

ANNEX H

USE EXISTING ROAD AS APPROACH

ANNEX-H
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Table of Contents

	Page
H.1 Use Existing Road as Approach	H-1

ANNEX H USE EXISTING ROAD AS APPROACH

H.1 Use Existing Road as Approach

This idea is to use existing road running from intersection with Route 10 at Tha Ngon market to Tha Ngon Firm, which passes through residential area of Ban Na and going up to north.

Alignment of approach road, in this case, will have two rectangular curvature in front of Tha Ngon market and entrance of bridge access. Drivability, therefore, becomes unfavorable for driver and moreover several environmental affects will be occurred. Considerable matters from this alternate idea are mentioned below.

First of all, use of existing road as new approach road requires 1) widening of road width including pavement widening and 2) intersection improvement. However, existing road has only 15 meters width as Right of Way (ROW) and houses are in line along the road. In this case, additional land acquisition in residential area shall be needed so as to do this widening and improvement works of the existing road and intersections. Demolition of houses and stores shall also be required involving removal of water supply and electricity.

Moreover, future traffic volume causes environmental problems such as traffic noise, air pollution. Furthermore, traffic jam at intersections is suspected. This traffic jam makes vehicles to pay high running cost than planned approach road.

Beside above, this existing road is being considered as access road to be used for preparation works. When approach road is changed and shifted on this existing road, northern part of this road shall be obliged to be used as access road, instead of the road before mentioned. There are, however, several difficulties to pass this northern part because of steep section, narrow road width, many curvature and so.

In view of construction cost, there is no difference between these two candidates. comparison table in cost is attached hereinafter as reference.

From these demerits, approach road shall be the planned route which passes through the area alongside the irrigation canal constructed out of skirt of Ban Na. this planned approach road by-passes village center largely and moreover will boost regional development scheme of the area.

Attached table shows the comparison of construction cost estimate for the two routes. Approach through existing road is slightly higher in construction cost than the planned road.

Compensation Table of Construction Cost
Right of Way for improvement of existing road (15 meters)

Description	Unit	Existing road as approach		Planned route		
		Unit Price	Quantities	Amount(\$)	Quantities	Amount(\$)
Road Construction						
Earth Work						
Clearing & grubbing	sqm	0.038	0	0	32,600	1,239
Removing top soil	cum	1.03	0	0	6,500	6,695
Road excavation	cum	2.92	2,664	7,779	8,100	23,652
Borrow excavation	cum	6.61	0	0	1,980	13,088
Sub total				7,779		44,674
Pavement						
Subbase course	sqm	3.4	7,010	23,834	15,580	52,972
Base course	sqm	6.64	7,010	46,546	14,760	98,006
Surfacing	sqm	5	7,010	35,050	9,840	49,200
Shoulder	sqm	4	4,860	19,440	4,440	17,760
Sub total				124,870		217,938
Drainage facility						
Pipe culvert	m	310	0	0	36	11,160
Concrete ditch	m	25	1,920	48,000	0	0
Sub total				48,000		11,160
Total of Construction				180,649		273,772
Land acquisition & Compensation						
Residential area	sqm	-1.15	2,490	2,864	1,225	1,409
Paddy field	sqm	0.86	0	0	11,100	9,546
Farm	sqm	0.58	0	0	9,450	5,481
House removing	nos	10,000	3	30,000	2	20,000
Waterline removing	m	24.4	870	21,228	0	0
Electricity remove	nos	730	1	730	2	1,460
Sub total				54,822		37,896
Total Cost				235,471		311,668
Residual Value (Construction Cost x15% + Land Aquisition)				29,961		57,502
Grand Total				205,510		254,166

Compensation Table of Construction Cost
Right of Way for improvement of existing road (30 meters)

Description	Unit	Unit Price	Existing road as approach		Planned route	
			Quantities	Amount(\$)	Quantities	Amount(\$)
Road Construction						
Earth Work						
Clearing & grubbing	sqm	0.038	0	0	32,600	1,239
Removing top soil	cum	1.03	0	0	6,500	6,695
Road excavation	cum	2.92	2,664	7,779	8,100	23,652
Borrow excavation	cum	6.61	0	0	1,980	13,088
Sub total				7,779		44,674
Pavement						
Subbase course	sqm	3.4	7,010	23,834	15,580	52,972
Base course	sqm	6.64	7,010	46,546	14,760	98,006
Surfacing	sqm	5	7,010	35,050	9,840	49,200
Shoulder	sqm	4	4,860	19,440	4,440	17,760
Sub total				124,870		217,938
Drainage facility						
Pipe culvert	m	310	0	0	36	11,160
Concrete ditch	m	25	1,920	48,000	0	0
Sub total				48,000		11,160
Total of Construction				180,649		273,772
Land acquisition & Compensation						
Residential area	sqm	1.15	15,000	17,250	2,450	2,818
Paddy field	sqm	0.86	0	0	22,200	19,092
Farm	sqm	0.58	0	0	18,900	10,962
House removing	nos	10,000	13	130,000	6	60,000
Waterline removing	m	24.4	870	21,228	0	0
Electricity remove	nos	730	12	8,760	2	1,460
Sub total				177,238		94,332
Total Cost				357,887		368,104
Residual Value (Construction Cost x15% + Land Aquisition)				44,347		73,937
Grand Total				313,540		294,166

