 Backhoe(0.6m3) 25 m3/hr

(Tk.)

Item	Spec.	Unit	Quantity	Unit Price	Cost	Remarks
1.Manpower						
a.Foreman		Man/day	0.12	225	27	
b.Oprater		"	0.6	270	162	
c.Assistant		"	0.21	150	32	
d.Labour		"			0	
Sub-Total					221	
2.Oil		l	15	14.5	218	124ps
Sub-Total					261	*1.2
3.Equipment	0.6m3	Hr	1	1540	1540	
					0	
Sub-Total					1540	
4.Miscellaneous		L.S	1		101	
					0	
5.Total					2123	
6.Unit Cost	per m3				85	85
7.L/C & F/C					14	71
			L/C(%)= 16		F/C(%)= 84	

Table HD 3.2 :Hourly Operation Cost of Equipment

No:1 Clamshell(0.8m3) 25 m3/hr

(Tk.)

Item	Spec.	Unit	Quantity	Unit Price	Cost	Remarks
1.Manpower						
a.Foreman		Man/day	0.12	225	27	
b.Oprater		"	0.6	270	162	
c.Assistant		"	0.21	150	32	
d.Labour		"			0	
Sub-Total					221	
2.Oil		l	17	14.5	247	106 PS
Sub-Total					296	*1.2
3.Equipment	0.8m3	Hr	1	2930	2930	
					0	
Sub-Total					2930	
4.Miscellaneous		L.S	1		172	
					0	
5.Total					3619	
6.Unit Cost	per m3				145	
7.L/C & F/C					17	128
			L/C(%)= 12		F/C(%)= 88	

No:2 Dumptrack(11t) 20 m3/hr

(Tk.)

Item	Spec.	Unit	Quantity	Unit Price	Cost	Remarks
1.Manpower						
a.Foreman		Man/day	0	225	0	
b.Oprater		"	0.51	270	138	
c.Assistant		"	0	150	0	
d.Labour		"			0	
Sub-Total					138	
2.Oil		l	12	14.5	174	319 PS
Sub-Total					209	*1.2
3.Equipment	11t	Hr	1	1860	1860	
					0	
Sub-Total					1860	
4.Miscellaneous		L.S	1		110	
					0	
5.Total					2317	
6.Unit Cost	per m3				116	116
7.L/C & F/C					13	102
			L/C(%)= 12		F/C(%)= 88	

Table L HD 3.3 :Hourly Operation Cost of Equip

No: 1 Swamp Bulldozer(16t) 30 m3/hr

(Tk.)

Item	Spec.	Unit	Quantity	Unit Price	Cost	Remarks
1.Manpower						
a.Foreman		Man/day	0.12	225	27	
b.Oprater		"	0.60	270	162	
c.Assistant		"	0.21	150	32	
d.Labour		"			0	
Sub-Total					221	
2.Oil		l	19	14.5	276	153 PS
Sub-Total					331	*1.2
3.Equipment	16t	Hr	1	1740	1740	
					0	
Sub-Total					1740	
4.Miscellaneous		L.S	1		115	
					0	
5.Total					2406	
6.Unit Cost	per m3				80	80
7.L/C & F/C					12	68
			L/C(%)= 15		F/C(%)= 85	

No: 2 Bulldozer(21t) 60 m3/hr

(Tk.)

Item	Spec.	Unit	Quantity	Unit Price	Cost	Remarks
1.Manpower						
a.Foreman		Man/day	0.12	225	27	
b.Oprater		"	0.6	270	162	
c.Assistant		"	0.21	150	32	
d.Labour		"			0	
Sub-Total					221	
2.Oil		l	27	14.5	392	219 PS
Sub-Total					470	*1.2
3.Equipment	21t	Hr	1	2520	2520	
					0	
Sub-Total					2520	
4.Miscellaneous		L.S	1		161	
					0	
5.Total					3371	
6.Unit Cost	per m3				56	56
7.L/C & F/C					7	49
			L/C(%)= 13		F/C(%)= 87	

3

Table HD 3.4 :Hourly Operation Cost of Equipment

No:1 Sand Pile Driver (50kw) 60 m/hr

(Tk.)

