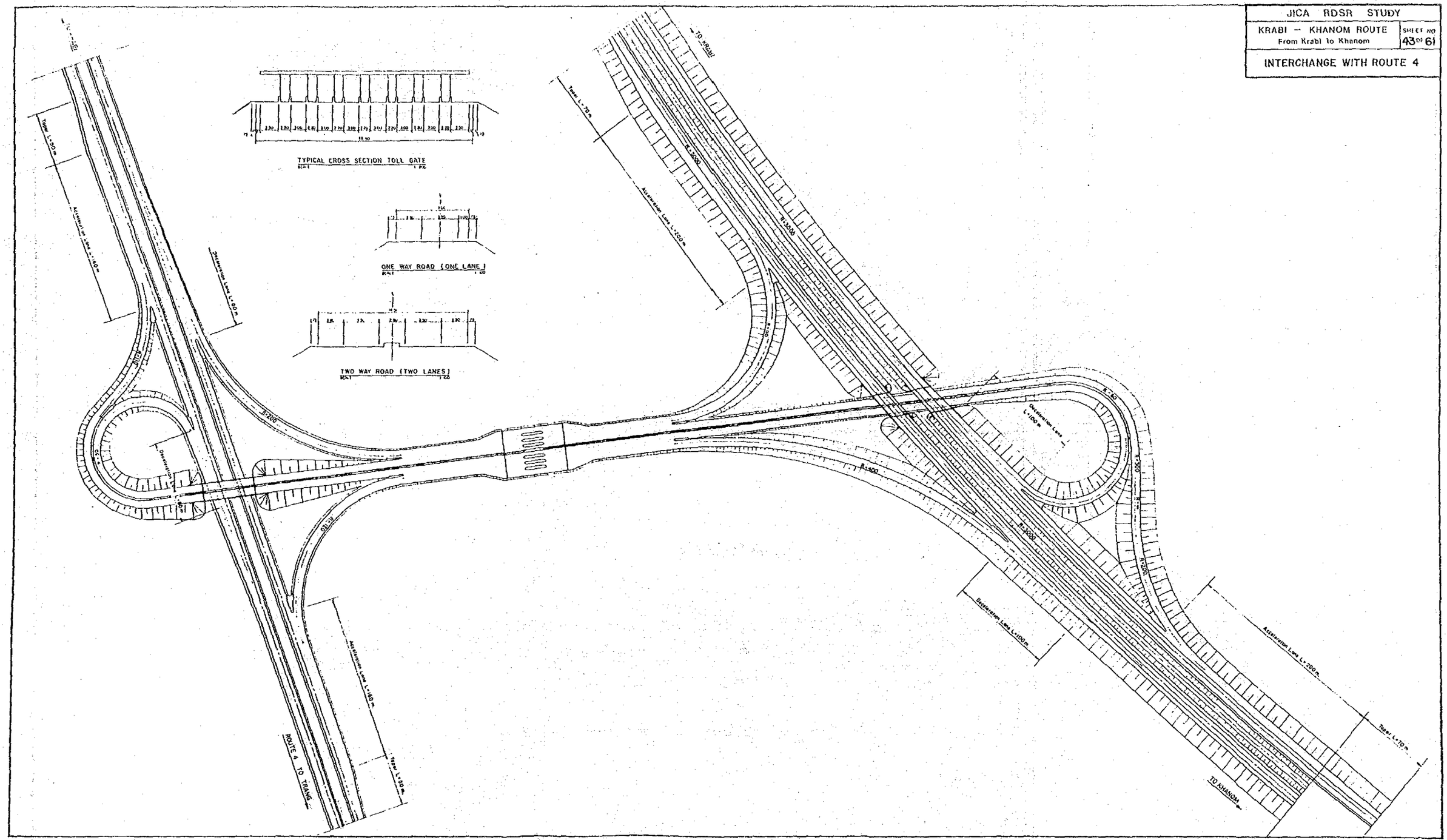
JICA RDSR STUDY

KRABI – KHANOM ROUTE
From Krabi to Khanom

SHEET NO 43 OF 61

INTERCHANGE WITH ROUTE 4

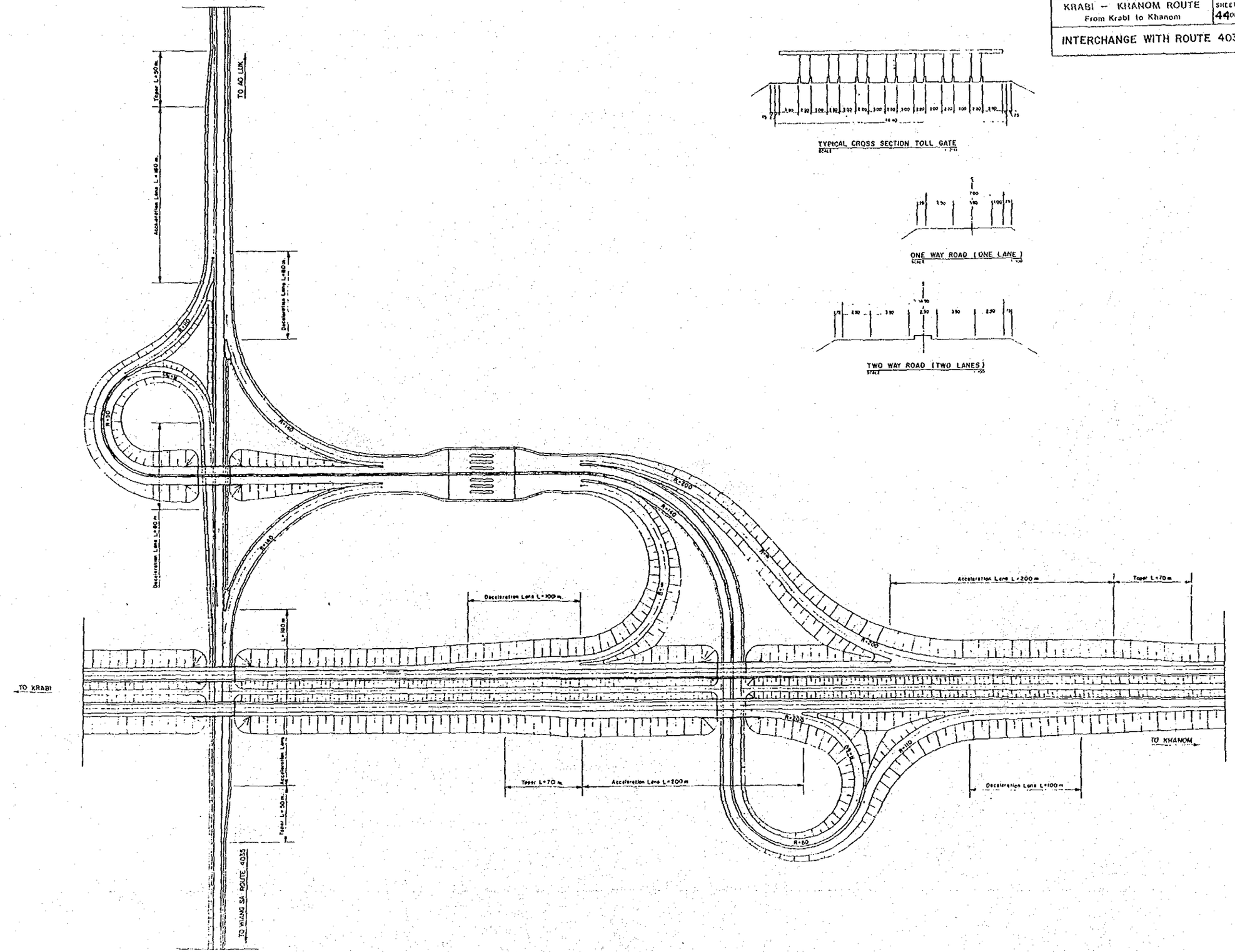


INTERCHANGE WITH ROUTE 4035

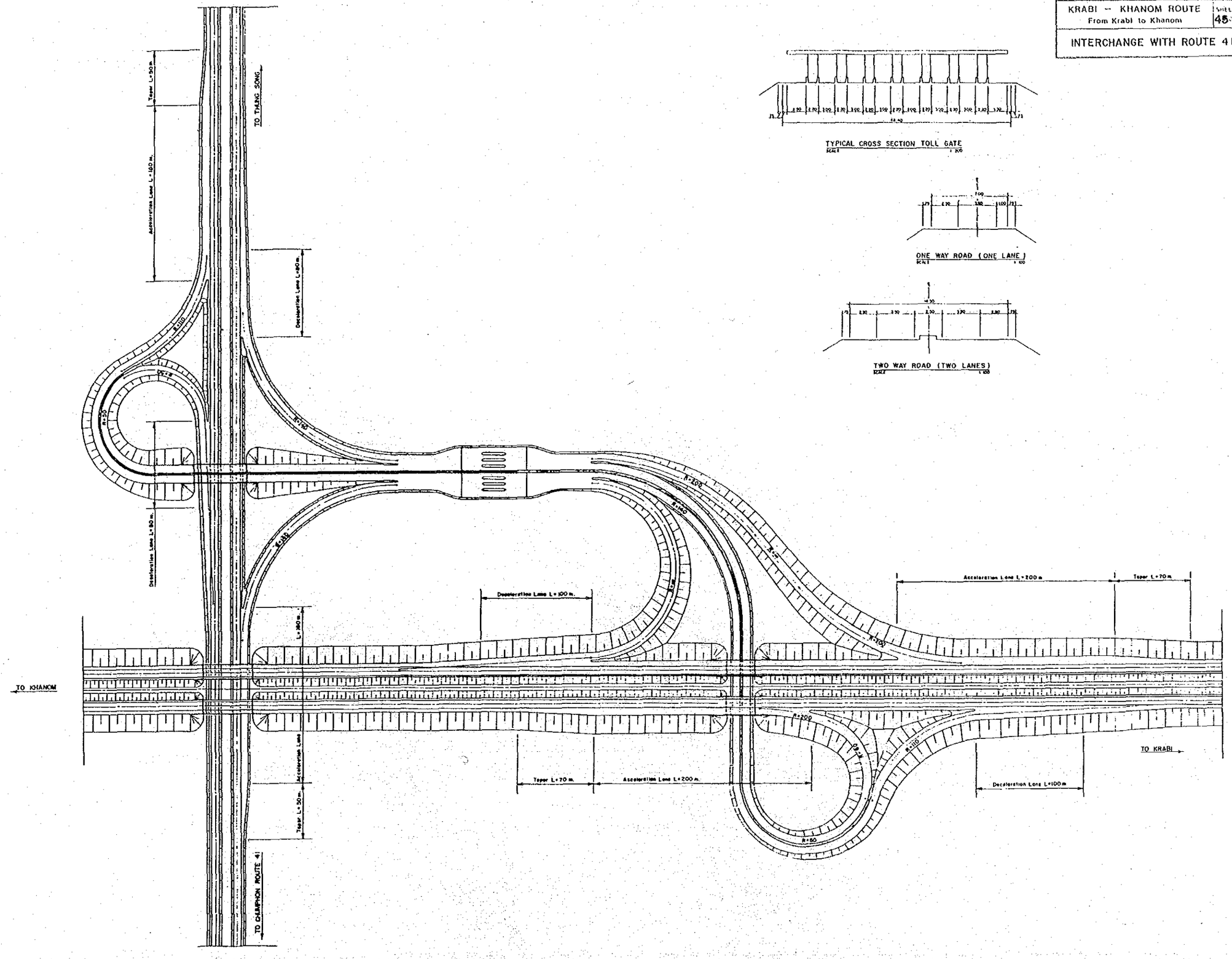
TYPICAL CROSS SECTION TOLL GATE
SCALE 1:100