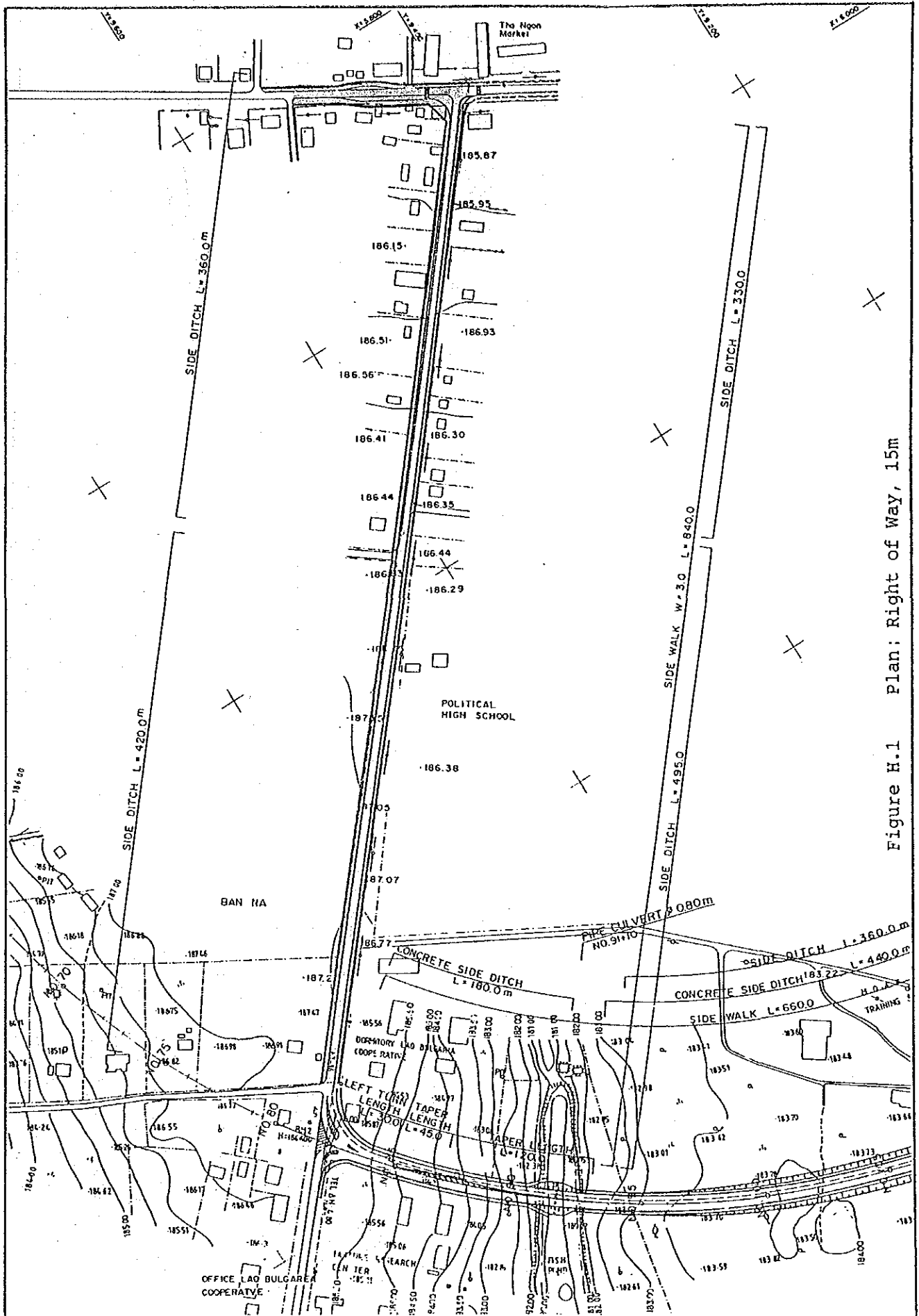


Figure H.1 Plan: Right of Way, 15m

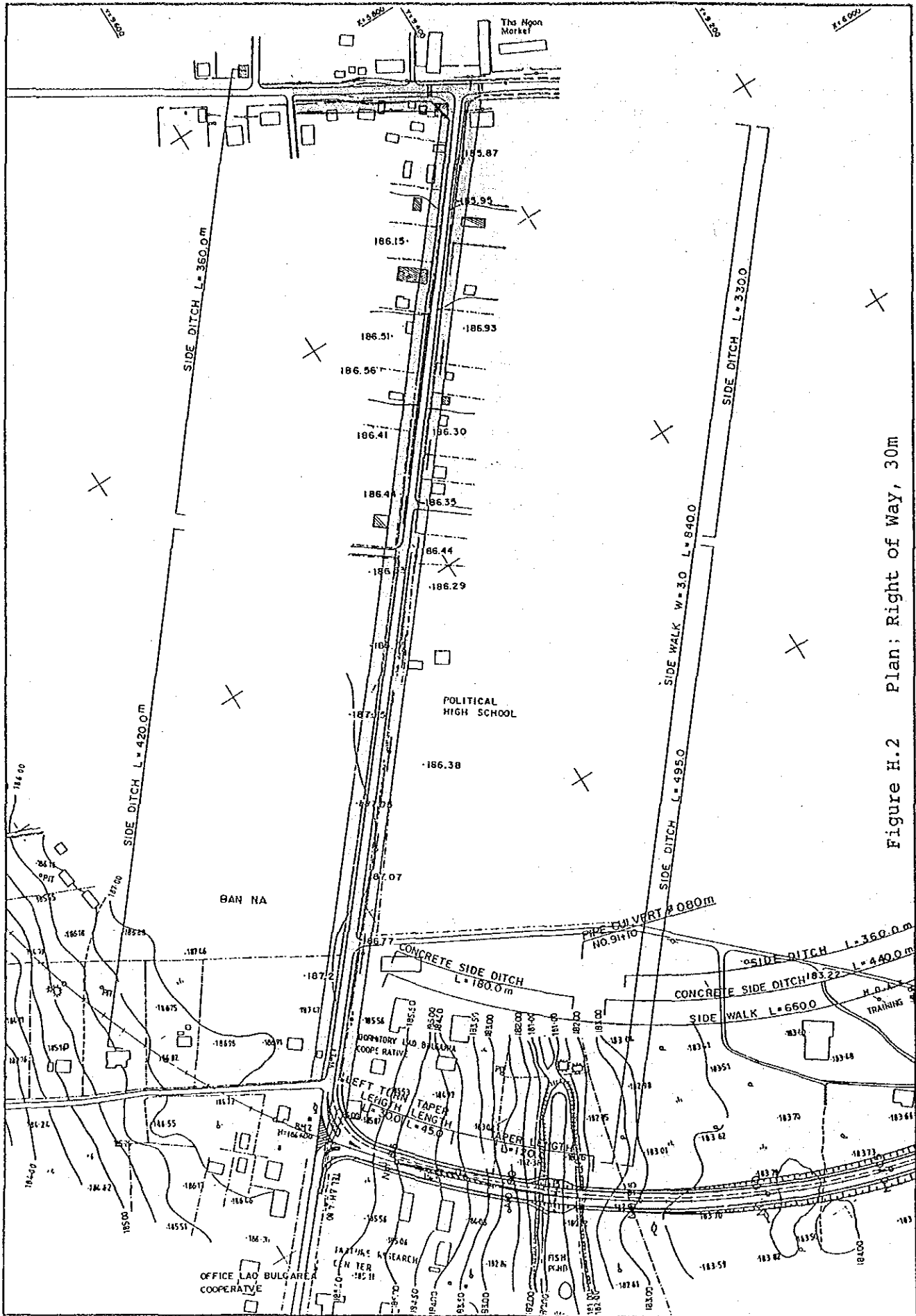
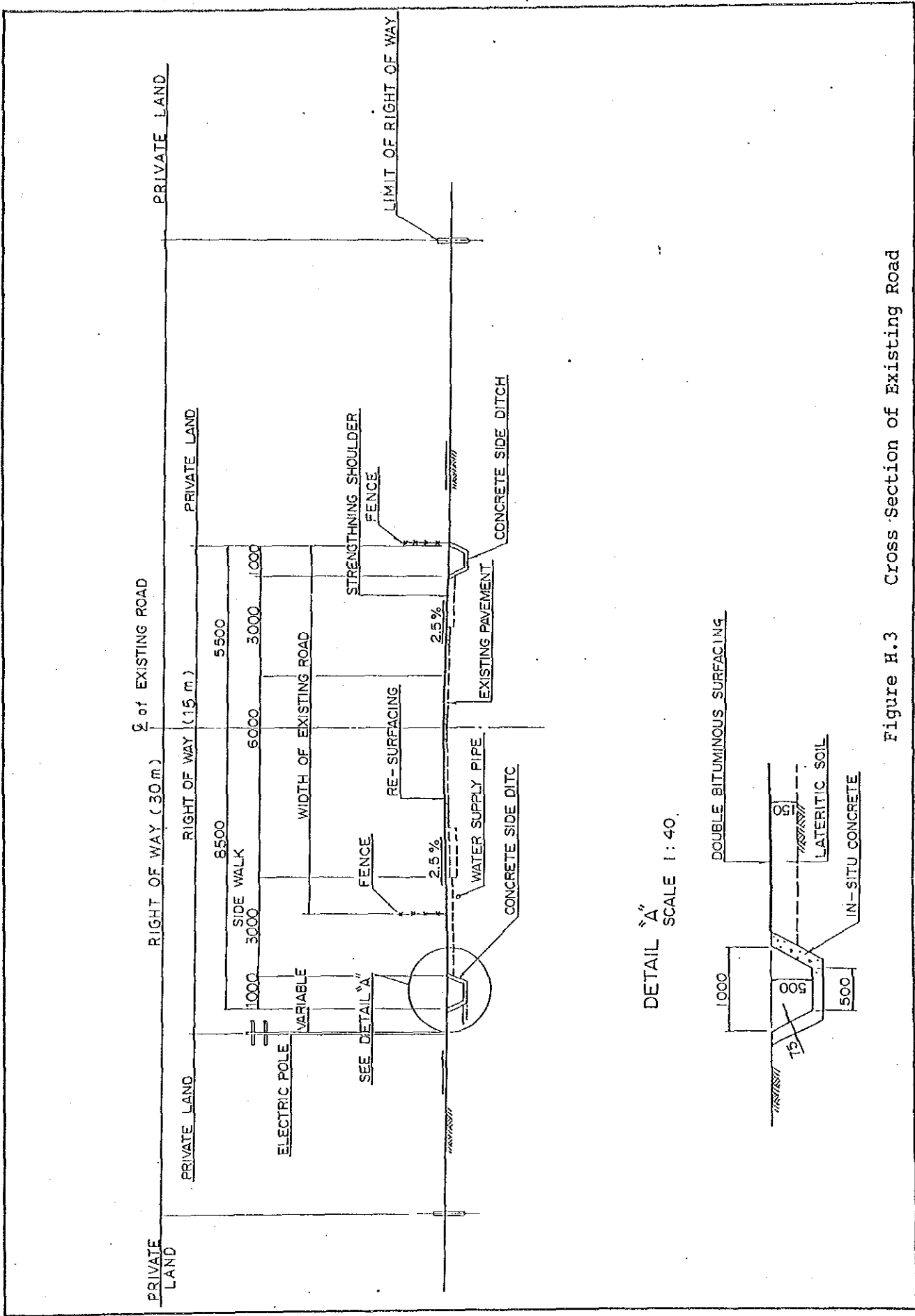


Figure H.2 Plan: Right of Way, 30m



DETAIL "A"
 SCALE 1:40

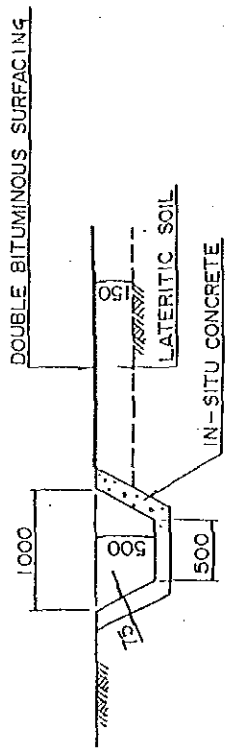


Figure H.3 Cross Section of Existing Road

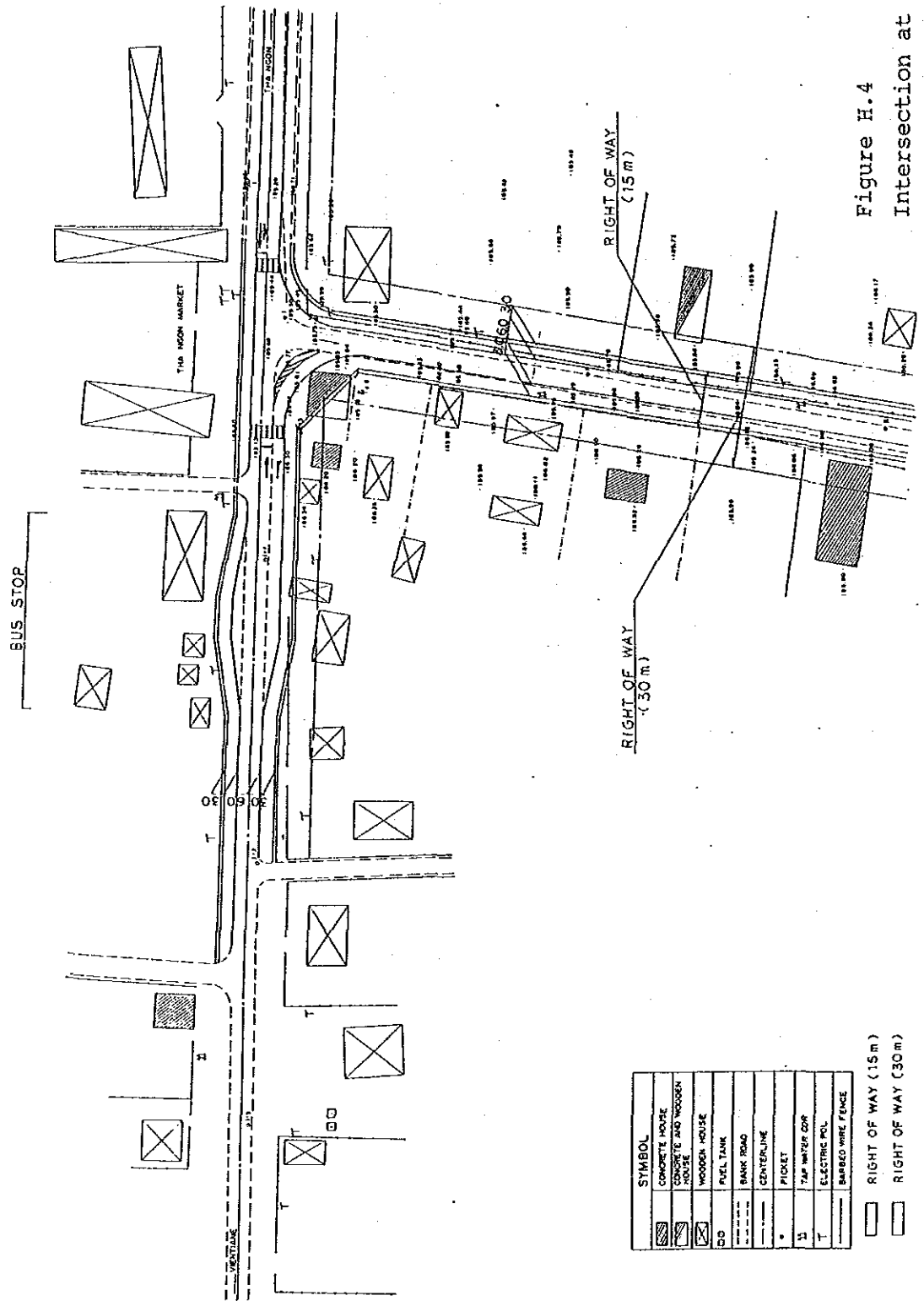


Figure H.4
Intersection at Tha Ngon Market

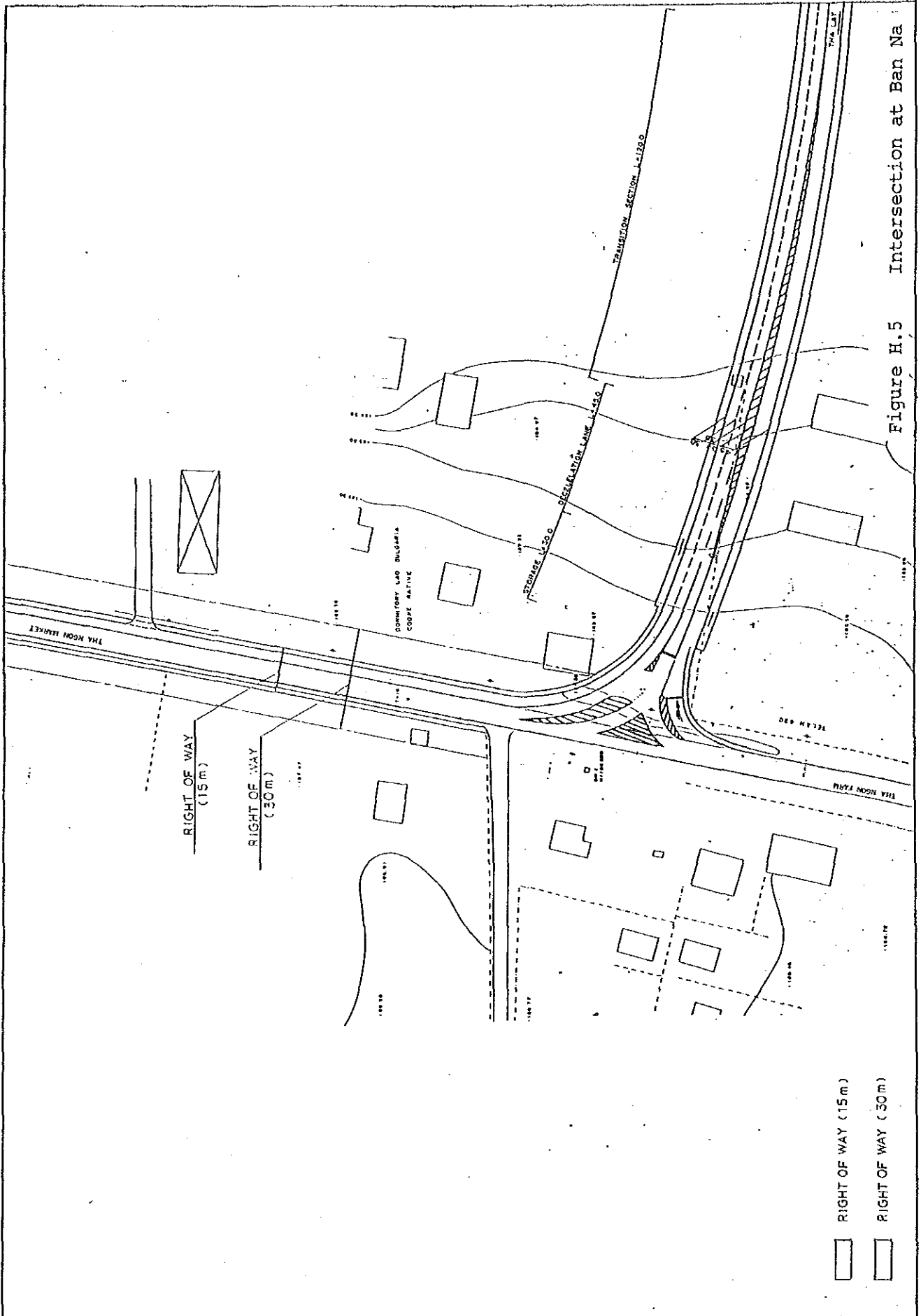


Figure H.5 Intersection at Ban Na

ANNEX I

GOVERNMENT TARIFF AND TAX

ANNEX I GOVERNMENT TARIFF AND TAX

Custom tariff obtained from Vientiane Municipality have been used for cost estimate.