Item	Spec.	Unit	Quantity	Unit Price	Cost	Remarks
1.Manpower						
a.Foreman		Man/day	0.12	225	27	
b.Oprater		"	0.60	270	162	
c.Assistant		"	0.21	150	32	
d.Labour		"			0	
Sub-Total					221	
2.Oil		l	6	14.5	87	105 PS
Sub-Total					104	*1.2
3.Equipment	50 KW	Hr	1	6640	6640	
					0	
Sub-Total					6640	
4.Miscellaneous		L.S	1		348	
					0	
5.Total					7313	
6.Unit Cost	per m				122	122
7.L/C & F/C					10	112
			L/C(%)= 8		F/C(%)= 92	

No:2 Air Compressor(10.5m3/min) 1 day

(Tk.)

Item	Spec.	Unit	Quantity	Unit Price	Cost	Remarks
1.Manpower						
a.Foreman		Man/day	1.0	225	225	
b.Oprater		"	1.0	270	270	
c.Assistant		"	1.0	150	150	
d.Labour		"			0	
Sub-Total					645	
2.Oil		l	93	14.5	1349	
Sub-Total					1618	*1.2
3.Equipment	10.5 m3/	day	1	2795	2795	
					0	
Sub-Total					2795	
4.Miscellaneous		L.S	1		253	
					0	
5.Total					5311	
6.Unit Cost	per day				5311	5311
7.L/C & F/C					1060	4251
			L/C(%)= 20		F/C(%)= 80	

3

Table HD 3.5 :Hourly Operation Cost of Equipment

No:1 Generator(200kva) 1 day

(Tk.)

Item	Spec.	Unit	Quantity	Unit Price	Cost	Remarks
1.Manpower						
a.Foreman		Man/day	1.0	225	225	
b.Oprater		"	1.0	270	270	
c.Assistant		"	1.0	150	150	
d.Labour		"			0	
Sub-Total					645	
2.Oil		l	225	14.5	3263	260 PS
Sub-Total					3915	*1.2
3.Equipment	200 KVA	Day	1	3185	3185	
					0	
Sub-Total					3185	
4.Miscellaneous		L.S	1		387	
					0	
5.Total					8132	
6.Unit Cost	per day				8132	
7.L/C & F/C					1424	6709
			L/C(%)= 18		F/C(%)= 82	

No: Concrete Plant 30 m3/hr

(Tk.)

Item	Spec.	Unit	Quantity	Unit Price	Cost	Remarks
1.Manpower						
a.Foreman		Man/day	0.12	225	27	
b.Oprater		"	0.60	270	162	
c.Assistant		"	0.21	150	32	
d.Labour		"			0	
Sub-Total					221	
2.Oil(KW)		l	65	2.5	163	
Sub-Total					195	*1.2
3.Equipment		Hr	1	3860	3860	
					0	
Sub-Total					3860	
4.Miscellaneous		L.S	1		214	
					0	
5.Total					4489	
6.Unit Cost	per m3				150	150
7.L/C & F/C					15	135
			L/C(%)= 10		F/C(%)= 90	

Table HD 3.6 :Hourly Operation Cost of Equipment

No: 1 Tracter Shovel (0.8m3) 33 m3/hr

(Tk.)

Item	Spec.	Unit	Quantity	Unit Price	Cost	Remarks
1.Manpower						
a.Foreman		Man/day	0.12	225	27	
b.Oprater		"	0.60	270	162	
c.Assistant		"	0.21	150	32	
d.Labour		"			0	
Sub-Total					221	
2.Oil		l	8	14.5	116	65 PS
Sub-Total					139	*1.2
3.Equipment	0.8 m3	Hr	1	1200	1200	
					0	
Sub-Total					1200	
4.Miscellaneous		L.S	1		78	
					0	
5.Total					1638	
6.Unit Cost	per m3				50	50
7.L/C & F/C					9	40
			L/C(%)=	19	F/C(%)= 81	

No: 2 Concrete Pump Car 45 m3/hr

(Tk.)

Item	Spec.	Unit	Quantity	Unit Price	Cost	Remarks
1.Manpower						
a.Foreman		Man/day	0.0	225	0	
b.Oprater		"	0.51	270	138	0.17
c.Assistant		"	0.0	150	0	
d.Labour		"			0	
Sub-Total					138	
2.Oil		l	8	14.5	116	133 PS
Sub-Total					139	*1.2
3.Equipment	45 m3	Hr	1	1590	1590	
					0	
Sub-Total					1590	
4.Miscellaneous		L.S	1		93	
					0	
5.Total					1960	
6.Unit Cost	per m3				44	44
7.L/C & F/C					5	38
			L/C(%)=	12	F/C(%)= 88	

3

Table HD 3.7 :Hourly Unit Cost of Equipment

No:1 Diesel Pile Hammer(2.5t) 1 hr

(Tk.)