ONE WAY ROAD (ONE LANE)
SCALE 1:100

TWO WAY ROAD (TWO LANES)
SCALE 1:100



JICA RDSR STUDY	
KRABI – KHANOM ROUTE From Krabi to Khanom	SHEET NO 45 OF 61
INTERCHANGE WITH ROUTE 41	



TYPICAL CROSS SECTION TOLL GATE
SCALE 1:200

ONE WAY ROAD (ONE LANE)
SCALE 1:100

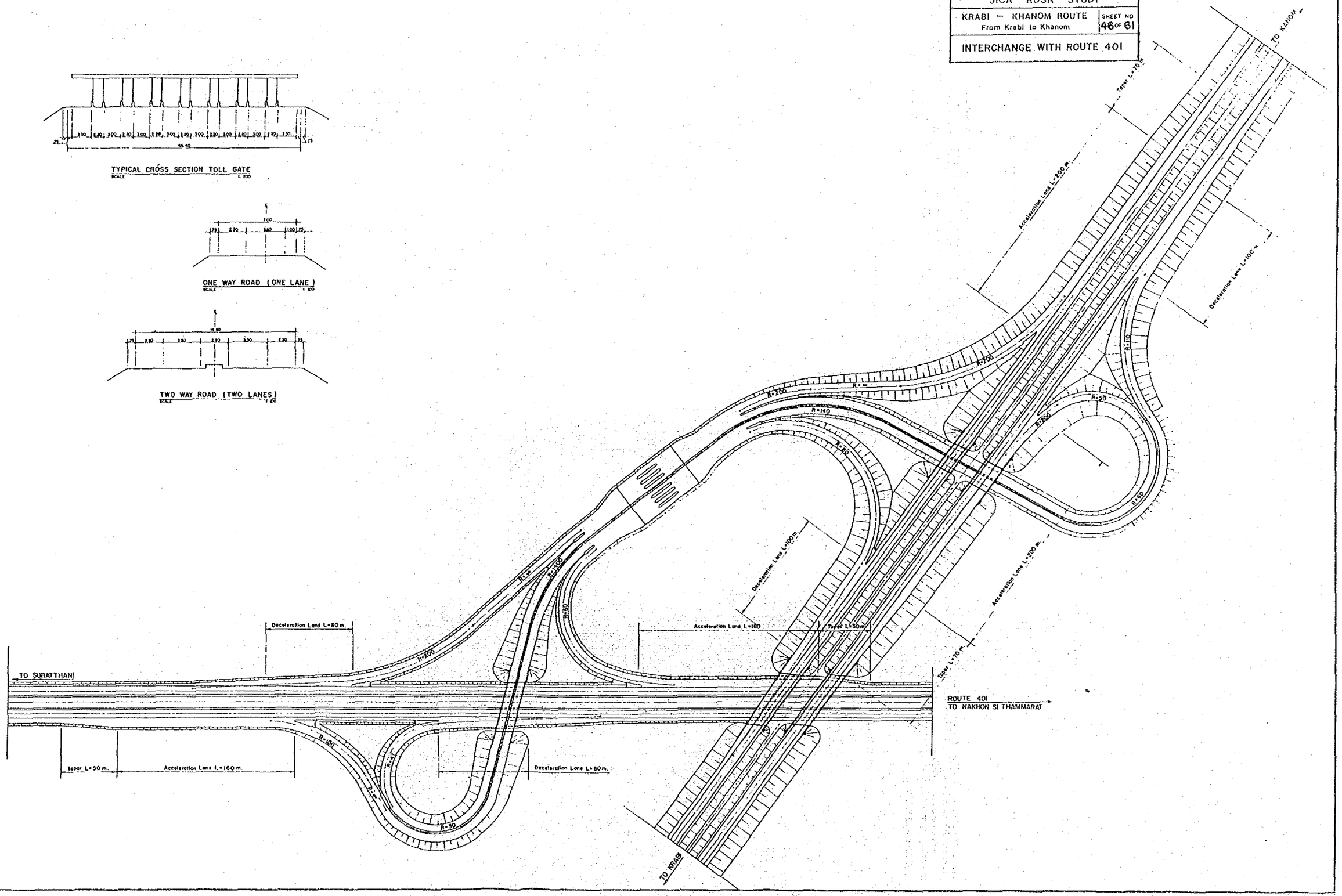
TWO WAY ROAD (TWO LANES)
SCALE 1:100

JICA RDSR STUDY	
KRABI – KHANOM ROUTE From Krabi to Khanom	SHEET NO 46 OF 61
INTERCHANGE WITH ROUTE 401	

TYPICAL CROSS SECTION TOLL GATE
SCALE 1:100

ONE WAY ROAD (ONE LANE)
SCALE 1:100

TWO WAY ROAD (TWO LANES)
SCALE 1:100



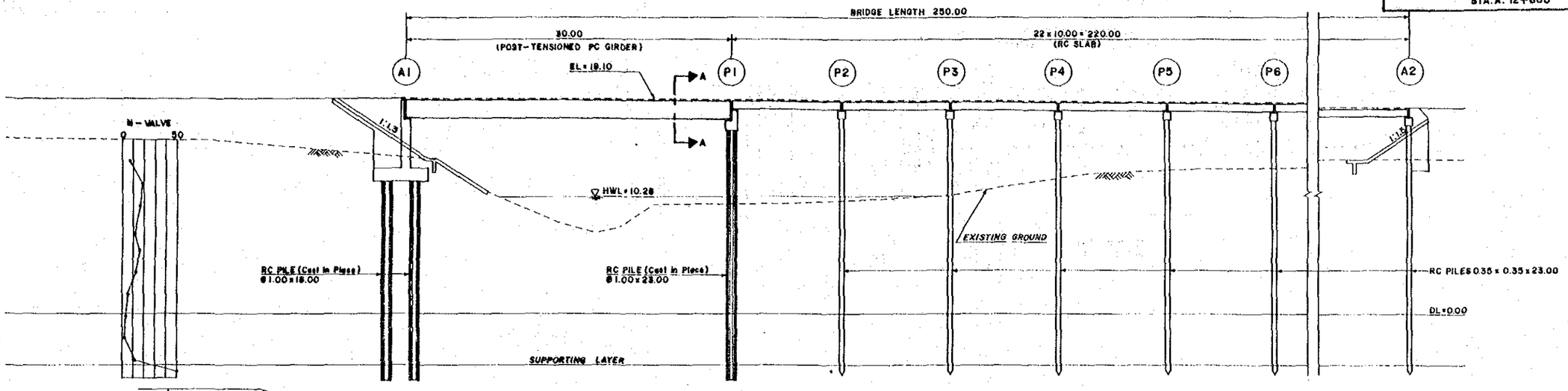
JICA RDSR STUDY

KRABI – KHANOM ROUTE
From Krabi to Khanom

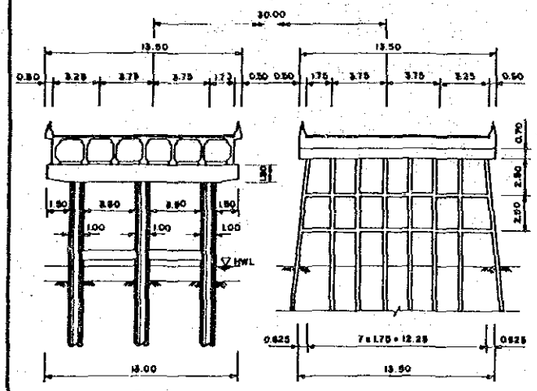
SHEET NO 47 OF 61

BRIDGE FOR KHLONG NOI NANG (B1)