The conclusion
of
Council minister
For government Tariff Tax
1989
Content.

I . The proposal for Tariff Activity

Import-export

II . The proposal for commodity to Import-export

III . The Tariff Tax For import.

	<u>CHAPTER I</u>	<u>GROUP. I</u>	<u>FOR import-export</u>
clause 1 :	Earth mover machinery		1 %
clause 5 :	Machine and equipment for constructiton		2 %
clause 10:	Heavy machinery I.E. Bulldozer, Grader, Crane Tractor, Backhoe, Crawler		<u>Exception</u>
clause 13:	Transportation in Land		5 %
clause 14:	Transportation Naval		4.5 %

GROUP. II

For Construction Equipment

And Electricity.

clause 23:	Equipment or raw materal for Construction eTc...		9 %
clause 24:	Material for Roofing		9 %
clause 25:	Material for ceilling, walling, and for Repairing of		9 %
clause 28:	Ptrgsn House, and Supplement House		11 %
clause 29:	Electric Equipment and all kind of Battery		11 %

GROUP. III

Energy, Fuel, gas.

clause 30:	Energy from Electricity	11.12 %
clause 32:	Fuel, Gas, Crude oil.	12 %

Chapter III Import Tax.

Group-5

-	Equipment For Road Construction	2 %
-	Equipment For Irrigation	2 %
-	Concrete Mixer, Concrete Vibrating And Concrete Drilling machine	2 %
-	The implement And Spare Parls	2 %

Group 6

-	machinery for plant or hydro-power dam	<u>Exception</u>
-	Hydro-power moter	2 %
-	Dynamo	2 %
-	Transformer, Conductor	2 %

Group 8

-	Boring machine	5 %
-	Hoist, Cable	5 %
-	Tropogeology Equipment, meter, Temperature, measure Weight ETC ...	5 %
-	Water meter, Electricity Panel	5 %

Group 9

-	Vehicle Engine and marine engine	3 %
-	Truck Engine	5 %

Group 10

	Tractor, Grader,	<u>Exception</u>
	Bulldozer, Wheel Loader, ETC... ..	11 %

Group 13

-	Dump-Cargo Truck	2 %
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-	Bus, Van	5 %
-	Pickup	15 %
-	Jeep	15 %
-	Sedan, Car	50 %

Group 14

	Iron bar	5 %
	Copper Wire	5 %
	Tin	20 %
	Zinc	5 %
	Aluminium	5 %
	Plastic	5 %

Group 23 For mason

-	Brick	20 %
-	Cement	3 %
-	Clime	3 %
-	Another material for mason	5 %

Group 24 For Roofing

-	Tile	20 %
-	Fibro	3 %
-	Plastic Roofing Sheet	5 %
-	Galvanized From Sheet	5 %

Group 27

-	Barb Wire	7 %
-	Screen	7 %
-	Steel bar	3 %
-	Nail	10 %
-	Nut And Bolt	7 %
-	Hndle, Lock, Hange	
	Key TEC	7 %
-	Washing Plate, Toilet ETC	5 %

Group 85

- HFSSB Radio-or Talky Walky 10 %
- Signal Traffic Light 5 %

Group 87

- Camera 15 %
- Video 10 %
- Cenema machine 10 %

Group 89

Stationary

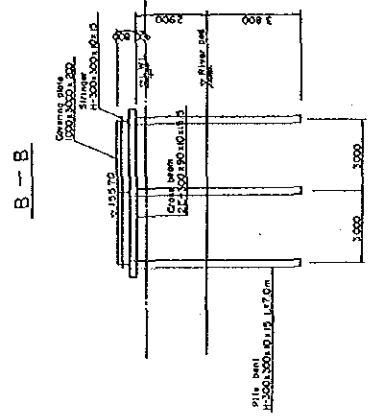
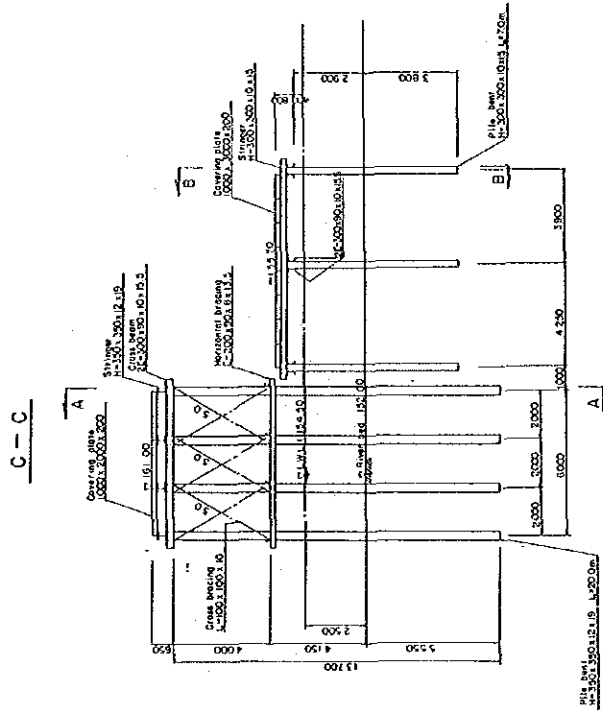
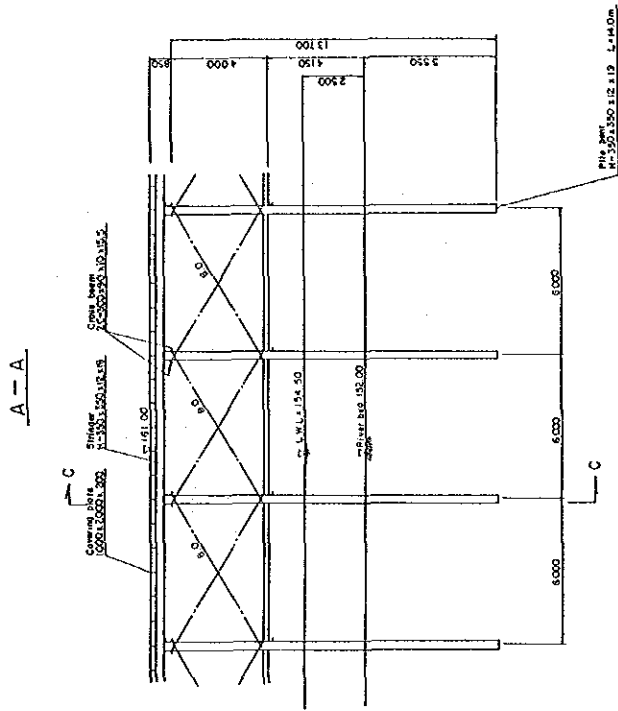
- Type Writer 5 %
- Roneo 5 %
- Calcurator 5 %

ANNEX J
TEMPORARY WORK

ANNEX J
TEMPORARY WORK

Table of Contents

J.1 Temporary Work	Page J-1
--------------------	-------------



Material for Temporary Platform

Description	Dimensions
Covering plate	SD 1000 x 2000
Stringer	H-350 x 350 x 12.19
Cross beam	C-300 x 80 x 10 x 13.5
Pile bent	H-300 x 300 x 9 x 15 L x 7.0 m

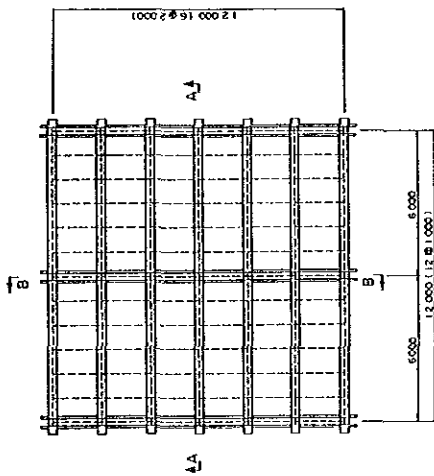
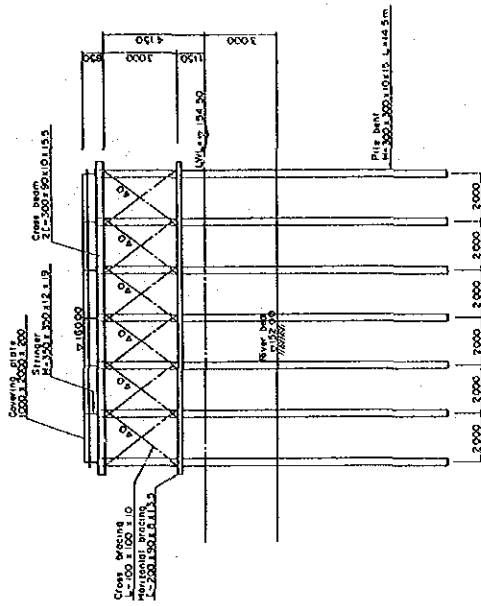
Material for Temporary Bridge

Description	Dimensions
Covering plate	SD 1000 x 2000
Stringer	H-350 x 350 x 12.19
Cross beam	C-300 x 80 x 10 x 13.5
Horizontal bracing	C-200 x 80 x 8 x 13.5
Cross bracing	L-100 x 100 x 10
Pile bent	H-350 x 350 x 12.19 L x 14.0 m

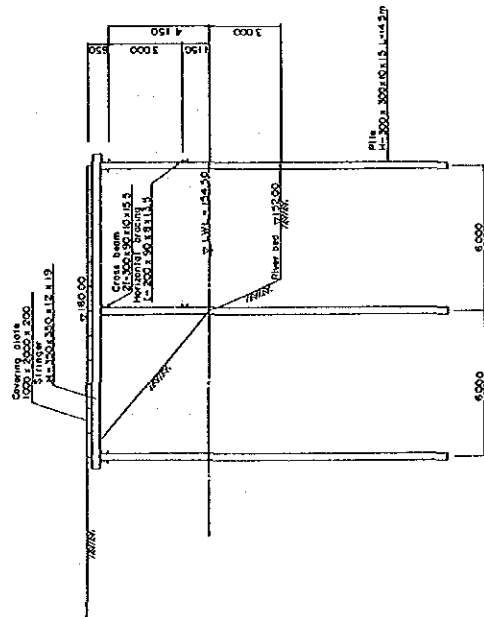
THA-NON BRIDGE CONSTRUCTION PROJECT
 TEMPORARY BRIDGE AND PLATFORM (2/2)
 SCALE 1:100
 DATE FEBRUARY 1991 DRAWING NO.
 JAPAN INTERNATIONAL COOPERATION AGENCY

Figure J.2 Temporary Bridge and platform (2/2)