Item	Spec.	Unit	Quantity	Unit Price	Cost	Remarks
1.Manpower						
a.Foreman		Man/day	0.12	225	27	
b.Oprater		"	0.60	270	162	
c.Assistant		"	0.21	150	32	
d.Labour		"			0	
Sub-Total					221	
2.Oil		l	0	14.5	0	102 PS
Sub-Total					0	*1.2
3.Equipment	Hammer only	Hr	1	890	890	
					0	
Sub-Total					890	
4.Miscellaneous		L.S	1		56	
					0	
5.Total					1166	
6.Unit Cost	per Hr				1166	
7.L/C & F/C					276	890
			L/C(%)= 24		F/C(%)= 76	

No: 2 Vibration Hammer(45kw) 1 hr

(Tk.)

Item	Spec.	Unit	Quantity	Unit Price	Cost	Remarks
1.Manpower						
a.Foreman		Man/day	0.09	225	20	
b.Oprater		"	0.45	270	122	
c.Assistant		"	0.15	150	23	
d.Labour		"			0	
Sub-Total					164	PS
2.Oil		l	0	14.5	0	153
Sub-Total					0	*1.2
3.Equipment	Hammer only	Hr	1	700	700	
					0	
Sub-Total					700	
4.Miscellaneous		L.S	1		43	
					0	
5.Total					907	
6.Unit Cost	per Hr				907	907
7.L/C & F/C					207	700
			L/C(%)= 23		F/C(%)= 77	

Table HD 3.8 :Hourly Operation Cost of Equipment

No: _____ Clawler Clane(30t) 1 hr

(Tk.)

Item	Spec.	Unit	Quantity	Unit Price	Cost	Remarks
1.Manpower						
a.Foreman		Man/day	0.12	225	27	
b.Oprater		"	0.66	270	178	
c.Assistant		"	0.21	150	32	
d.Labour		"			0	
Sub-Total					237	
2.Oil		l	10	14.5	145	149 PS
Sub-Total					174	*1.2
3.Equipment	35t	Hr	1	3520	3520	
					0	
Sub-Total					3520	
4.Miscellaneous		L.S	1		197	
					0	
5.Total					4127	
6.Unit Cost	per Hr				4127	4127
7.L/C & F/C					451	3677
			L/C(%)= 11		F/C(%)= 89	

No: _____ Track Crane(10t) 1 hr

(Tk.)

Item	Spec.	Unit	Quantity	Unit Price	Cost	Remarks
1.Manpower						
a.Foreman		Man/day	0.12	225	27	
b.Oprater		"	0.54	270	146	
c.Assistant		"	0.18	150	27	
d.Labour		"			0	
Sub-Total					200	
2.Oil		l	8	14.5	116	230 PS
Sub-Total					139	*1.2
3.Equipment	10t	Hr	1	1170	1170	
					0	
Sub-Total					1170	
4.Miscellaneous		L.S	1		75	
					0	
5.Total					1584	
6.Unit Cost	per Hr				1584	1584
7.L/C & F/C					289	1295
			L/C(%)= 18		F/C(%)= 82	

Table HD 3.9 :HourlyOperation Cost of Equipment

1 Compaction Roller 1 hr

(Tk.)

Item	Spec.	Unit	Quantity	Unit Price	Cost	Remarks
1.Manpower						
a.Foreman		Man/day	0.12	225	27	
b.Oprater		"	0.6	270	162	
c.Assistant		"	0.21	150	32	
d.Labour		"			0	
Sub-Total					221	
2.Oil		l	7	14.5	102	94 PS
Sub-Total					122	*1.2
3.Equipment	10t	Hr	1	700	700	
					0	
Sub-Total					700	
4.Miscellaneous		L.S	1		52	
					0	
5.Total					1094	
6.Unit Cost	per Hr				1094	
7.L/C & F/C					285	810
			L/C(%)= 26		F/C(%)= 74	

No:2 Concrete Track Mixer(6m3) 1 hr

(Tk.)