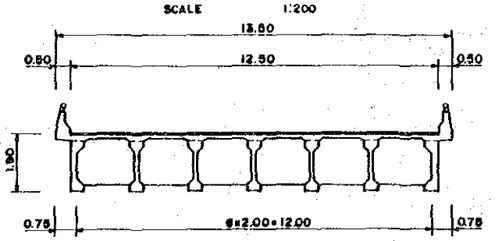
STA.A: 12+600



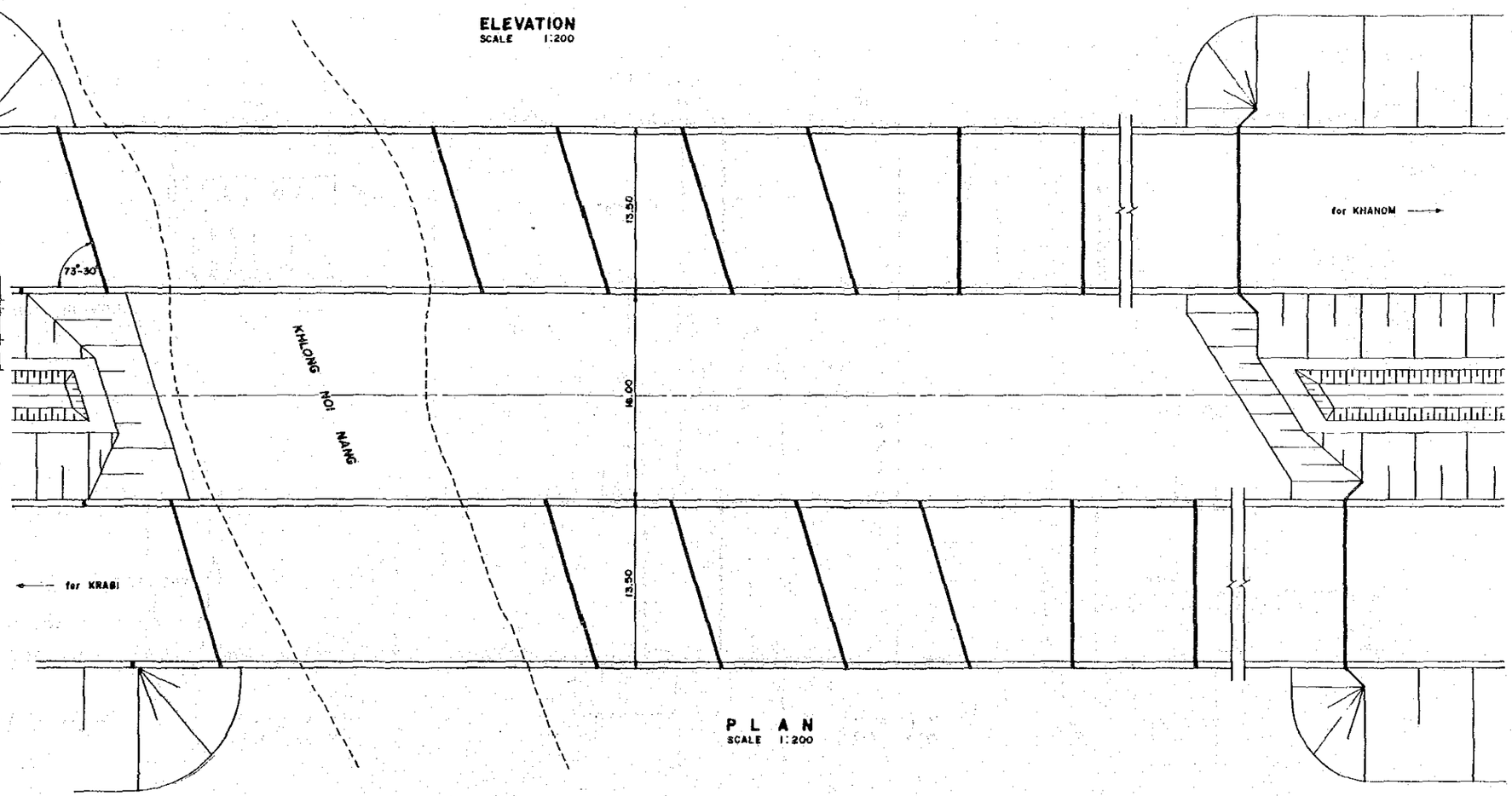
ELEVATION
SCALE 1:200



CROSS SECTION
SCALE 1:200



SECTION A-A
SCALE 1:100



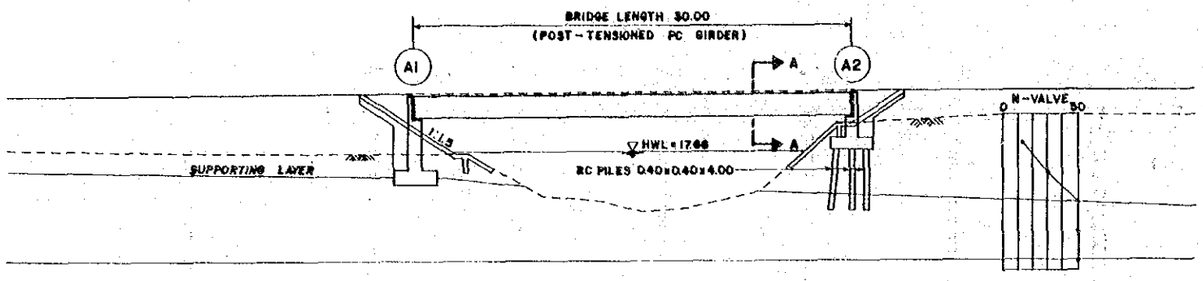
PLAN
SCALE 1:200

JICA RDSR STUDY

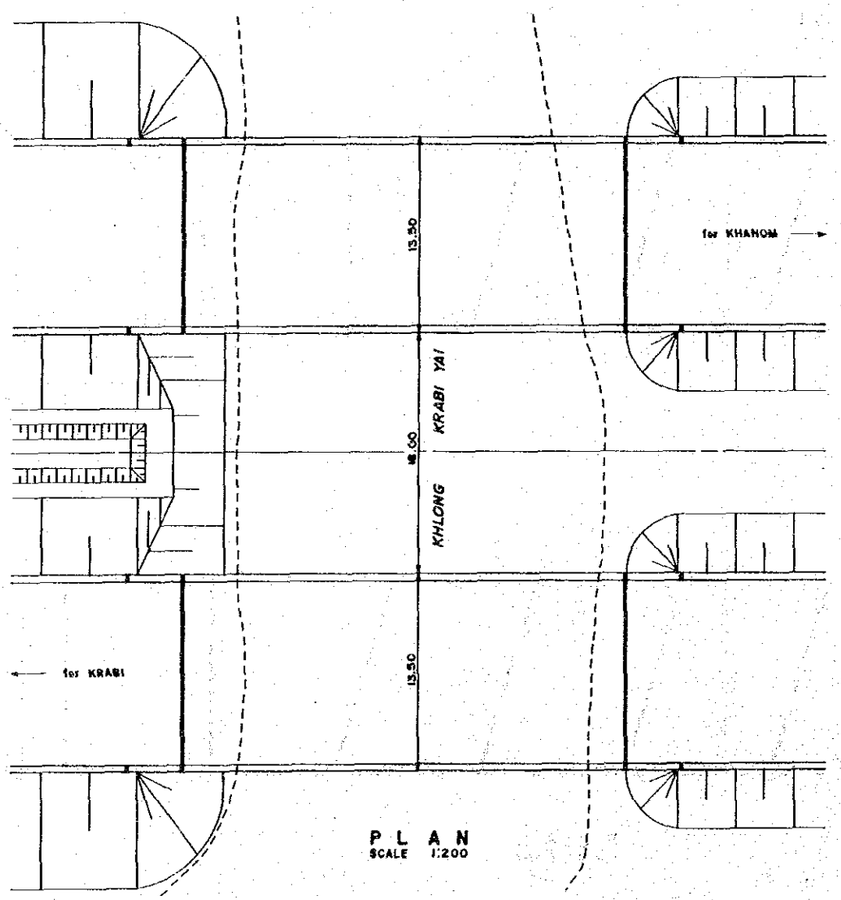
KRABI – KHANOM ROUTE
From Krabi to Khanom

SHEET NO 48 OF 61

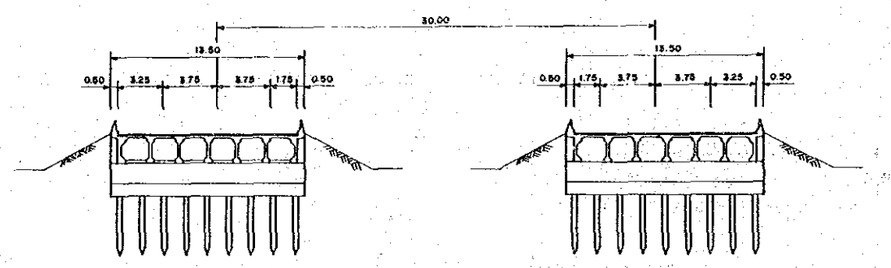
BRIDGE FOR KHLONG KRABI YAI (B2)
STA. C : 16+630