B - B



A - A



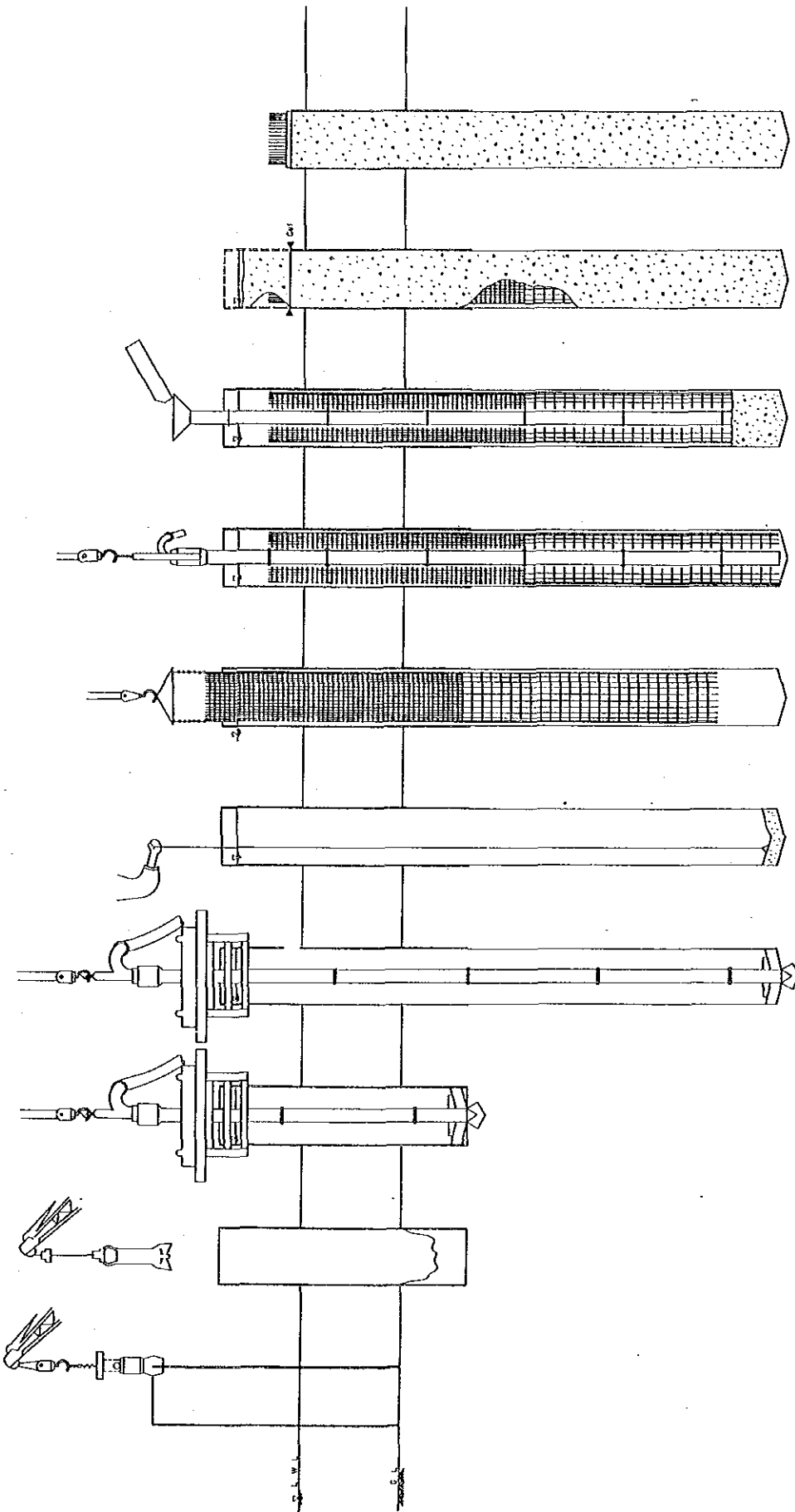
Material	Description	Dimensions
	Covering plate	3D 1,000 x 2,000
	Stringer	H-300 x 300 x 12 x 1.5
	Cross beam	L-200 x 150 x 8 x 13.5
	Horizontal bracing	L-200 x 150 x 8 x 13.5
	Cross bracing	L-100 x 100 x 10
	Pile beam	H-300 x 300 x 10 x 13 L=14.5m

THA INOH BRIDGE CONSTRUCTION PROJECT
TEMPORARY LANDING PIER
SCALE 1:100
DATE FEBRUARY, 1991 DRAWING NO.
JAPAN INTERNATIONAL COOPERATION AGENCY

Figure J.3 Temporary Landing Pier

CONSTRUCTION OF PILE SCALE 1:60

- ① Drive stand pipe
- ② Excavate by hammer grab
- ③ Set reverse circulation drill and fill up water
- ④ Drilling
- ⑤ Inspection and dispose slime
- ⑥ Insert reinforcement bar cage
- ⑦ Insert tremie and dispose slime
- ⑧ Place concrete
- ⑨ Cut off stand pipe
- ⑩ Dispose pile head



THA NOKA BRIDGE CONSTRUCTION PROJECT
CONSTRUCTION OF BORED PILE
SCALE 1:60
DATE FEBRUARY, 1991 DRAWING NO.
JAPAN INTERNATIONAL COOPERATION AGENCY

Figure J.4 Construction of bored pile

ANNEX K

CONSTRUCTION COST FOR 2 YEARS PERIOD

ANNEX K CONSTRUCTION COST 2 YEARS PERIOD

- K.1 Summary of project capital cost
- K.2 Breakdown of construction cost
- K.3 Breakdown of costs of land acquisition and Engineering service
- K.4 Summary of Unit Price analysis
- K.5 Equipment Owership cost
- K.6 Material Owership cost
- K.7 Packing and Transport cost
- K.8 Engineering service cost for detail design
- K.9 Engineering Service cost for supervision for 2 years construction period.
- K.10 Implementing time schedule (rapid construction speed)

Table K.1 Summary of Project Capital Cost and Economic Converted Cost ; 2 years

	Financial Cost ('00US\$)	Economic Cost ('00US\$)	1st Year	2nd Year	3rd Year
I CONSTRUCTION COST ('00YS\$)	131,410	117,727		57,380	60,347
1. Direct Construction Cost ('00US\$)	70,729	62,015			
Foreign portion ('0000Yen)	65,187	61,928			
Material	29,878	28,384			
Equipment	35,309	33,544			
Local Portion ('00US\$)	28,123	21,539			
Labour	7,543	3,107			
Material	16,679	15,011			
Equipment	3,901	3,511			
2. Indirect Construction Cost ('00US\$)	60,681	55,712			
Foreign portion ('0000Yen)	64,991	63,311			
Material	60,617	59,156			
Equipment	4,374	4,155			
Local Portion ('00US\$)	18,203	14,332			
Labour	5,660	2,264			
Material	11,387	11,028			
Equipment	1,156	1,040			
II LAND ACQUISITION COST					
Local portion ('00US\$)	952	857	857		
III ENGINEERING SERVICE COST ('00US\$)	11,553	11,449	2,900	4,270	4,279
Foreign portion ('0000Yen)	17,103	17,085			
Local portion ('00US\$)	375	282			
Labour	111	44			
Material	264	238			
IV CONTINGENCY, 5% of (I) ('00US\$)	6,570	5,886		2,869	3,017
Total	150,485	135,919	3,757	64,519	67,643

Note: (1) Foreign currency is expressed in Japanese Yen, while local currency is represented in US dollars.

(2) Average Tokyo Bank TTS rate February through July of 1990 of US dollars is adopted:
1US\$ = 153Yen

(3) 5% of the foreign portion's material and equipment cost is eliminated as import tax.

(4) The economic cost of local labour is obtained by applying 0.4 to market cost.

(5) 0.9 of conversion factor is applied for the market cost of local material and equipment.

Table K.2 Breakdown of Construction Cost and Economic Conversion Cost; Construction Period 2 years (1)

Description (Conversion Factor)	Financial Cost						Economic Cost (100US\$)
	Foreign Cost Component (10,000Yen)		Local Cost Component (100US\$)			Total (100US\$)	
	Material (0.95)	Equipment (0.95)	Labour (0.4)	Material (0.9)	Equipment (0.9)		
I CONSTRUCTION COST							
1. Direct Construction Cost							
1.1 Bridge							
1.1.1 Superstructure							
1) Bridge deck slab	2,530 m ²	178	15	926	994	7	
2) Main girder, fabrication	30 nr	9,934	106	1,743	3,817	35	
3) Main girder, scaffolding	30 nr	115	-	76	-	-	
4) Main girder, temporary setting	30 nr	-	-	61	2	-	
5) Manufacturing platform, main girder	123 m	62	12	33	260	3	
6) Adjustable work for platform	30 nr	-	-	22	1	-	
7) Setting and removing of p. crane	2 nr	300	50	140	1,003	12	
8) Railwork for portal crane	sum	-	-	34	1	-	
9) Rubber bearing work	30 nr	260	-	20	2	-	
10) Erection of main girder	30 nr	31	15	475	14	22	
11) Cross beam	sum	672	5	365	362	3	
12) Equipment ownership cost/PC girder	30 nr	-	8,842	-	-	-	
13) Equipment ownership cost/concreting	sum	-	616	-	-	-	
Total of Superstructure		11,552	9,661	3,895	6,456	86	20,617
1.1.2 Substructure							
1.1) Abutments							
(1) Concrete placing by truck crane	255 m ²	7	21	22	415	5	
(2) Formwork	643 m ²	-	18	75	11	6	
(3) Reinforcement work	13 t	195	-	55	3	-	
(4) Levelling concrete	734 m ²	-	1	1	-	18	
(5) Scaffolding	26 m ²	75	11	42	-	4	
(6) Pipe timbering	10,636 m ²	-	-	2	-	-	
(7) Excavation	14,221 m ²	-	275	-	-	151	
(8) Backfill	sum	-	429	17	4	242	
(9) Equipment ownership cost/concreting	sum	-	1,026	-	-	-	
(10) Equipment ownership cost/earthwork	sum	-	995	-	-	-	
Total of abutments		277	2,776	214	433	426	3,068
							2,754

Table K.3 Breakdown of Construction Cost and Economic Conversion Cost; Construction Period 2 years (2)

Description (Conversion Factor)	Financial Cost						Economic Cost (1000US\$)
	Foreign Cost Component (10,000yen)		Local Cost Component (1000US\$)			Total (1000US\$)	
	Material (0.95)	Equipment (0.95)	Labour (0.4)	Material (0.9)	Equipment (0.9)		
2) Piers							
(1) Concrete placing by truck crane	739 m ³	19	61	65	1,202	14	
(2) Formwork	1,177 m ²	-	33	138	19	11	
(3) Reinforcement work	163 t	925	-	263	13	-	
(4) Scaffolding	2,011 m ²	344	29	115	-	10	
(5) Footing concrete, placing by truck crane	554 m ³	14	46	49	902	11	
(6) Footing concrete, formwork	259 m ³	-	7	30	4	2	
(7) Footing concrete, reinforcement work	21 t	117	-	33	2	-	
(8) Equipment, ownership cost/concrete Total of piers	sum	-	590	-	-	-	3,605
		1,419	766	693	2,142	48	4,311
3) In situ concrete pile, reverse circulation drill							
(1) ISCP, L = 15m, submersible	24 nr	2,319	979	575	1,181	326	
(2) ISCP, L = 13m, on land	6 nr	131	164	128	327	28	
(3) Ownership cost, standpile	sum	-	1,400	-	-	-	
(4) Equipment, ownership cost/drill	sum	-	5,661	-	-	-	
(5) Equipment, ownership cost/concrete Total ISCP	sum	-	333	-	-	-	
		2,450	8,537	703	1,508	354	9,746
4) U-shape wall							
(1) Concrete placing by truck crane	1,285 m ³	34	106	113	2,091	25	
(2) Formwork	782 m ²	-	22	92	13	7	
(3) Reinforcement work	40 t	226	-	64	3	-	
Total of U-shape wall		260	128	269	2,107	32	2,662
Total of Substructure		4,406	12,207	1,879	6,190	860	19,787
Total of Bridge (1.1)		15,958	21,868	5,774	12,646	946	44,089
							38,029

Table K.5 Breakdown of Construction Cost and Economic Cost; Construction Period 2 years (4)

Description	(Conversion Factor)	Financial Cost						Economic Cost (100US\$)
		Foreign Cost Component (10,000yen)		Local Cost Component (100US\$)			Total (100US\$)	
		Material (0.95)	Equipment (0.95)	Labour (0.4)	Material (0.9)	Equipment (0.9)		
1.4 Rivetment work								
1) Excavation	9,372 m ³	-	243	-	-	133		
2) Refill	5,271 m ³	-	159	6	2	90		
3) Concrete block pitching	4,337 m ³	5,802	-	104	246	-		
Total of Rivetment work (1.4)		5,802	402	110	248	223	4,636	
Total of Direct Construction Cost (1)		29,878 (28,384)	34,309 (33,544)	7,543 (3,017)	16,679 (15,011)	3,901 (3,511)	70,729 (62,015)	

Table K.6 Breakdown of Construction Cost and Economic Conversion Cost; Construction Period 2 years (5)