Item	Spec.	Unit	Quantity	Unit Price	Cost	Remarks
1.Manpower						
a.Foreman		Man/day	0	225	0	
b.Oprater		"	0.51	270	138	
c.Assistant		"	0	150	0	
d.Labour		"			0	
Sub-Total					138	
2.Oil		l	12	14.5	174	319 PS
Sub-Total					209	*1.2
3.Equipment	11t	Hr	1	1400	1400	
					0	
Sub-Total					1400	
4.Miscellaneous		L.S	1		87	
					0	
5.Total					1834	
6.Unit Cost	per Hr				1834	1834
7.L/C & F/C					246	1588
			L/C(%)= 13		F/C(%)= 87	

3

Table HD 3.10 :Hourly OperationCost of Equipment

No:1 Tamper 1 Day

(Tk.)

Item	Spec.	Unit	Quantity	Unit Price	Cost	Remarks
1.Manpower						
a.Foreman		Man/day	0	225	0	
b.Oprater		"	1	270	270	
c.Assistant		"	0	150	0	
d.Labour		"			0	
Sub-Total					270	
2.Oil		l	4	14.5	58	94 PS
Sub-Total					70	*1.2
3.Equipment	10kg	Day	1	709	709	J.S*1.2
					0	
Sub-Total					709	
4.Miscellaneous		L.S	1		52	
					0	
5.Total					1101	
6.Unit Cost	per Day				1101	
7.L/C & F/C					329	772
			L/C(%)=	30	F/C(%)=	70

J.S:Japan,s Lental Cost

No: 2 1 hr

(Tk.)

Item	Spec.	Unit	Quantity	Unit Price	Cost	Remarks
1.Manpower						
a.Foreman		Man/day		225	0	
b.Oprater		"		270	0	
c.Assistant		"		150	0	
d.Labour		"			0	
Sub-Total					0	
2.Oil		l		14.5	0	
Sub-Total					0	*1.2
3.Equipment	11t	Hr			0	
					0	
Sub-Total					0	
4.Miscellaneous		L.S			0	
					0	
5.Total					0	
6.Unit Cost	per Hr				0	0
7.L/C & F/C					0	0
			L/C(%)=	#DIV/0!	F/C(%)=	#DIV/0!

Data HD 4 : Data of Compensation Cost : Information from P.W.D

1. Foundation upto Plinth Level

1)	1-Storey Building	:	Tk. 1022.00 per m^2
2)	2-Storied Building	:	Tk. 1184.00 per m^2
3)	3-Storied Building	:	Tk. 1345.00 per m^2
4)	4-Storied Building	:	Tk. 1668.00 per m^2

2. Superstructure only without Foundation

1)	Ground Floor	:	Tk. 3067.00 per m^2
2)	First Floor	:	Tk. 3228.00 per m^2
3)	Second Floor	:	Tk. 3497.00 per m^2
4)	Third Floor	:	Tk. 3766.00 per m^2

3. Lime Terracing and Parapet wall : Tk. 377.00 per m^2
(Item No.3 to be added on the floor where Top Floor occurs)

If the building is more than 4-storied building additional amount for foundation to be added as per requirement and design on the basis of actual calculation.

i) For mosaic work in all rooms : Add Tk. 550.00 per m^2 for each floor over Item No.2

ii) For mosaic work in all rooms Teak wood with Sal wood chowkat, distemper, snowcem and plastic painting : Add Tk. 1100.00 per m^2 for each floor over Item No. 2

ii) For aluminium doors and windows : Add Tk. 1900.00 per m2 for each floor over Item No.2.

4. Semi-permanent building with C.I. sheet roofing on best local timber truss, brick flat soling, C.C. (1:3:6), brick work (1:4 or 1:6) including 75 mm D.P.C. foundation and plinth, 125 mm thick panel brick work in superstructure with 250 mm x 250 mm intermediate. Pillar at 2.4 m to 3 m c/c., doors, windows, window grill, R.C.C. work (1:2:4), minimum 12 mm thick cement plaster (1:6) to both sides of superstructure walls and 12 mm cement plaster (1:4) in plinth, steps and dado.

: Tk. 3250.00 per m^2

5. 5 and 6-storied building :

Foundation upto Plinth Level :

a)	5-Storied Building	:	Tk. 1868.00 per m^2
b)	6-Storied Building	:	Tk. 2055.00 per m^2

6. Superstructure only without foundation :

a)	Fourth Floor	:	Tk. 4067.00 per m^2
b)	Fifth Floor	:	Tk. 4433.00 per m^2

7. If the buildings are constructed having frame structure for the cost of foundation upto plinth level add 35% on the cost of foundation of the corresponding storied brick footing building according to this Schedule of Rates and for superstructure without foundation add 40% on corresponding floor rate according to this Schedule of Rates.

The above rates are prepared on July 1989