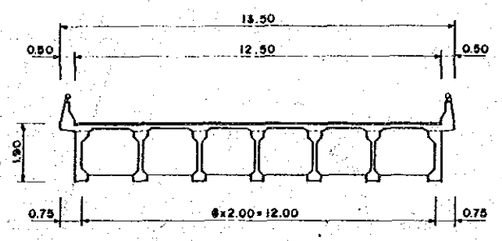
ELEVATION
SCALE 1:200



PLAN
SCALE 1:200

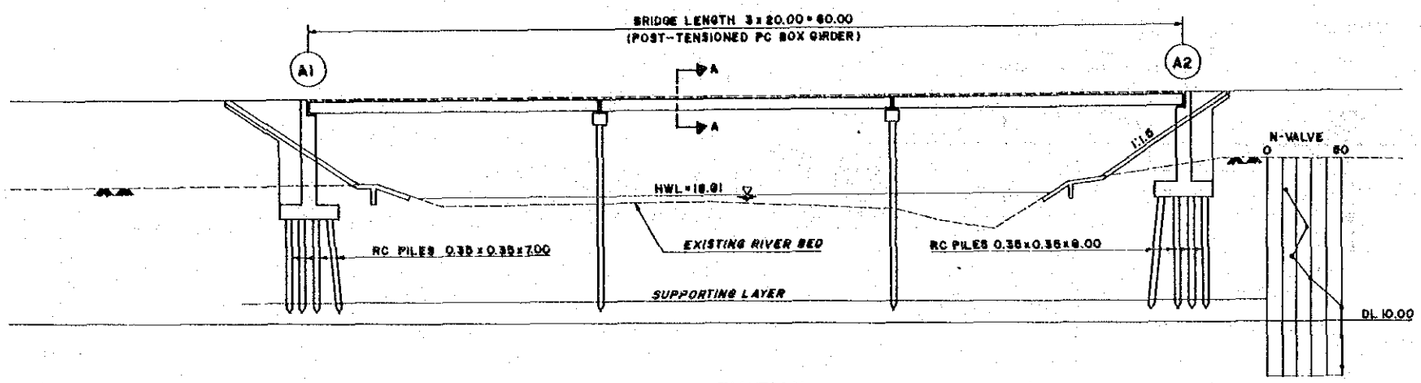


CROSS SECTION OF (A2)
SCALE 1:200

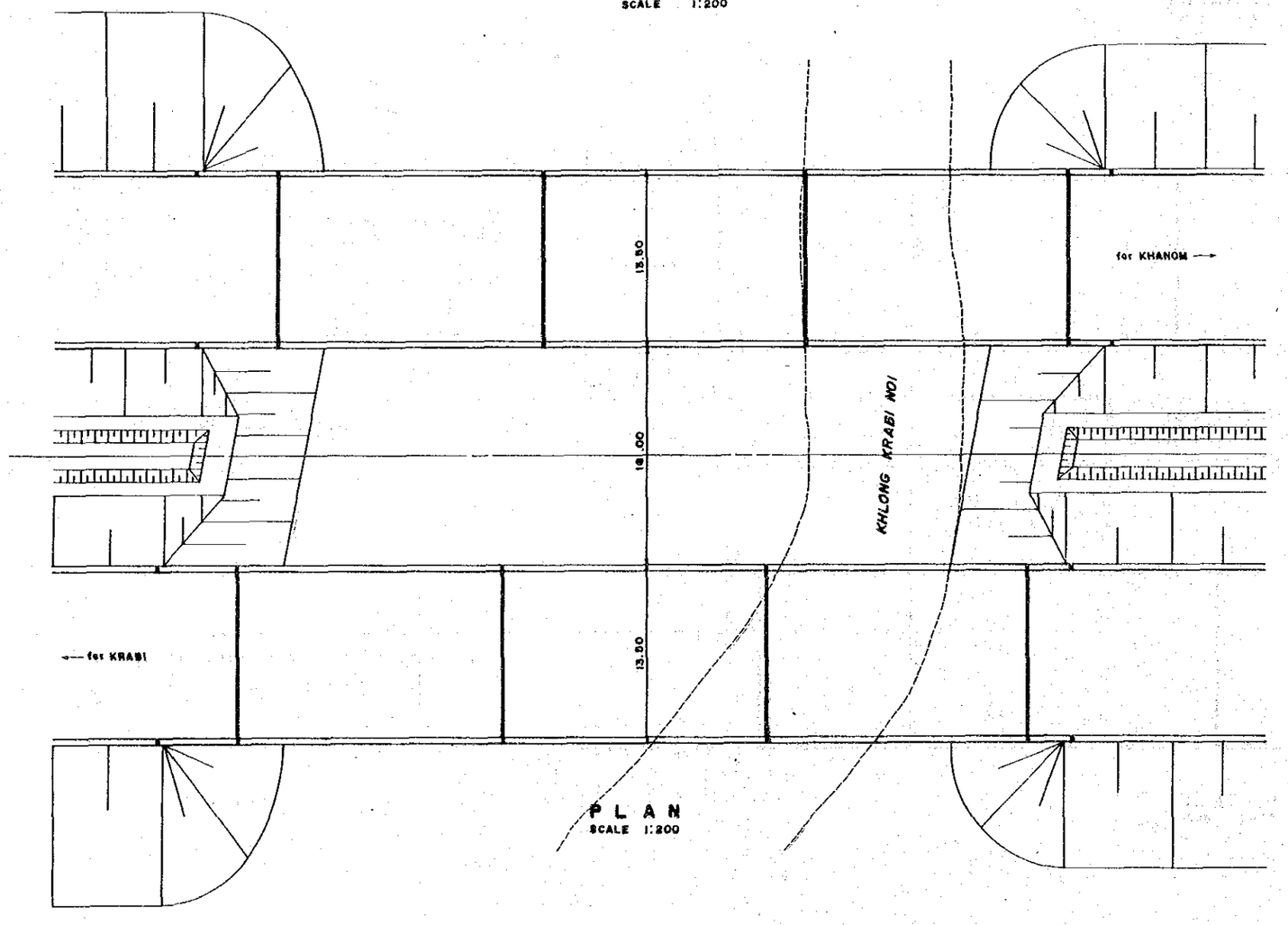


SECTION A-A
SCALE 1:100

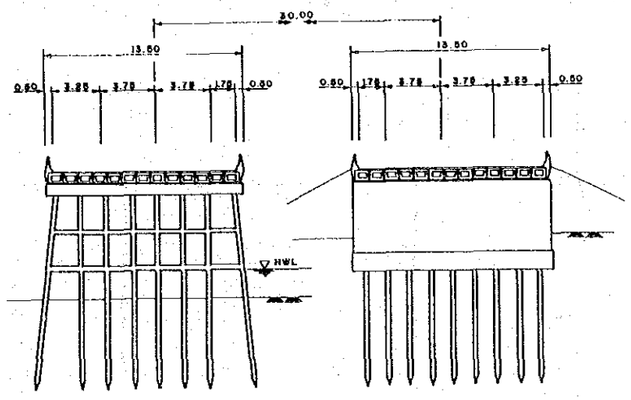
JICA RDSR STUDY	
KRABI – KHANOM ROUTE From Krabi to Khanom	SHEET NO. 49 OF 61
BRIDGE FOR KHLONG KRABI NOI (B3) STA. C : 27+100	



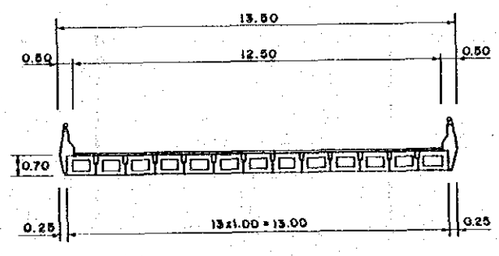
ELEVATION
SCALE 1:200



PLAN
SCALE 1:200

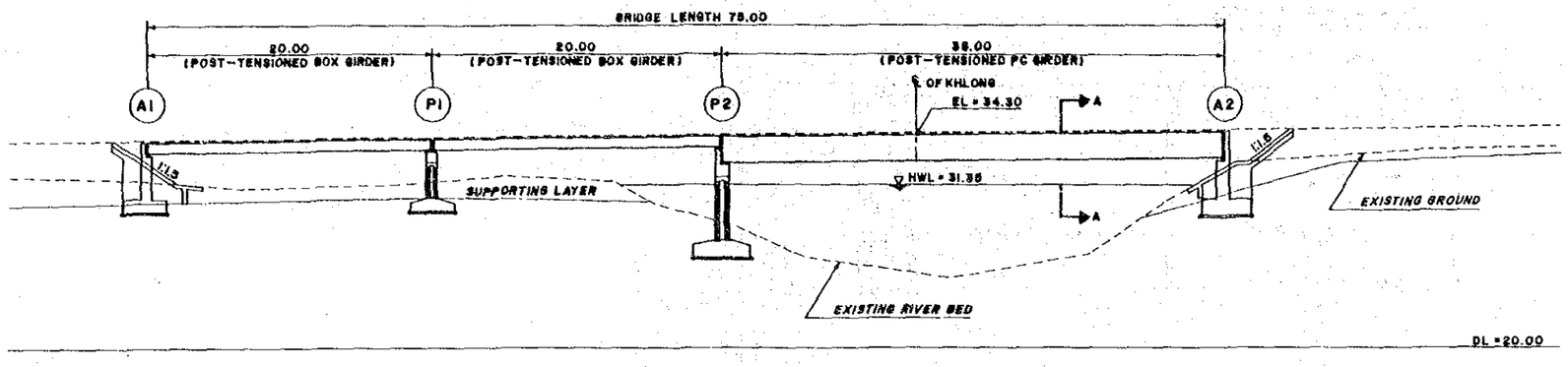


CROSS SECTION
SCALE 1:200

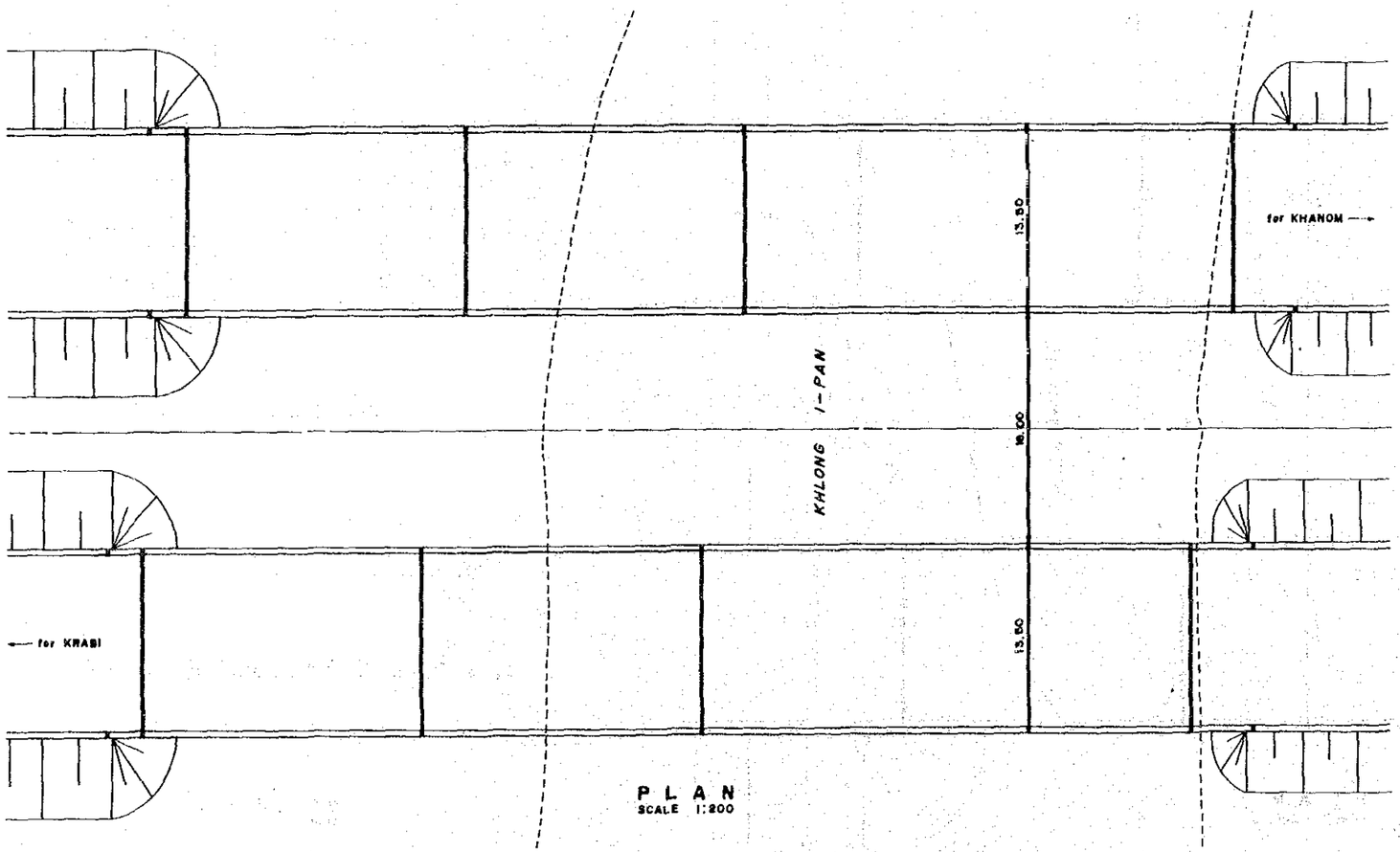


SECTION A-A
SCALE 1:100

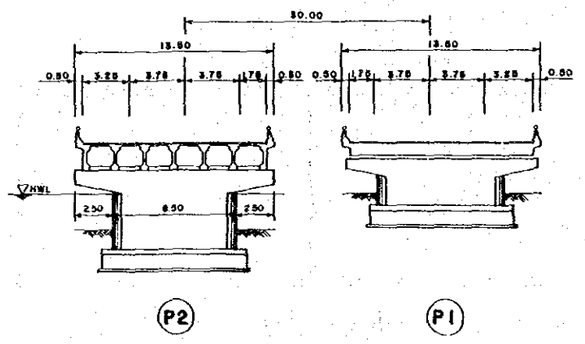
BRIDGE FOR KHLONG I-PAN (B4)
STA. C : 74+180