Description (Conversion Factor)	Financial Cost						Economic Cost (100US\$)
	Foreign Cost Component (10,000yen)		Local Cost Component (100US\$)			Total (100US\$)	
	Material (0.95)	Equipment (0.95)	Labour (0.4)	Material (0.9)	Equipment (0.9)		
2. Indirect Construction Cost							
2.1 Preliminaries and general items							
1) Temporary facilities	6,988	843	1,543	1,376	766		
(1) Temporary facilities	1,371	-	278	545	-		
(2) Security	667	-	980	-	-		
(3) Technical administrative							
sum							
sum							
sum							
Total of preliminaries and general items (2.1)	9,026	843	2,801	1,921	766	11,938	9,667
2.2 Packing and transport cost							
Total of Packing and Transport Cost (2.2)	12,279	-	-	7,798	-	15,823	15,823
2.3 Dispatch of expatriate technician							
1) Remuneration	16,313	-	-	-	-		
2) Allowance	2,318	-	-	-	-		
3) Travelling expenses	499	-	-	-	-		
total of despatch of Expatriate technician (2.3)	19,130	-	-	-	-	12,503	12,503

Table K.7 Breakdown of Construction Cost and Economic Conversion Cost; Construction Period 2 years (6)

Description (Conversion Factor)	Financial Cost						Economic Cost (100US\$)
	Foreign Cost Component (10,000yen)		Local Cost Component (100US\$)		Total (100US\$)		
	Material (0.95)	Equipment (0.95)	Labour (0.4)	Material (0.9)			
2.4 Site costs							
1) Insurance	1,144	-	-	-	-	-	
2) Remuneration of expatriate engineers	12,397	-	-	-	-	-	
3) Remuneration of local staff	-	-	1,483	-	-	-	
4) Welfare cost	257	-	-	-	-	-	
5) Office equipment cost	635	-	-	-	-	-	
6) Communication expenses	163	-	-	-	-	-	
7) Travelling expenses expatriate staff	260	-	-	-	-	-	
8) Communication and transport cost	381	-	622	-	-	-	
9) Furniture of staff quarters	44	-	-	-	-	-	
Total of site cost (2.4)	15,281	-	2,105	-	-	-	10,330
2.5 Overhead cost							
10% of sum of direct construction cost and despatch cost of expatriate technician							
Total of overhead cost (2.4)	4,901	3,531	754	1,668	390		7,389
Total of Indirect Construction Cost (2) Economic Converted Cost	60,617 (59,156)	4,374 (4,155)	5,660 (2,264)	11,387 (11,028)	1,156 (1,040)		55,712
Total of Construction Cost	90,495	39,683	13,203	28,066	5,057		117,727
							¥ 2,010,569

Table K.8 Breakdown of Construction Cost and Economic Converted Cost; Construction Period 2 years (7)

Description (Conversion Factor)	Foreign Cost Component (10,000yen)				Local Cost Component (100US\$)			Total (100US\$)	Economic Cost (100US\$)
	Material		Equipment		Labour	Material	Equipment		
	(0.95)	(0.95)	(0.9)	(0.9)					
<p>II. MAINTENANCE COST Note: No maintenance work will be substantially required for the bridge works. We assume both routine and periodical maintenance be required only for the pavement of the roadway.</p> <p>1. Routine Maintenance Cost Note: It is assumed 3% of the pavement surface course area (995m²) be repaired at the unit price 5.97US\$/m² every year. (total : 5,970US\$)</p> <p style="padding-left: 40px;">Maintenance cost, routine (composition)</p> <p style="padding-left: 40px;">Economic Converted cost (every year)</p> <p>2. Periodic Maintenance Cost Note: 50% of the pavement surface course area (33,160m²) will be assumed to be reconstructed at the unit price 5.97US\$/m² at every 7 years after completion. (total : 98,983US\$)</p> <p style="padding-left: 40px;">Maintenance cost, periodic (composition)</p> <p style="padding-left: 40px;">Economic converted cost (every 7 years)</p>									
					19 (31.5%)	17 (28.0%)	24 (40.5%)	50 (100.0%)	44
					312 (31.5%)	277 (28%)	401 (40.5%)	990 (100%)	735

Table K.9 Breakdown of Costs of Land Acquisition and Engineering Service and Economic Converted Costs; Construction Period 2 years

Description	Financial Cost				Economic Cost (100US\$)	
	Foreign Cost Component (10,000yen)		Local Cost Component (100US\$)			Total (100US\$)
	Material (0.95)	Equipment (0.95)	Labour (0.4)	Material Equipment (0.9)		
<p>III. Land Acquisition and Compensation Cost</p> <p>Note: Since it is difficult to obtain the clearcut figure of the productivity foregone for each farm and paddy field, the conversion rate 0.9 will be uniformly their economic cost is established by applying to the financial cost.</p>						
<p>1. Residential are</p> <p>2. Paddy field</p> <p>3. Farm</p> <p>4. Orchard</p> <p>5. Residence</p> <p>Total of Land Acquisition Cost</p> <p>Economic converted cost</p>	<p>1,500 m²</p> <p>6,200 m²</p> <p>42,000 m²</p> <p>12,000 m²</p> <p>5 nr</p>	<p>(@ 1.15US\$)</p> <p>(@ 0.86US\$)</p> <p>(@ 0.58US\$)</p> <p>(@ 1.15US\$)</p> <p>(@10,000US\$)</p>		<p>17</p> <p>53</p> <p>24</p> <p>138</p> <p>500</p> <p>952</p> <p>(857)</p>		<p>(90.0%)</p> <p>(857)</p>
<p>IV. Engineering Service Cost</p> <p>1. Detailed design</p> <p>2. Supervision</p> <p>Total of Engineering Service</p>		<p>4,430 (CF= 1.0)</p> <p>181 (CF= 0.9)</p> <p>12,492 (CF= 1.0)</p>	<p>111</p> <p>111</p> <p>(44)</p>	<p>264</p> <p>264</p> <p>(238)</p>	<p>-</p> <p>-</p>	<p>952</p> <p>11,553</p> <p>(99.1%)</p> <p>(11,449)</p>

Table K.10 Summary of Unit Price Analysis (1)

Unit	Amount	Foreign Component						Local Component					
		Material cost		Equipment cost		Labour cost		Material cost		Equipment cost		Equipment cost	
		Unit Cost	Cost	Unit Cost	Cost	Unit Cost	Cost	Unit Cost	Cost	Unit Cost	Cost	Unit Cost	Cost
Superstructure													
Bridge deck slab	sqm	2530	705	1,783,650	61	154,330	36.61	92623.30	39.27	99353.10	0.42	1062.60	
Main girder, fabrication	nr	30	3,311,433	99,344,790	35,450	1,063,500	5808.36	174250.80	12722.99	381689.70	115.13	3453.90	
Main girder, scaffolding	nr	30	38,250	1,147,500	0	0	253.80	7614.00	0.00	0.00	0.00	0.00	
Main girder, temporary setting	nr	30	0	0	0	0	201.69	6050.70	6.04	181.20	0.00	0.00	
Main girder, platform	m	123	5,049	621,027	945	116,235	27.04	3325.92	211.57	26023.11	2.22	273.06	
Adjustable work for platform	nr	30	0	0	0	0	74.13	2223.90	2.22	66.60	0.00	0.00	
Portal crane	nr	2	1,498,425	2,996,850	251,358	502,716	7021.81	14043.62	50171.78	100343.56	591.92	1183.84	
Potal crane, rail	sum	1	0	0	0	0	3389.85	3389.85	101.25	101.25	0.00	0.00	
Bearing	nr	30	86,612	2,596,360	0	0	65.99	1979.70	7.16	214.80	0.00	0.00	
Main girder, election	nr	30	10,384	311,520	5,090	152,700	1582.12	47463.60	45.86	1375.80	73.56	206.80	
Cross beam	sum	1	6,718,783	6,718,783	53,303	53,303	36481.07	36481.07	36198.69	36198.69	259.87	259.87	
Sub total	1	1	15,522,480	2,042,784	2,042,784	0	389446.46	162.66	41478.90	1.93	492.15		
Substructure													
Abutment, concrete	cum	255	261	66,555	821	209,355	8.82	2249.10	162.66	41478.90	1.93	492.15	
Abutment, formwork	sqm	643	0	0	279	179,481	11.73	7545.91	1.64	1055.01	0.94	604.70	
Abutment, reinforcement	t	34	56,732	1,945,908	0	0	161.19	5528.82	8.06	276.46	0.00	0.00	
Abutment, leveling concrete	cum	13	0	0	590	7,611	11.17	144.09	0.22	2.84	136.11	1755.82	
Abutment, scaffolding	sqm	734	1,026	752,571	146	107,091	5.70	4180.95	0.00	0.00	0.49	359.42	
Abutment, pipe timbering	cum	26	0	0	0	0	7.14	185.64	0.71	18.46	0.00	0.00	
Abutment, excavation	cum	10636	0	0	259	2,754,724	0.00	0.00	0.00	0.00	1.42	15103.12	
Abutment, backfill	cum	14221	0	0	302	4,294,742	0.12	1706.52	0.03	426.63	1.70	24175.70	
Pier, formwork	cum	739	251	192,801	821	606,473	8.82	6515.33	162.66	120156.94	1.93	1425.69	
Pier, concrete	sqm	1177	0	0	279	328,383	11.73	13806.21	1.64	1930.28	0.94	1106.38	
Pier, reinforcement	t	163	56,732	9,247,316	0	0	161.19	26273.97	8.06	1313.78	0.00	0.00	
Pier, scaffolding	sqm	2011	1,711	3,440,308	146	293,562	5.70	11460.99	0.00	0.00	0.49	985.24	
Footings, concrete	cum	554	261	144,698	821	455,162	8.82	4889.81	162.66	90178.70	1.93	1069.99	
Footings, formwork	sqm	259	0	0	279	72,317	11.73	3040.42	1.64	425.09	0.94	243.65	
Footings, reinforcement	t	21	56,732	1,174,352	0	0	161.19	3336.63	8.06	166.84	0.00	0.00	
U-shape wall, concrete	cum	1285	261	335,489	821	1,055,313	8.82	11337.23	162.66	209083.16	1.93	2480.82	
U-shape wall, formwork	sqm	782	0	0	279	218,056	11.73	9168.17	1.64	1281.82	0.94	734.70	
U-shape wall, reinforcement	t	40	56,732	2,257,934	0	0	161.19	6415.36	8.06	320.79	0.00	0.00	
In situ concrete pile L=15m	nr	24	966,287	23,190,888	408,044	9,793,056	2396.18	57508.32	4919.24	118061.76	1360.40	23649.60	
In situ concrete pile L=13m	nr	6	217,671	1,306,026	273,244	1,639,464	2140.05	12840.30	5452.74	32716.44	459.33	2755.98	
Sub total			44,054,846	59,577,326	22,014,801	24,057,585	188133.77	577580.23	1264441.12	618893.91	85942.97	94383.04	
Total of bridge													

Table K.11 Summary of Unit Price Analysis (2)

Unit	Amount	Foreign Component						Local Component										
		Material cost		Equipment cost		Labour cost		Material cost		Equipment cost								
		Unit Cost	Cost	Unit Cost	Cost	Unit Cost	Cost	Unit Cost	Cost	Unit Cost	Cost							
Approach road																		
Approach road, pavement	26868	99	2,659,932	148	3,976,464	1.69	45406.92	0.85	22837.80	1.20	32241.60							
Approach road, subgrade	33585	0	0	1,242	14,712,570	0.91	30562.35	0.12	4030.20	6.35	213264.75							
Approach road, base course	31234	0	0	19	593,446	0.10	3123.40	4.53	141490.02	0.25	7808.50							
Culvert, dia=800	8	157,926	1,263,408	58,390	467,120	1174.98	9399.84	12647.74	101181.92	186.10	1488.80							
Culvert, dia=1000	2	157,926	315,852	58,390	116,780	1174.98	2349.96	12647.74	25295.48	186.10	372.20							
Side ditch	6000	18	108,000	50	300,000	3.95	23700.00	13.31	79860.00	0.16	960.00							
Road marking	9000	28	252,000	363	90.00	0.01	90.00	0.00	0.63	0.00	0.00							
Guardrail	1400	3,790	5,306,000	0	0	12.77	17878.00	0.00	0.00	0.00	0.00							
Total of approach road			9,905,192	47,166,743			132510.47		374696.05		256135.85							
Temporary bridge																		
Temporary bridge	1	0	0	4,066,600	4,066,600	24983.42	24983.42	1668.75	1668.75	15501.06	15501.06							
Platform	1	24,462	24,462	640,433	640,433	4193.94	4193.94	1137.69	1137.69	565.14	565.14							
Temporary landing pier	1	19,070	19,070	650,917	650,917	4209.65	4209.65	1027.88	1027.88	877.31	877.31							
Total of temporary bridge			43,532	5,357,950			33387.01		3834.32		16943.51							
Rivertment work																		
Rivertment work, excavation	9372	0	0	259	2,427,348	0.00	0.00	0.00	0.00	1.42	13308.24							
Rivertment work, refill	5271	0	0	302	1,591,842	0.12	632.52	0.00	158.13	1.70	8960.70							
Rivertment work, concrete block	4337	13,379	58,024,723	0	0	2.36	10365.43	0.03	24590.79	0.00	0.00							
Total of rivertment work			58,024,723	4,019,190			10997.95	5.67	24748.92		22268.94							
Total			27,550,773	80,601,468			754475.66		1667720.41		389731.24							