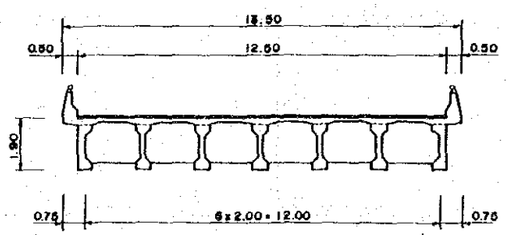
ELEVATION
SCALE 1:200



PLAN
SCALE 1:200

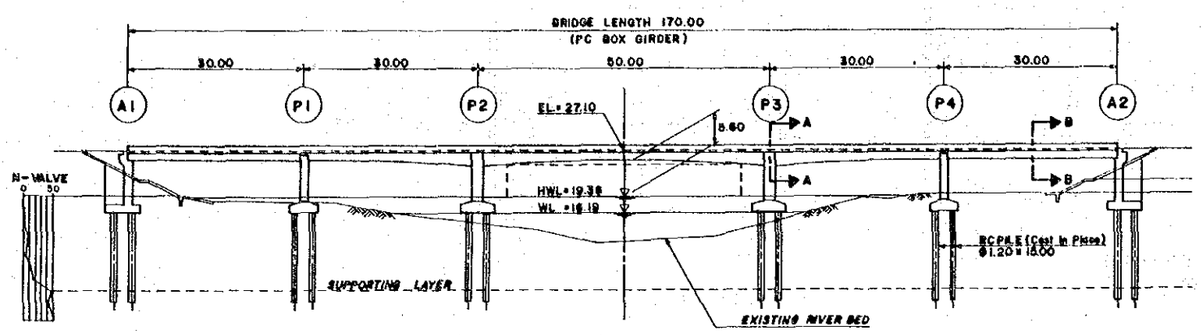


CROSS SECTION
SCALE 1:200

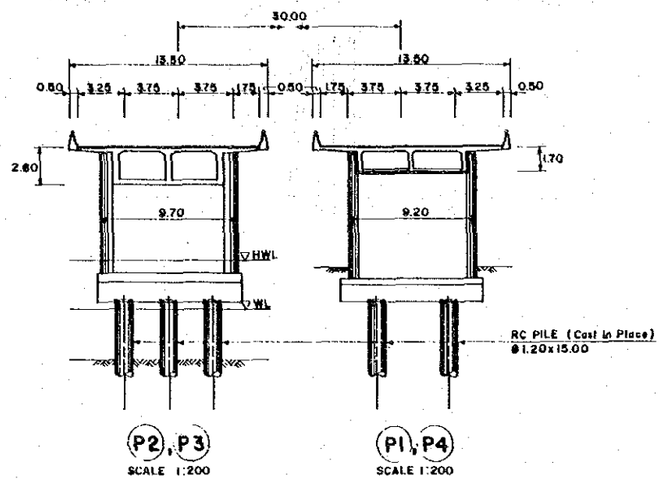


SECTION A-A
SCALE 1:100

JICA RDSR STUDY	
KRABI – KHANOM ROUTE From Krabi to Khanom	SHEET NO 51 OF 61
BRIDGE FOR MAE NAM TA PI (B5) STA. C : 110+450	

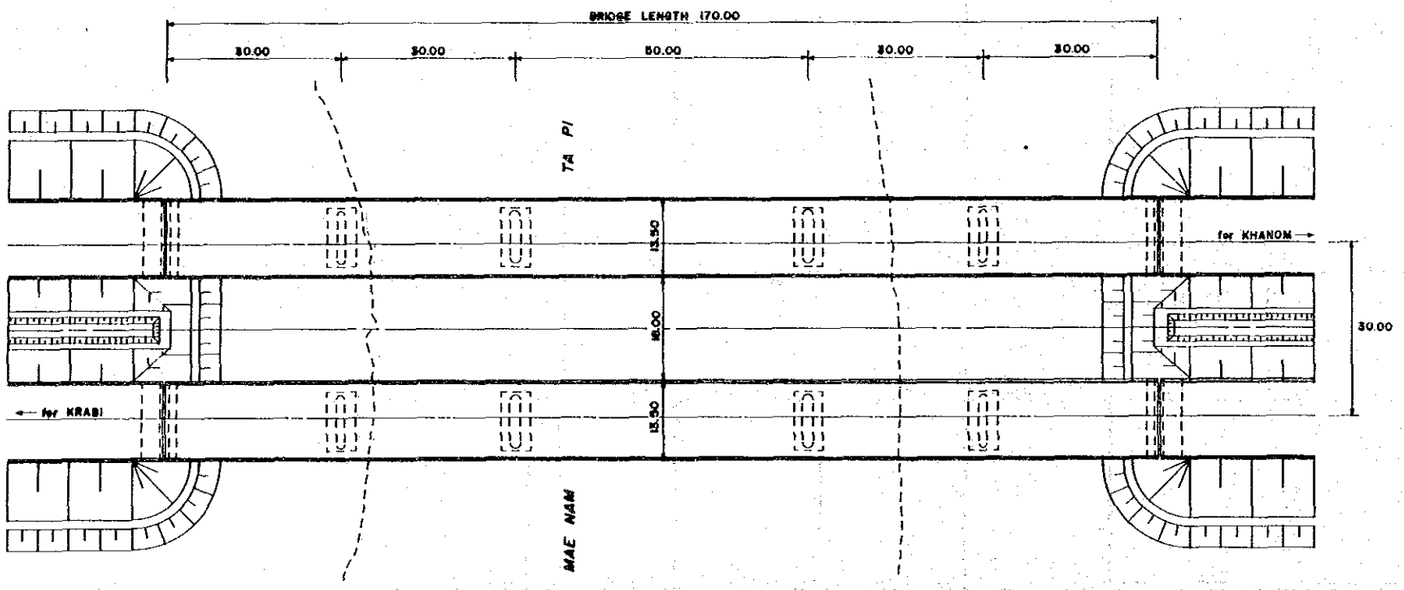


ELEVATION
SCALE 1:500

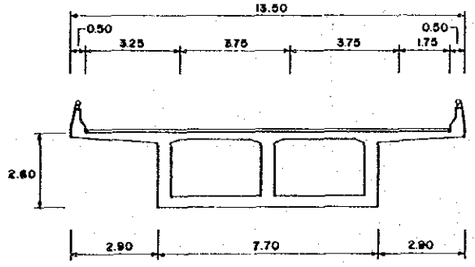


SCALE 1:200

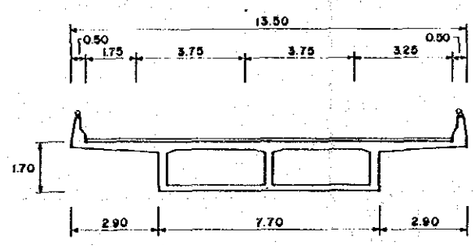
SCALE 1:200



PLAN
SCALE 1:800



SECTION A-A
SCALE 1:100



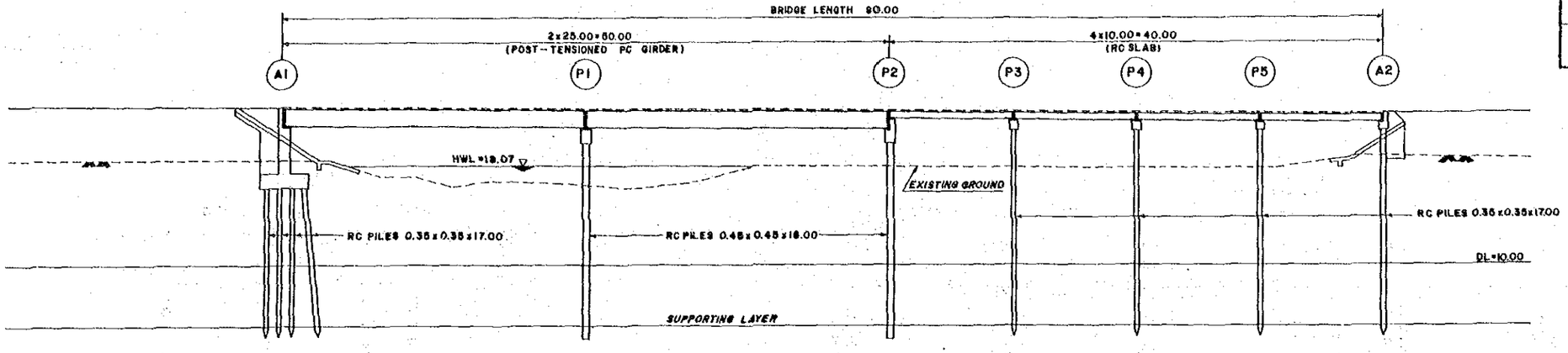
SECTION B-B
SCALE 1:100

JICA RDSR STUDY

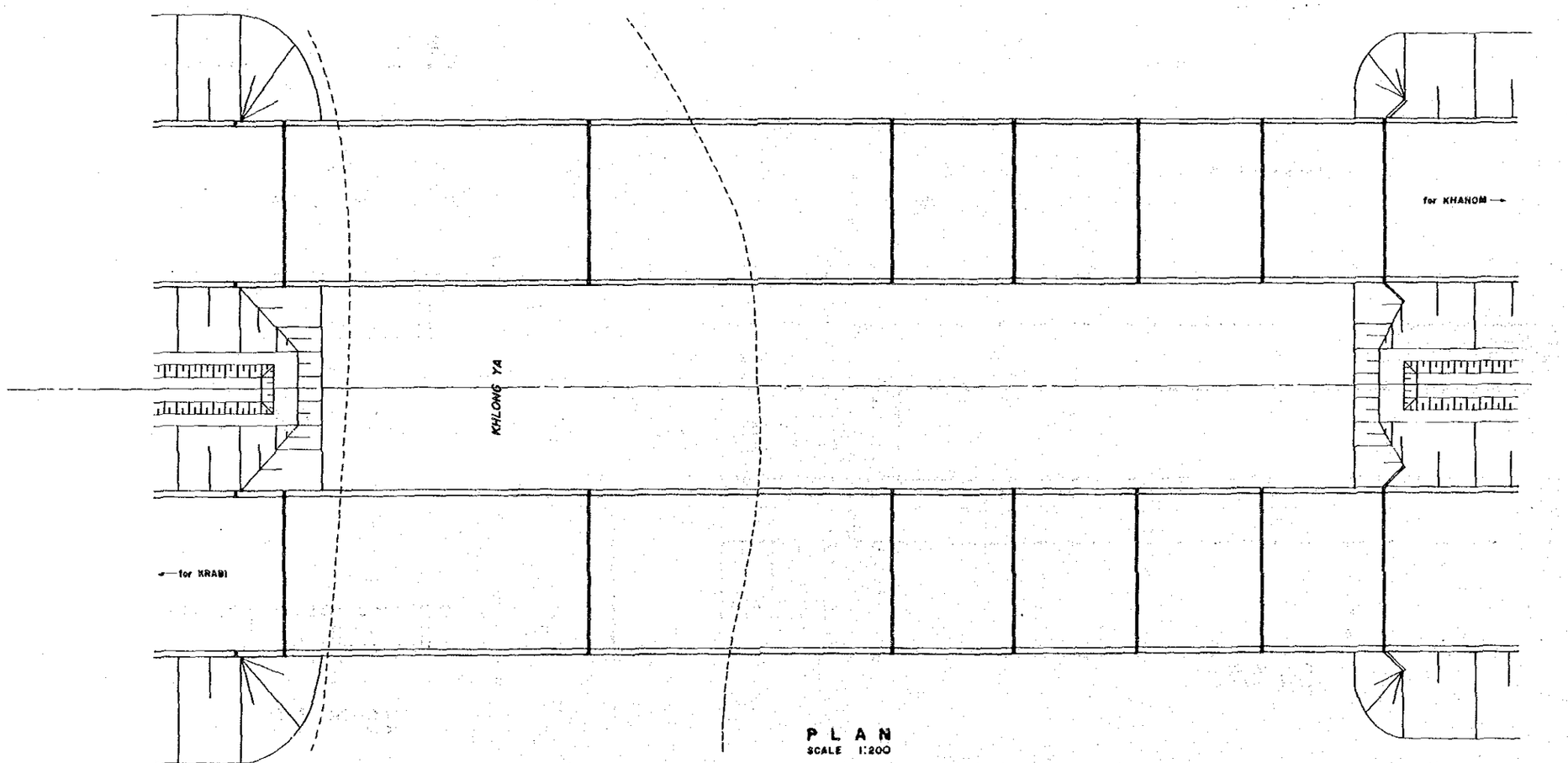
KRABI – KHANOM ROUTE
From Krabi to Khanom

SHEET NO. 52 OF 61

BRIDGE FOR KHLONG YA (B6)
STA.C: 121+600

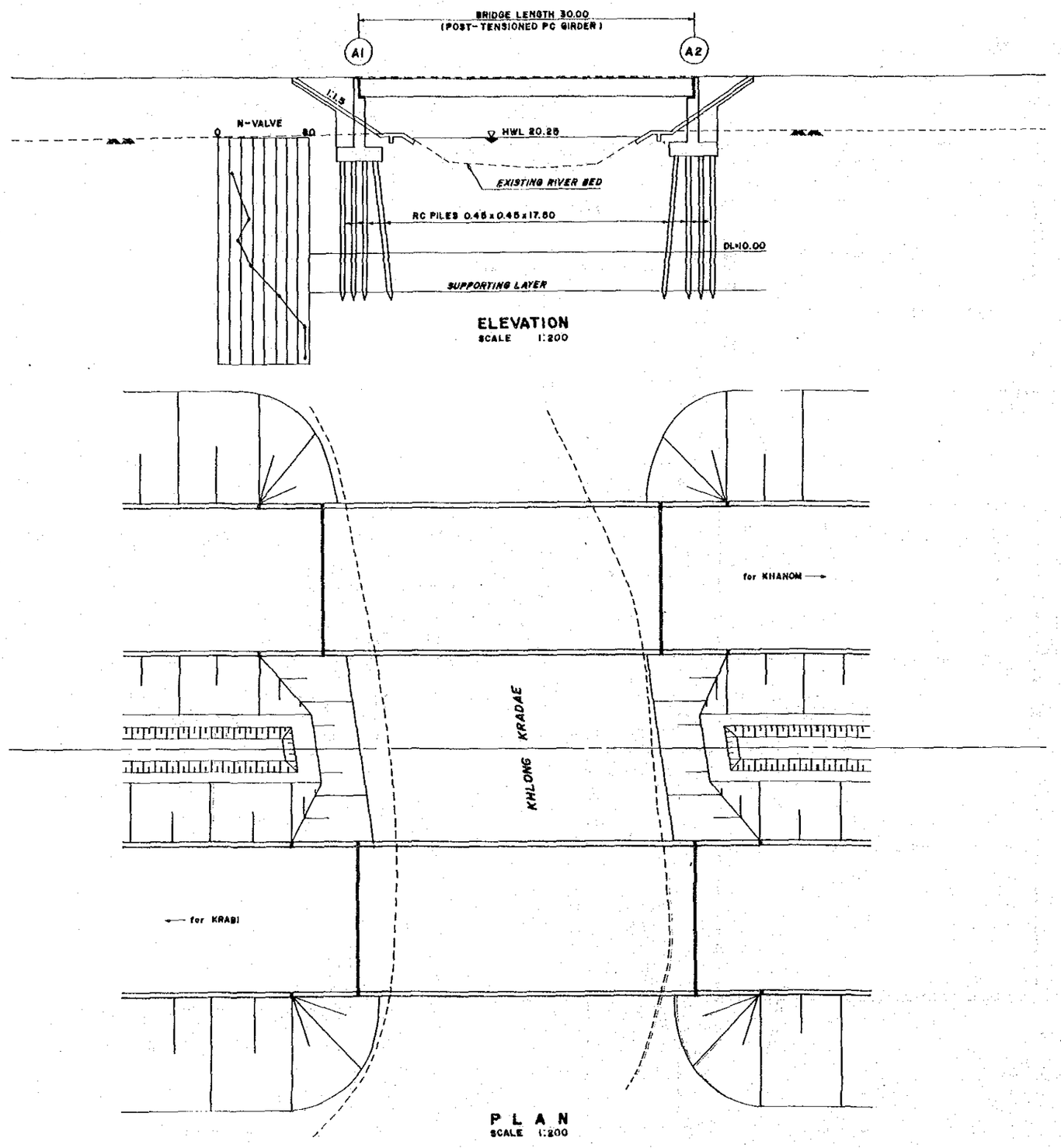


ELEVATION
SCALE 1:200

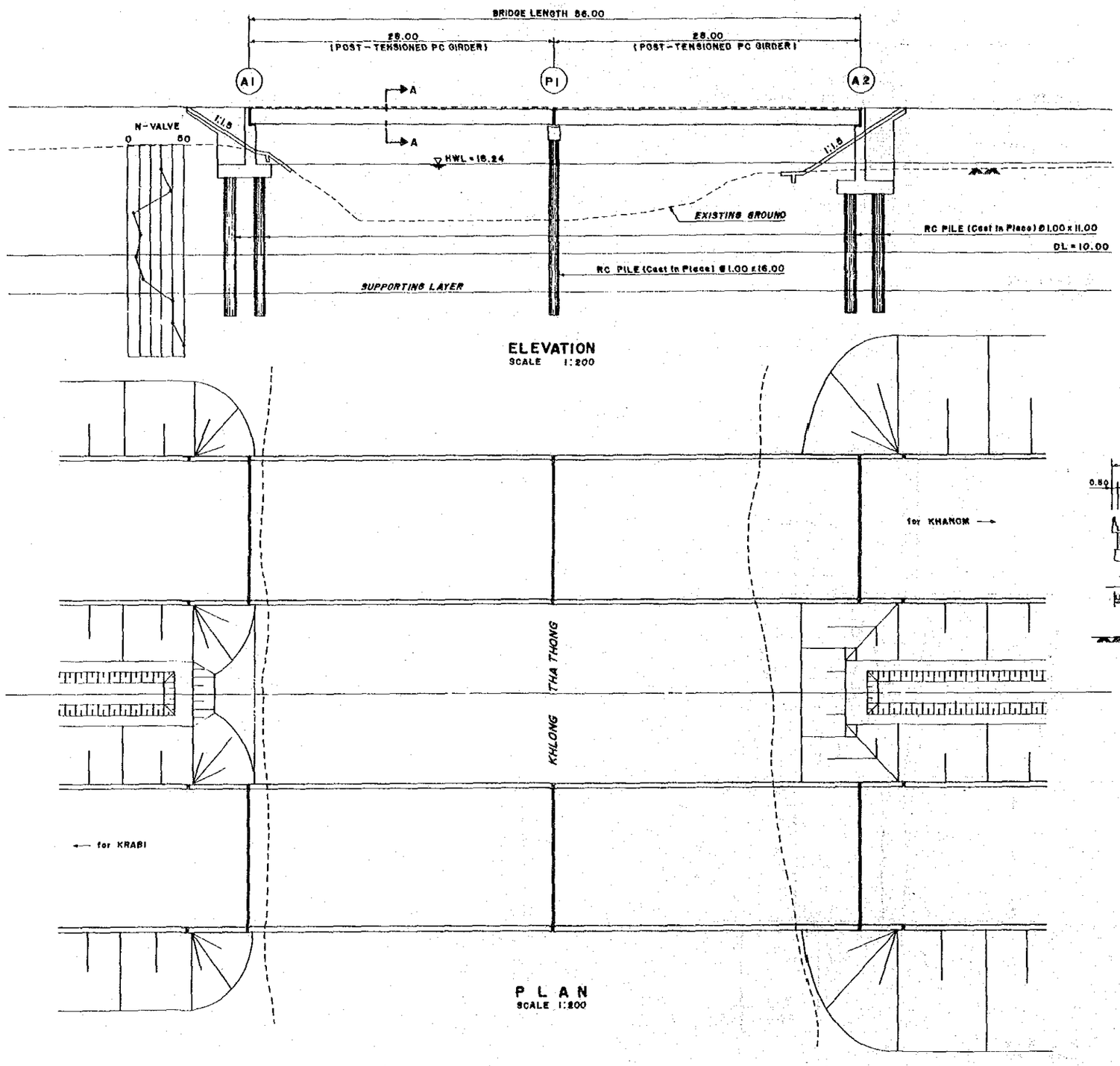


PLAN
SCALE 1:200

JICA RDSR STUDY	
KRABI – KHANOM ROUTE From Krabi to Khanom	SHEET NO 53 OF 61
BRIDGE FOR KHLONG KRADAE (B7) STA. C : 153+350	