Table K.12 Estimate of Equipment Owership Cost (1)

Description		Quantity	Owing days			Remarks
			Day	Owing cost	Cost	
Earthwork						
Back hoe	1.0m ³	1	450	13,410	6,034,500	
Wheel loader	1.2m ³	1	450	4,662	2,097,900	
Bulldozer	21 t	1	450	17,370	7,816,500	
Vibration roller	1.0 t	1	450	1,116	502,200	
Compactor	50~60kg	1	450	180	81,000	
Tamper	80kg	1	450	266	119,475	
Pick hammer	-	2	450	50	44,550	
Macadam roller	10~12 t	1	450	596	2,689,200	
Tyre roller	8~20 t	1	450	5,499	2,474,550	
Grader	3.1m	1	450	7,857	3,535,650	
Dump truck	11 t	2	450	5,616	5,054,400	
Dump truck	4 t	1	450	3,681	1,656,450	Abutment 4months 31%
Earthwork total					32,106,375	Approach road 9months 69%
Abutment Total					9,952,976	
					22,153,399	
Pavement work						
Distributor	-	1	180	2,421	435,780	
Chipsreader	-	1	180	535	96,228	
Road sweeper	-	1	180	12,150	2,187,000	
Line maker	-	2	180	239	97,038	
Truck	2 t	1	180	1,512	544,320	
Compressor	3.7m ³			1,278	230,040	
Pavement total					3,590,406	
Approach road Total					25,743,805	
Temporary bridge						
Crawler crane	50 t	2	390	25,650	20,007,000	
Truck crane	25 t	2	390	21,240	16,567,200	
Diesel hummer	2.5 t	1	390	9,540	3,720,600	
Vibro hummer	40 t	1	390	9,270	3,615,300	
Trailer	32 t	1	390	10,350	4,036,500	
Unic truck	4 t	1	390	3,681	1,435,590	
Truck	10 t	1	390	5,301	2,067,390	
Generater	60KVA	1	390	1,728	673,920	
Total					52,123,500	

Table K.13 Estimate of Equipment Owership Cost (2)

Description		Quantity	Owing days			Remarks
			Day	Owing cost	Cost	
PC girder						
Portal crane	60t	2	450	12,690	11,421,000	
Girder hanging	60t	2	450	21,060	18,954,000	
Metal fitting	60t	2	450	191	171,720	
Lateral transfer	60t	2	450	1,404	1,263,600	
Erection girder	-	100	450	493	22,194,000	
Bent	-	12	450	462	2,493,180	
Winch	5t	2	450	12,600	11,340,000	
Hydraulic jack	75t	8	450	1,080	3,888,000	
Hydraulic pump	75t	4	450	881	1,585,980	
Carriage	60t	2	450	1,710	1,539,000	
Roller	60t	10	450	1,395	6,277,500	
Expansion pump	1T19.3	3	450	878	1,185,840	
Rail	-	14.7	450	170	1,125,212	
Cutter	-	1	-	-	292,500	
Bender	-	1	-	-	299,250	
Working table	-	1	-	-	89,100	
Gas cutter	-	1	-	-	34,650	
High speed cutter	-	1	-	-	37,238	
Electric saw	-	1	-	-	66,150	
Disk sander	ED-150A	1	450	191	12,465	
Pilot attachment	-	1	450	44	85,860	
Electric drill	-	1	450	313	19,845	
Grouting mixer	200	1	450	497	140,940	
Grouting pump	30	1	450	896	223,560	
Chain block	5.0t	4	450	516	1,611,900	
Chain block	2.0t	4	450	80	928,260	
Lever block	5.0t	3	450	123	108,135	
Lever block	3.0t	2	450	190	110,970	
Lever block	1.5t	1	450	134	85,455	
Chill hall	3.0t	1	450	215	60,345	
Chill hall	1.6t	1	450	86	96,795	
Pulley	300	5	450	213	194,400	
Pulley	400	5	450		479,925	
Total					88,416,774	

Table K.14 Estimate of Equipment Ownership Cost (3)

Description		Quantity	Owing days			Remarks
			Day	Owing cost	Cost	
Concrete work						
Concrete plant	30m ³ /hr	1	600	13,500	8,100,000	
Cement silo	30 t	1	600	1,341	804,600	
Bucket elevator	20t/hr	1	600	900	540,000	
Screw Conveyor	20t/hr	2	600	475	570,240	
Generator	200KVA	1	600	4,158	2,494,800	
Generator	100KVA	1	600	2,178	1,306,800	
Compressor	10.6m ³	1	600	3,564	2,138,400	
Welder	300A	1	600	84	50,220	
Converter	12A	2	600	163	195,480	
Vibrator	40	10	600	143	858,600	
Underwater pump	#4	3	600	137	246,240	
Underwater pump	#3	2	600	200	239,760	
Underwater pump	#2	4	600	284	682,560	
Washer	11kw	1	600	754	452,520	
Concrete bucket	0.6	1	600	336	201,420	
Concrete bucket	1.0	1	600	479	287,280	
Truck mixer	4.5m ³	2	600	5,400	6,480,000	
Total					25,648,920	
					6,155,741	Superstructure 24%
					10,259,568	Abutment 40%
					5,899,252	Pier 23%
					3,334,360	In situ concrete pile 13%
In situ concrete pile						
Crawler crane	50 t	2	210	25,650	10,773,000	
Truck crane	25 t	2	210	21,240	8,920,800	
Vibro hammer	40 t	1	210	9,270	1,946,700	
Trailer	32 t	1	210	10,350	2,173,500	
Truck	4 t	1	210	3,681	773,010	
Truck	10 t	1	210	5,301	1,113,210	
Generator	200KVA	1	210	1,728	362,880	
Boat	15 t	1	210	7,542	1,583,820	
Float	10 t	20	210	1,458	6,123,600	
Welder	150A	1	210	287	60,291	
Winch	5 t	3	210	12,600	7,938,000	
Reverse circulation	-	1	210	19,620	4,120,200	
Hammer grab	1500	1	210	27,180	5,707,800	
Hammer crown	-	1	210	4,968	1,043,280	
Underwater pump	-	1	210	1,477	310,149	
Tremie pipe	250	12	210	245	616,896	
Drill pipe	200	12	210	1,206	3,039,120	
Total					56,606,256	

Table K.15 Estimate of Material Overshop Cost (1)

Description	Size	Quantities	Weight	Month	Purchase		Rental		Maintenance		Remarks
					Unit	Cost	Unit	Cost	Unit	Cost	
1. Temporary Bridge											EL=166.00
Pile	H350x350x13x19	2720	372.640	20			2,850	21,240,480	3,100	1,155,184	
Beam	H350x350x13x19	840	115.080	20			2,850	6,559,560	3,100	356,748	
Deck plate	1000x2000x200	1260	236.880	20			600	15,120,000	1,200	1,512,000	
Section steel	I300x90x10	602	52.734			83,000	4,376,922				
	I200x90x 8		35.996			79,000	2,843,684				
	L100x100x10		57.592			73,000	4 204,216				
	L100x100x10		3.242			350	1,135				
	FR12x350x310		2.452			150,000	367,800				
	FR16x147x310		1.746			150,000	411,900				
	FR 9x270x310		1.418			150,000	212,700				
	FR12x250x270		0.192			150,000	28,800				
Bolt	EN60, 70xM22		2.080			70,000	145,600				
	H1B(F10T)		2.694			180,000	484,920				
	H1B(F10T)		0.924			170,000	157,080				
	H1B(F10T)		0.824			160,000	131,840				
Sub total			887.494			13,366,597	42,920,040			3,023,932	Total 59,310,569

Table K.16 Estimate of Material Owership Cost (2)

Description	Size	Quantities	Weight	Month	Purchase		Rental		Maintenance		Remarks
					Unit	Cost	Unit	Cost	Unit	Cost	
2. Platform											EL=155.70
Pile	H350x350x12x19	63	8.631	20			2,850	491,967	3,100	26,756	
Beam	H350x350x12x19	27	3.699	20			2,850	210,843	3,100	11,467	
Deck plate	1000x3000x200	48	10.208				600	576,000	1,200	57,600	
Section steel	I300x90x10	6	1.840		83,000	152,720					
	I200x90x 8		0.050		160,000	8,000					
	I100x100x10		0.083		160,000	13,280					
Sub total			24.511			174,000		1,278,810		95,823	
Platform 4hr			98.044			696,000		5,115,240		383,292	Total 6,194,532
3. Landing Pier											EL=160.00
Pile	H350x350x12x19	3045	41.717	20			2,850	2,377,869	3,100	129,323	
Beam	H350x350x12x19	91	12.467	20			2,850	710,619	3,100	38,648	
Deck plate	1000x2000x200	144	27.072	20			600	1,728,000	1,200	172,800	
Section steel	I300x90x10	84	3.201		83,000	265,683					
	I200x90x 8	42	1.273		79,000	100,567					
	I100x100x10	144	2.146		73,000	156,658					
Bolt	HDB(F10T)		0.200		170,000	34,000					
	HDB(F10T)		0.103		160,000	16,480					
Sub total			88.179			573,388		4,816,488		340,770	Total 5,730,646

Table K.17 Estimate of Packing and Transport Cost

No.	Item	Quantity	unit	F/T	Packing	Shipping		Ship's cargo		Customs	On land	Total	
						¥	\$	¥	\$			¥	\$
	Mobilization	1.00	sum	4891	¥ 41,298,900	¥ 34,237,000	¥ 47,255,121	\$ 1671	\$ 414,788			122,791,021	416,459.00
	Demobilization	1.00	sum	3110	\$ 147,739	\$ 142,289	\$ 201,568	\$ 1671	\$ 265,111			0	758,378.00
	Reduction												
	Rail	1.00	sum	500	\$ 25,000	\$ 22,876	\$ 41,882		\$ 55,000				- 144,758.00
	H-beam	1.00	sum	1074	\$ 53,700	\$ 49,138	\$ 61,992		\$ 118,140				- 282,970.00
	Total											122,791,021	779,791.00

Packing (¥/FT) ¥ 15,850/FT Crate (CR) ¥ 14,250/FT Skid/Bundle (S/B) ¥ 7,650/FT Marking (M) ¥ 4,750/FT
 Shipping (¥/FT) ¥ 7,000/FT Self-propelled vehicles ¥ 7,000/FT Plants ¥ 7,000/FT
 Ship's cargo (¥/FT) Referred to Estimate Cost.
 Customs (\$/FT) Sum of Port charge, Customs and Storage charge \$ 1671
 On land (\$/FT) General cargo \$ 87/FT, Self-propelled vehicles \$ 35/FT, Plants \$ 80/FT, Steel \$ 110/FT

Table K.18 Packing and Transport Cost (1.)