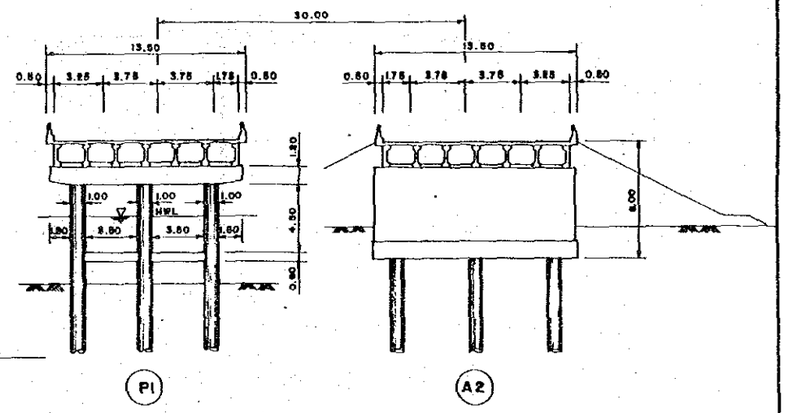


BRIDGE FOR KHLONG THA THONG (B6)
STA.C : 170+600

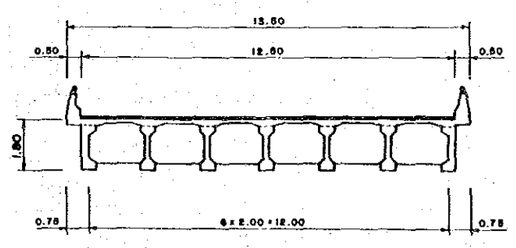


ELEVATION
SCALE 1:200

PLAN
SCALE 1:200

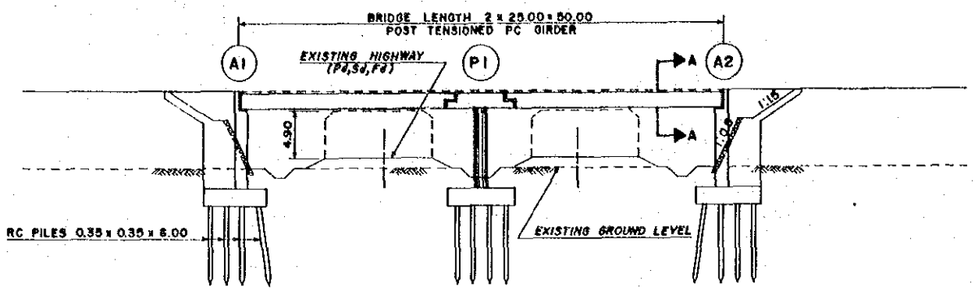


CROSS SECTION
SCALE 1:200

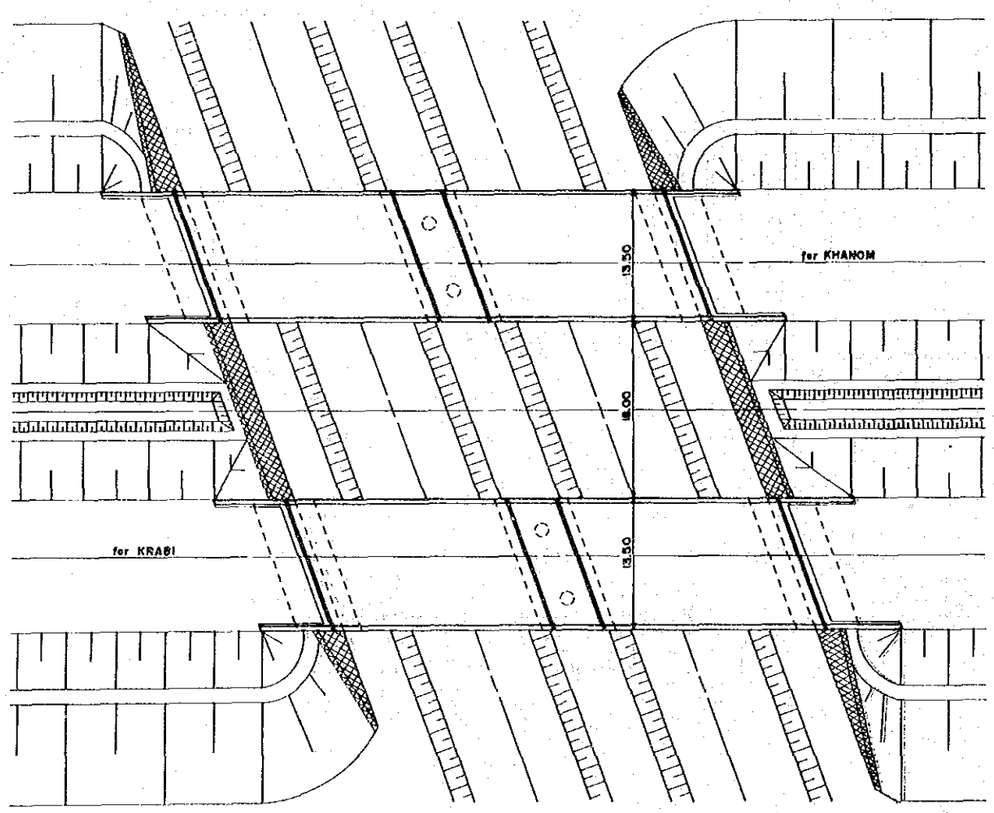


SECTION A-A
SCALE 1:100

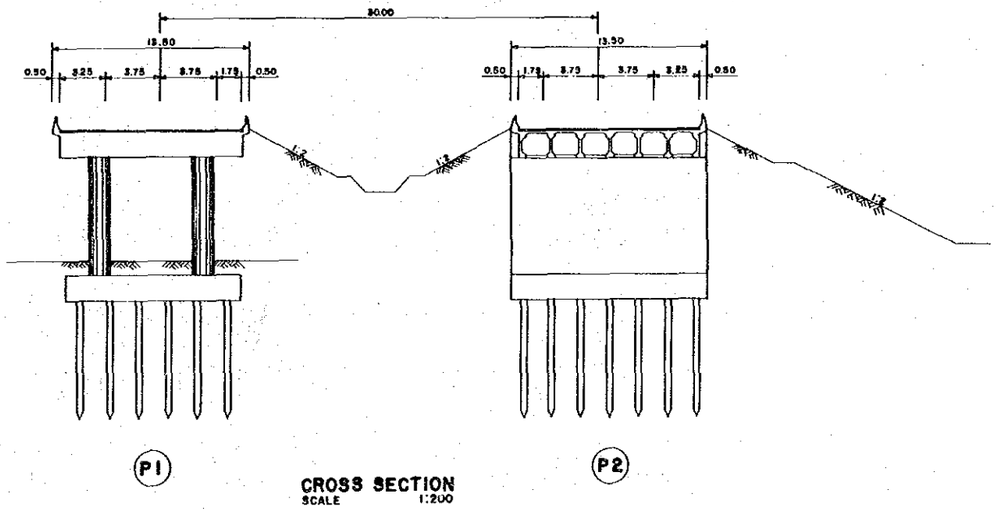
BRIDGE FOR HIGHWAY CROSSING (1)



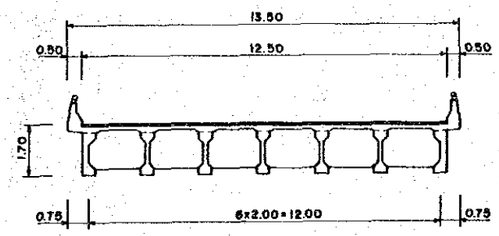
ELEVATION
SCALE 1:300



PLAN
SCALE 1:300

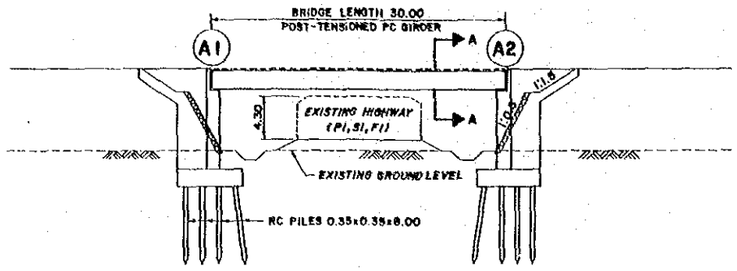


CROSS SECTION
SCALE 1:200

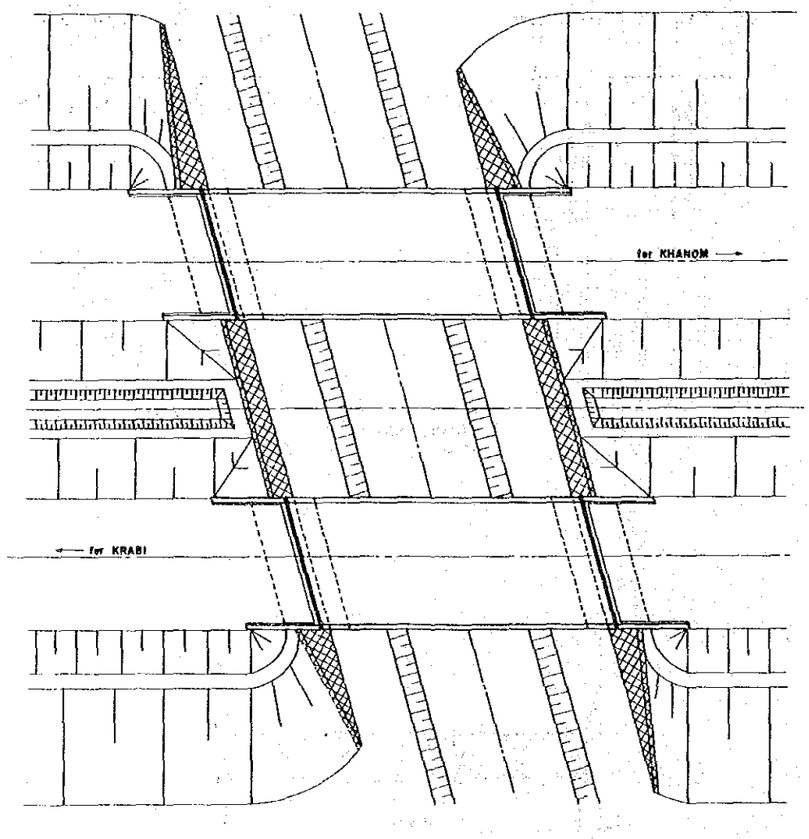


SECTION A-A
SCALE 1:100

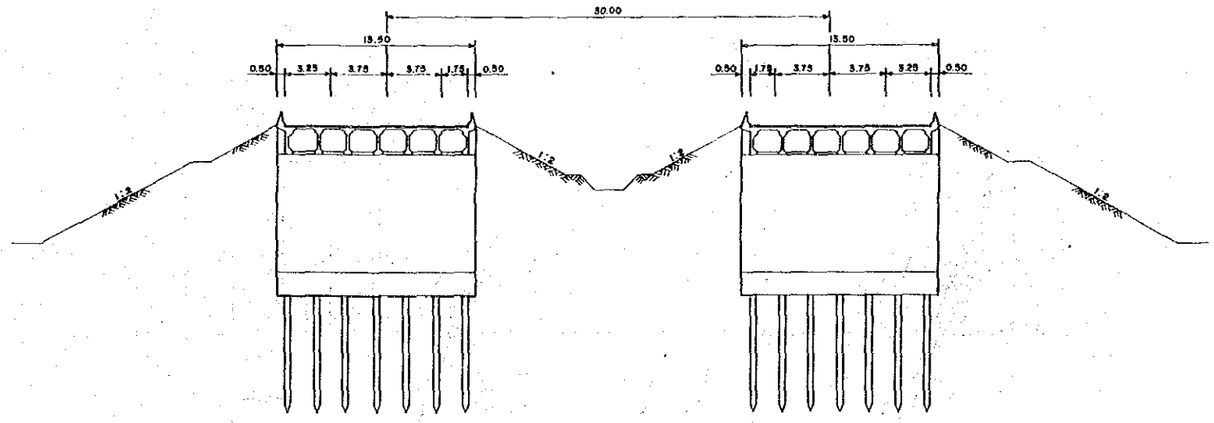
JICA RDSR STUDY	
KRABI – KHANOM ROUTE From Krabi to Khanom	SHEET NO. 56 OF 61
BRIDGE FOR HIGHWAY CROSSING (2)	