No.	Item	Quantity	unit	F/T	Packing (¥)	Shipping (¥)	Ship's cargo (¥)	Customs (\$)	On land (\$)	Total	
										¥	\$
1	Crawler crane 50t	2	nr	260	M 1,235,500	1,820,000	1,992,062		20,800.00	5,047,062	22,471.00
2	Truck crane 25t	2	nr	220	M 1,045,000	1,540,000	1,660,051		7,700.00	4,245,051	7,700.00
3	Back hoe	1	nr	54	M 256,500	378,000	691,688		4,320.00	1,326,188	4,320.00
4	Wheel loader	1	nr	44	M 209,000	308,000	309,439		3,520.00	826,439	3,520.00
5	Bulldozer 21t	1	nr	60	M 285,000	420,000	830,025		4,800.00	1,535,025	4,800.00
6	Vibration roller	1	nr	3	M 14,250	21,000	33,027		240.00	68,277	240.00
7	Vibrating compactor	1	nr	3	CR 42,750	21,000	33,027		261.00	96,777	261.00
8	Tamper	1	nr								
9	Pick hammer	2	nr								
10	Diesel hammer	1	nr	6	CR 85,500	42,000	66,055		480.00	193,555	480.00
11	Pile Hammer & head	2	nr	12	CR 171,000	84,000	132,109		960.00	387,109	960.00
12	Vibro pile driver	1	nr	8	CR 114,000	56,000	88,073		640.00	258,073	640.00
13	Boat FRP 15t	1	nr	200	S/B1,530,000	1,400,000	1,652,400		16,000.00	4,582,400	16,000.00
14	Boom of crawler crane	1	sum	30	CR 427,500	210,000	330,270		2,610.00	967,773	2,610.00
15	Generator 175KVA	1	nr	8	CR 114,000	56,000	88,073		696.00	258,073	696.00
16	Generator 100KVA	1	nr	7	CR 99,750	49,000	77,064		609.00	225,814	609.00
17	Generator 60KVA	1	nr	4	CR 57,000	28,000	44,036		348.00	129,036	348.00

Packing (¥/FT) Case (CA) ¥ 15,850/FT Crate (CR) ¥ 14,250/FT Skid/Bundle (S/B) ¥ 7,650/FT Marking (M) ¥ 4,750/FT
 Shipping (¥/FT) General cargo ¥ 7,000/FT Self-propelled vehicles ¥ 7,000/FT Plants ¥ 7,000/FT
 Ship's cargo (¥/FT) Referred to Estimate Cost.
 Customs (\$/FT) Sum of Port charge, Customs and Storage charge \$ 1671
 On land (\$/FT) General cargo \$ 87/FT, Self-propelled vehicles \$ 35/FT, Plants \$ 80/FT, Steel \$ 110/FT

Table K.19 Packing and Transport Cost (2)

No.	Item	Quantity	unit	F/T	Packing (¥)	Shipping (¥)	Ship's cargo (¥)	Customs (\$)	On Land (\$)	Total	
										¥	\$
18	Compressor	2	nr	6	CR 59,400	42,000	66,055		522.00	167,455	522.00
19	Compressor	1	nr	8	CR 79,200	56,000	88,073		696.00	223,273	696.00
20	Welder 500A+150A	2	nr	2	CA 31,700	14,000	22,018		174.00	67,718	174.00
21	Converter	2	nr								
22	Vibrator	6	nr								
23	Underwater pump	9	nr	5	CA 79,250	35,000	55,046		435.00	169,296	435.00
24	High pressure washer	1	nr								
25	Concrete plant	1	nr	240	CA 2,760,000	1,680,000	2,642,188		20,880.00	7,082,188	20,880.00
26	Cement silo	1	nr	10	CA 158,500	70,000	110,091		870.00	338,591	870.00
27	Bucket elevator	1	nr	5	CA 79,250	35,000	55,046		435.00	169,296	435.00
28	Screw coeveyor	2	nr	5	CA 79,250	35,000	55,046		435.00	169,296	435.00
29	Concrete bucket	2	nr	2	CA 31,700	14,000	22,018		174.00	67,718	174.00
30	Dump truck 11t	2	nr	160	M 760,000	1,120,000	1,092,236		5,600.00	2,972,236	5,600.00
31	Truck mixer	2	nr	160	M 760,000	1,120,000	1,092,236		5,600.00	2,972,236	5,600.00
32	Truck 10t	1	nr	80	M 380,000	560,000	546,118		2,800.00	1,486,118	2,800.00
33	Truck crane 5t	1	nr	45	M 321,750	315,000	364,044		1,575.00	1,000,794	1,575.00
34	Trailer 32t	1	nr	140	M 665,000	980,000	996,031		4,900.00	2,641,031	4,900.00

Packing (¥/FT) ¥ 15,850/FT Crate (CR) ¥ 14,250/FT Skid/Bundle (S/B) ¥ 7,650/FT Marking (M) ¥ 4,750/FT
 Shipping (¥/FT) ¥ 7,000/FT Self-propelled vehicles ¥ 7,000/FT Plants ¥ 7,000/FT
 Ship's cargo (¥/FT) Referred to Estimate Cost.
 Customs (\$/FT) Sum of Port charge, Customs and Storage charge \$ 1671
 On land (\$/FT) General cargo \$ 87/FT, Self-propelled vehicles \$ 35/FT, Plants \$ 80/FT, Steel \$ 110/FT

Table K.20 Packing and Transport Cost (3)

No.	Item	Quantity	unit	F/T	Packing (¥)	Shipping (¥)	Ship's cargo (¥)	Customs (\$)	On land (\$)	Total	
										¥	\$
35	Truck 2t	2	nr	50	M 357,500	350,000	324,765		1,750.00	1,032,265	1,750.00
36	Van 2200cc	2	nr	16	M 114,400	112,000	594,612		1,435.00	821,012	1,435.00
37	Mini bus (15 persons)	1	nr	15	M 107,250	105,000					
38	Mini bus (29 persons)	1	nr	20	M 143,000	140,000					
39	Portal crane	2	nr								
40	Girder hanging	2	nr								
41	Metal fitting	2	set	180	CA 2,070,000	1,260,000	1,981,641		15,660.00	5,311,641	15,660.00
42	Lateral transfer	2	nr								
43	Election girder	1	nr								
44	Bent	3	nr								
45	Winch	5	nr								
46	Hydraulic jack	4	nr								
47	Hydraulic pump	4	nr	400	CA 4,600,000	2,800,000	4,403,646		34,800.00	11,803,646	34,800.00
48	Carriage	2	nr								
49	Roller	10	nr								

Packing (¥/FT) ¥ 15,850/FT Case (CA) ¥ 14,250/FT Skid/Bundle (S/B) ¥ 7,650/FT Marking (M) ¥ 4,750/FT
 Shipping (¥/FT) ¥ 7,000/FT Self-propelled vehicles ¥ 7,000/FT Plants ¥ 7,000/FT
 Ship's cargo (¥/FT) Referred to Estimate Cost.
 Customs (S/FT) Sum of Port charge, Customs and Storage charge \$ 1671
 On land (S/FT) General cargo \$ 87/FT, Self-propelled vehicles \$ 35/FT, Plants \$ 80/FT, Steel \$ 110/FT

Table K.21 Packing and Transport Cost (4)

No.	Item	Quantity	unit	F/T	Packing (¥)	Shipping (¥)	Ship's cargo (¥)	Customs (\$)	On land (\$)	Total	
										¥	\$
50	Chain block 5t	4									
51	Chain block 2t	4									
52	Lever block 1.5t	3									
53	Lever block 3t	2		2	CA 31,700	14,070	22,018		174.00	67,718	174.00
54	Lever block 5t	1									
55	Chill hall 1.6t	1									
56	Chill hall 1.6t	1									
57	Pulley (oak) φ 300	5									
58	Pulley (shackle) φ 300	5									
59	Pulley (oak) φ 400	5		2	CA 31,700	14,070	22,018		174.00	67,718	174.00
60	Pulley (shackle) φ 400	5									
61	Performed reinforcing bar	78.5	ton								
62	PC wire 12T-12.4	36.9	ton		120 S/B	840,000	1,321,094		13,200.00	3,079,094	13,200.00
63	PC wire 1T-19.3	6.5	ton								

Packing (¥/FT) Case (CA) ¥ 15,850/FT Crate (CR) ¥ 14,250/FT Skid/Bundle (S/B) ¥ 7,650/FT Marking (M) ¥ 4,750/FT
 Shipping (¥/FT) General cargo ¥ 7,000/FT Self-propelled vehicles ¥ 7,000/FT Plants ¥ 7,000/FT
 Ship's cargo (¥/FT) Referred to Estimate Cost.
 Customs (\$/FT) Sum of Port charge, Customs and Storage charge \$ 1671
 On land (\$/FT) General cargo \$ 87/FT, Self-propelled vehicles \$ 35/FT, Plants \$ 80/FT, Steel \$ 110/FT

Table K-22 Packing and Transport Cost (5)

No.	Item	Quantity	unit	F/T	Packing (¥)	Shipping (¥)	Ship's cargo (¥)	Customs (\$)	On land (\$)	Total	
										¥	\$
64	Sheath φ 65										
65	Sheath φ 35										
66	Fixing equipment	200	nr	80	CA 920,000	560,000	880,729		6,960.00	2,360,729	6,960.00
67	Fixing equipment	780	nr								
68	Rubber bareing	40	nr								
69	Anchor bolt	1	sum								
70	Equipment for tensioning	2	nr								
71	Equipment for main girder fabrication	1	sum		CA 2,875,000	1,750,000	2,752,279		21,750.00	7,377,279	21,750.00
72	Main girder formwork	1	sum								
73	Instruments	1	sum	56	CA 747,500	455,000	715,592		5,655.00	1,918,092	5,655.00
74	Consumption material	1	sum	230	CA 3,645,500	1,610,000	2,532,096		20,010.00	7,787,596	20,010.00
75	Rail	100	t	100	S/B 765,000	700,000	578,340		11,000.00	2,043,340	11,000.00
76	H-beam	1074	t	1074	S/B 8216,100	7,518,000	9,484,776		118,140.00	25,218,876	118,140.00
77	Steel box	500	t	500	S/B 3825,000	3,500,000	6,407,870		55,000.00	13,732,870	55,000.00

Packing (\$/FT) Case (CA) \$ 103.600/FT Crate (CR) \$ 93.137/FT Skid/Bundle (S/B) \$ 50.000/FT Marking (M) \$ 31.046/FT
 Shipping (\$/FT) General cargo \$ 45.752/FT Self-propelled vehicles \$ 45.752/FT Plants \$ 45.752/FT
 Ship's cargo (\$/FT) Sum of Port charge, Customs and Storage charge \$ 1671
 Customs (\$/FT) General cargo \$ 87/FT, Self-propelled vehicles \$ 35/FT, Plants \$ 80/FT, Steel \$ 110/FT
 On land (\$/FT)

Table K.23 Packing and Transport Cost (6)

No.	Item	Quantity	unit	F/T	Packing (\$)	Shipping (\$)	Ship's cargo (\$)	Customs (\$)	On land (\$)	Total	
										(\$)	(\$)
1	Crawler crane 50t	2	nr	260	M	8,072	11,896	13,020		20,800	55,458
2	Truck crane 25t	2	nr	220	M	6,830	10,065	10,850		7,700	35,446
3	Back hoe	1	nr	54	M	1,676	2,471	4,521		4,320	12,988
4	Wheel loader	1	nr	44	M	1,366	2,013	2,022		3,520	2,921
5	Bulldozer	1	nr	60	M	1,863	2,745	5,425		4,800	14,833
6	Vibration roller	1	nr	3	M	93	137	216		240	686
7	Diesel hammer	1	nr	6	CR	559	275	432		480	1,745
8	Pile hammer & head	2	nr	12	CR	1,118	549	863		960	3,490
9	vibro pile hammer	1	nr	8	CR	745	366	576		640	2,327
10	Boom of crawler crane	1		30	CR	2,794	1,373	2,159		2,610	8,936
11	Generator 175KVA	1	nr	8	CR	745	366	576		696	2,383
12	Generator 100KVA	1	nr	7	CR	652	320	504		609	2,085
13	Generator 60KVA	1	nr	4	CR	373	183	288		348	1,192
14	Compressor 3nr	2	nr	6	CR	388	275	432		522	1,617
15	Compressor 10nr	1	nr	8	CR	517	366	576		696	2,155
16	Concrete plant	1	nr	240	CA	18,039	10,980	17,269		20,880	67,169
17	Cement silo	1	nr	10	CA	1,036	458	720		870	3,084

Packing (\$/FT) Case (CA) \$ 103,600/FT Crate (CR) \$ 93,137/FT Skid/Bundle (S/B) \$ 50,000/FT Marking (M) \$ 31,046/FT
 Shipping (\$/FT) General cargo \$ 45,752/FT Self-propelled vehicles \$ 45,752/FT Plants \$ 45,752/FT
 Ship's cargo (\$/FT) Sum of Port charge, Customs and Storage charge \$ 1671
 Customs (\$/FT) General cargo \$ 87/FT, Self-propelled vehicles \$ 35/FT, Plants \$ 80/FT, Steel \$ 110/FT
 On land (\$/FT)

Table K.24 Packing and Transport Cost (7)

No.	Item	Quantity	unit	F/T	Packing (\$)	Shipping (\$)	Ship's cargo (\$)	Customs (\$)	On land (\$)	Total	
										(\$)	\$
18	Bucket elevator	1	nr	5	CA 518	229	360		435		1,542
19	Screw conveyor	2	nr	5	CA 518	229	360		435		1,542
20	Dump truck 11t	2	nr	160	B 4,967	7,320	7,139		5,600		25,026
21	Truck mixer 5m ³	2	nr	160	B 4,967	7,320	7,139		5,600		25,026
22	Truck 10t	1	nr	80	B 2,484	3,660	3,690		2,800		12,513
23	Truck crane 5t	1	nr	45	B 2,103	2,058	2,379		1,575		8,115
24	Trailer 32t	1	nr	140	B 4,346	6,405	6,510		4,900		22,161
25	Diesel truck 2t	2	nr	50	B 2,337	2,288	2,123		1,750		8,498
26	Van 2000cc	2	nr	16	B 748	732	3,886		1,435		10,038
27	Mini bus (15 persons)	1	nr	15	B 701	686					
28	Mini bus (29 persons)	1	nr	20	B 935	915					
29	Rail	100	t	100	S/B 5,000	4,575	3,780		11,000		24,355
30	H-beam	880	t	880	S/B 44,000	40,262	61,992		96,800		243,054
31	Steel box	500	t	500	S/B 25,000	22,876	41,882		55,000		144,758

Table K.25 Estimate of Engineering Service Cost for Detail Design

DESCRIPTION	UNIT	QUANTITY	FOREIGN PORTION (\$)		LOCAL PORTION (US\$)		REMARKS
			UNIT PRICE	AMOUNT	UNIT PRICE	AMOUNT	
Direct personnel expenses	sum	1.00		2,395,000			
Project manager	sum	1.00		6,015,000			
Bridge engineer	sum	1.00		1,560,000			
Highway engineer	sum	1.00		1,203,000			
Geologist	sum	1.00		936,000			
Surveyor	sum	1.00		2,005,000			
Specification and tender document	sum	1.00		936,000			
Cost estimate	sum	1.00		15,050,000			
Sub-total							
Direct expenses	sum	1.00		4,557,000			
Traveling expenses	sum	1.00		3,621,000			
Investigation expenses	sum	1.00		8,178,000			
Sub-total							
Overhead cost	sum	1.00		15,050,000			L.CX 100%
Technical administrative expense	sum	1.00		6,020,000			(L.C+O.C)X20%
Total				44,298,000			

Table K.26 Engineering Service Cost for Detail Design (1)

DESCRIPTION	UNIT	QUANTITY	FOREIGN PORTION (¥)		LOCAL PORTION (US\$)		TOTAL (US\$)	REMARKS
			UNIT PRICE	AMOUNT	UNIT PRICE	AMOUNT		
	Grade	Unit Price	Man-Month	Amount	Amount			
Direct personnel expense								
Position								
Project manager	2	958	2.5	2,395				
Bridge engineer (A)	3	802	2.5	2,005				
Bridge engineer (B)	3	802	2.5	2,005				
Bridge engineer (C)	3	802	2.5	2,005				
Highway engineer	4	624	2.5	1,560				
Geologist	3	802	1.5	1,203				
Surveyor	4	624	1.5	936				
Specification and tender document	3	802	2.5	2,005				
Cost estimate	4	624	1.5	936				
TOTAL			19.5	15,050				

Table K.27 Engineering Service Cost for Detail Design (2)

DESCRIPTION	UNIT	QUANTITY	FOREIGN PORTION (¥)		LOCAL PORTION (US\$)		TOTAL (US\$)	REMARKS
			UNIT PRICE	AMOUNT	UNIT PRICE	AMOUNT		
			Travel cost		Allowance			
Travelling expenses	Grade	day						
Position								
Project manager	2	30+ 0.9 × 15= 43.5	258,100 × 1 = 258,100	4,500 × 43.5= 195,750	13,500 × 44= 594,000	1,047,850		
Bridge engineer (A)	3	30+ 0.9 × 15= 43.5	258,100 × 1 = 258,100	3,800 × 43.5= 165,300	11,600 × 44= 510,000	933,800		
Highway engineer	4	30+ 0.9 × 15= 43.5	258,100 × 1 = 258,100	3,800 × 43.5= 165,300	11,600 × 44= 510,000	933,800		
Geologist	3	30	258,100 × 1 = 258,100	3,800 × 30 = 114,000	11,600 × 29= 336,400	708,500		
Surveyor	4	30+ 0.9 × 15= 43.5	258,100 × 1 = 258,100	3,800 × 43.5= 165,300	11,600 × 44= 510,000	933,800		
TOTAL			1,290,500	805,650	2,461,600	4,557,750		

Table K.28 Engineering Service Cost for Detail Design (3)

DESCRIPTION	UNIT	QUANTITY	FOREIGN PORTION (%)		LOCAL PORTION (US\$)		TOTAL (US\$)	REMARKS
			UNIT PRICE	AMOUNT	UNIT PRICE	AMOUNT		
Investigation expenses								
① Local labour cost	day	41.0	3,500	143,500				
② Vehicle rental (A)	day	41.0	3,500	143,500				
(B)				287,000				
Sub total								
③ Transport cost		-		-				
④ Materials and equipment		-		-				
⑤ Consumption goods		-		-				
⑥ Printing and filing for B/Q	sum	1.0	99,100	99,100				
Inking for tender drawing	nr	60.0	11,000	660,000				A1 size
Reducing for tender drawings	nr	60.0	130	7,800				A3 size
Printing and filing for tender document (report)	nr	5.0	6,100	30,500				A4 200X 25+ 1100
(drawings)	nr	5.0	19,500	97,500				A3 120X 110+ 6300
Sub total				894,900				
⑦ Miscellaneous	sum	1.0		2,440,000				Ref. estimate sheet
Total				3,621,000				

Table K.29 Engineering Service cost for Detail Design (4)

Item	Printing			Filing				
	Unit	Unit Price	Quantity	Amount	Unit	Unit Price	Quantity	Amount
Design Report	nr	8	500	4,000	nr	5	125	625
Superstructure D/R	nr	8	500	4,000	nr	5	200	1,000
Superstructure B/Q	nr	8	25	200	nr	5	125	625
Substructure D/R	nr	8	400	3,200	nr	5	170	850
Substructure B/Q	nr	8	250	2,000	nr	5	125	625
Accessories D/R	nr	8	150	1,200	nr	5	95	475
Approach road D/R	nr	8	200	1,600	nr	5	110	550
Drawings	nr	45	1,200	54,000	nr	5	800	4,000
Tender Document	nr	8	2,000	16,000	nr	5	350	1,750
Preliminary evaluation report	nr	8	100	800	nr	5	80	400
Evaluation Report	nr	8	100	800	nr	5	80	400
Total				87,800				11,300
				99,100				

Table K.30 Engineering Service Cost for Detail Design (5)

	Man-Month										
	6	7	8	9	10	11	Domestic	Site	Total		
Project Manager	■	■					1.0	1.5	2.5		
Bridge Engineer (A)	■						1.0	1.5	2.5		
Bridge Engineer (B)	□						2.5		2.5		
Bridge Engineer (C)	□						2.5		2.5		
Highway Engineer	■						1.0	1.5	2.5		
Geologist	■	■					0.5	1.0	1.5		
Subeyor	■	■						1.5	1.5		
Spec. Writer	□						2.5		2.5		
Cost Estimator		□					1.5		1.5		
Total man-month for detail design							12.5	7.0	19.5		

■ : Domestic

□ : Site

Table K.31 Estimate of Engineering Service Cost for Supervision ;Construction Period 2 years

DESCRIPTION	UNIT	QUANTITY	FOREIGN PORTION (¥)		LOCAL PORTION (US\$)		REMARKS
			UNIT PRICE	AMOUNT	UNIT PRICE	AMOUNT	
Direct personnel expenses							
Project Manager	sum	1.00		2,395,000			
Resident Engineer	sum	1.00		20,852,000			
Highway Engineer	sum	1.00		14,352,000			
Bridge Engineer	sum	1.00		11,228,000			
Sub-total				48,827,000			
Direct expenses							
Traveling expenses	sum	1.00		7,734,000			
Investigation expenses	sum	1.00		1,811,000		37,546.00	
Sub-total				9,545,000			
Overhead cost	sum	1.00		48,827,000			L.CX 100%
Technical administrative expense	sum	1.00		19,530,000			(L.C+O.C)X20%
Total				126,729,000		37,546.00	

Table K.32 Engineering Service Cost for Supervision ;Construction Period 2 years (1)

DESCRIPTION	UNIT	QUANTITY	FOREIGN PORTION (¥)		LOCAL PORTION (US\$)		TOTAL (US\$)	REMARKS
			UNIT PRICE	AMOUNT	UNIT PRICE	AMOUNT		
Direct personnel expenses								
Position	Grade	Man-Month	Unit Price	Amount				
Project Manager	2	2.5	958	2,395				
Resident Engineer	3	26	802	20,852				
Highway Engineer	4	23	624	14,352				
Bridge Engineer	3	14	802	11,228				
Total		65.5		48,827				

Table K.33 Engineering Service Cost for Supervision ;Construction Period 2 years (2)

DESCRIPTION	UNIT	QUANTITY	FOREIGN PORTION (¥)		LOCAL PORTION (US\$)		TOTAL (US\$)	REMARKS
			UNIT PRICE	AMOUNT	UNIT PRICE	AMOUNT		
Position	Grade			Travel cost		Allowance	Amount	
Position	Grade			Travel cost		Allowance	Amount	
Project Manager	2	30+ 15+ 30= 75		258,100 × 3 = 774,300	4,500 × 75 =	337,500	1,111,800	
Resident Engineer	3	30+ 30× 0.9 + 30× 0.8 × 24= 633		258,100 × 1 = 258,100	3,800 × 633 =	2,405,400	2,663,500	
Highway Engineer	4	30+ 30× 0.9 + 30× 0.8 × 21= 561		258,100 × 1 = 258,100	3,800 × 561 =	2,131,800	2,131,800	
Bridge Engineer	3	30+ 30× 0.9 + 30× 0.8 × 12= 345		258,100 × 1 = 258,100	3,800 × 345 =	1,311,000	1,569,100	
Total				1,548,600		6,185,700	7,734,300	

Table K.34 Engineering Service Cost for Supervision ;Construction Period 2 years (3)

DESCRIPTION	UNIT	QUANTITY	FOREIGN PORTION (¥)		LOCAL PORTION (US\$)		TOTAL (US\$)	REMARKS
			UNIT PRICE	AMOUNT	UNIT PRICE	AMOUNT		
Investigation expenses								
① Local labour cost								
Typist	M/M	26.0			117.00	3,042.00		
Civil Engineer	M/M	23.0			220.00	5,060.00		
Driver	M/M	26.0			117.00	3,042.00		
Sub total						11,144.00		
② Rental Vehicle	nr	1.0	1,224,165	1,224,165			8,001.08	29/12× 280day + ¥910
Van	nr	1.0			857.00	857.00	857.00	+26/12× 900day + ¥312
transportation	l	9,100			0.233	2,015.00	2,015.00	0.233 \$/l
Fuel	M	26.0			850.00	22,100.00	22,100.00	850 \$/M
Office rental								
Sub total				1,224,165		24,972.00	32,973.08	
③ Transport cost	nr	5,200	-				271.90	200nr/px 26M for copy
④ Material and equipment			8	41,600			1,430.00	1nr/MX 26M, 55\$/nr
⑤ Communication expense	nr	26.0			55.00	1,430.00	1,430.00	7nr/MX 26M
⑥ Printing and filing	nr	182.0	3,000	546,000			3,568.63	
Total				1,811,765		37,546.00	49,387.61	

Table K.35 Engineering Service Cost for Supervision ;Construction Period 2 years (4)

	Mark Schedule of Supervision																												Man-Month
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	
Project Manager																													2.5
Resident Engineer																													26.0
Highway Engineer																													23.0
Bridge Engineer																													14.0
Preparatory works																													
Substructure																													
Superstructure																													
Approach road																													
Demobilization																													
Total																												65.5	

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1