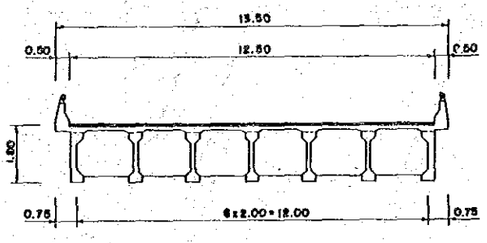
ELEVATION
SCALE 1:300



PLAN
SCALE 1:300

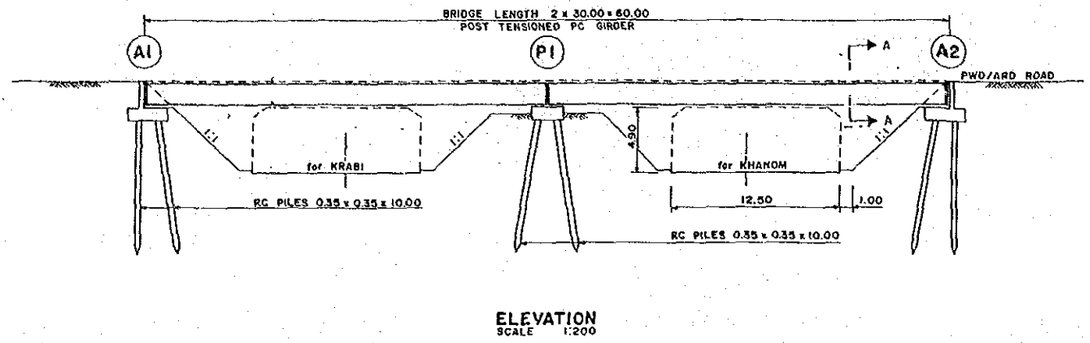


CROSS SECTION OF (A2)
SCALE 1:200

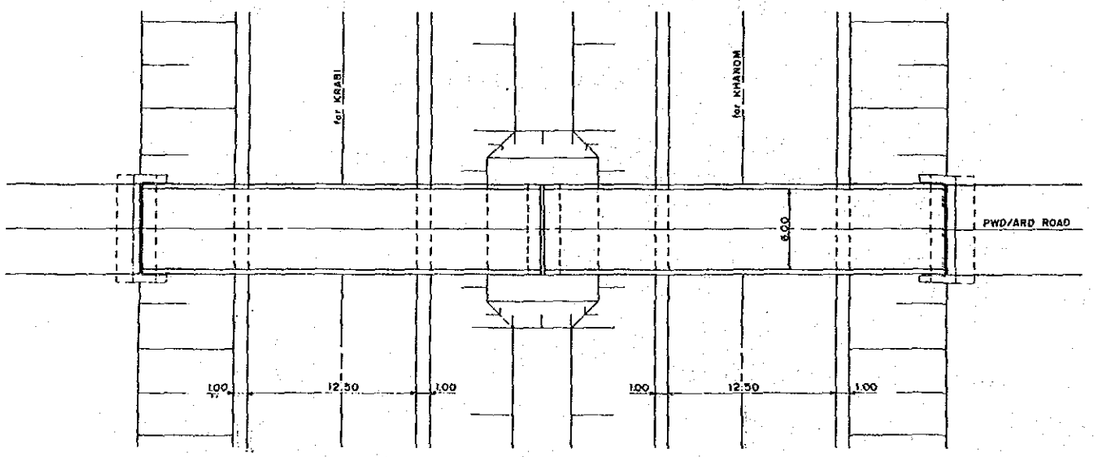


SECTION A–A
SCALE 1:100

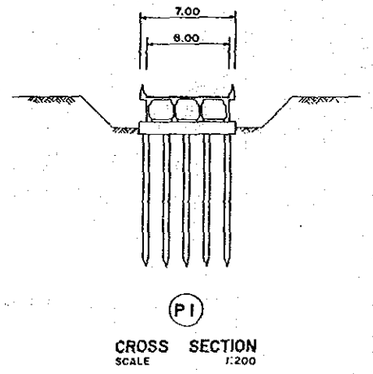
VIADUCT FOR PWD/ARD ROAD



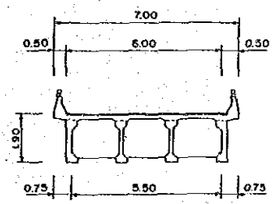
ELEVATION
SCALE 1:200



P L A N
SCALE 1:200

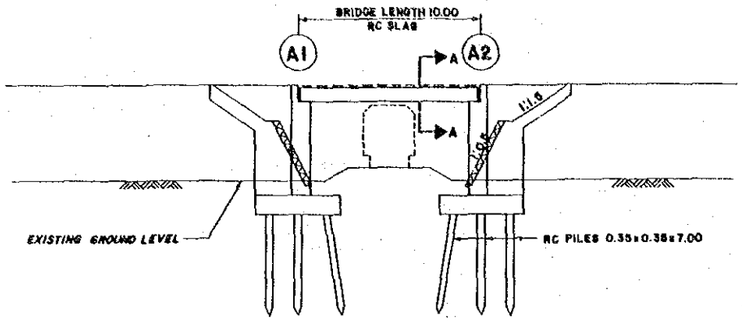


CROSS SECTION
SCALE 1:200

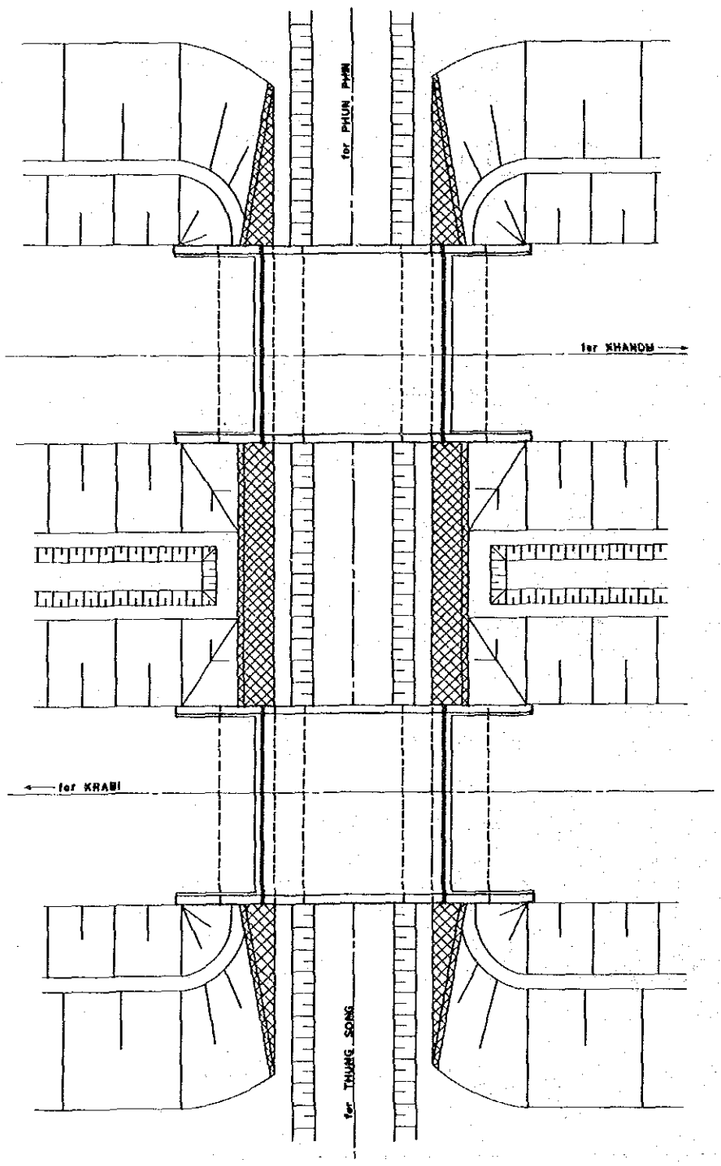


SECTION A–A
SCALE 1:100

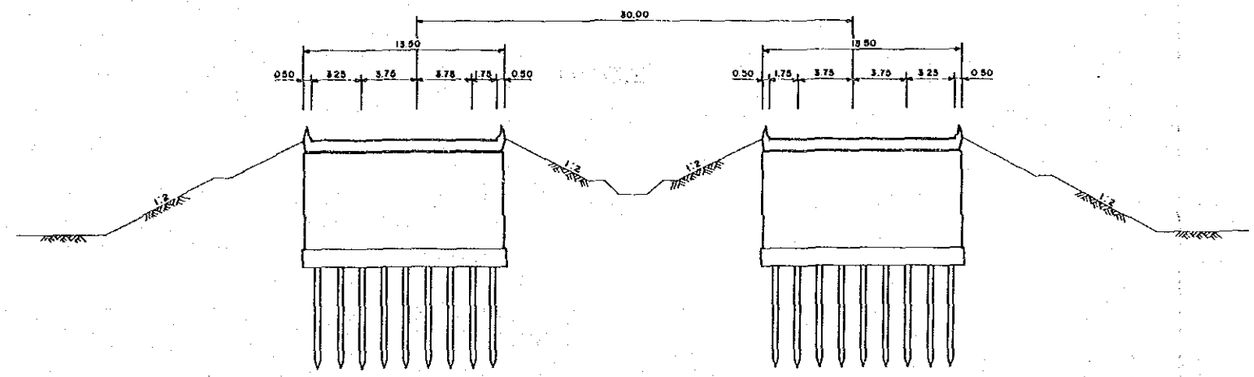
JICA RDSR STUDY	
KRABI – KHANOM ROUTE From Krabi to Khanom	SHEET NO 58 OF 61
BRIDGE FOR RAILWAY CROSSING STA.C:125+370	



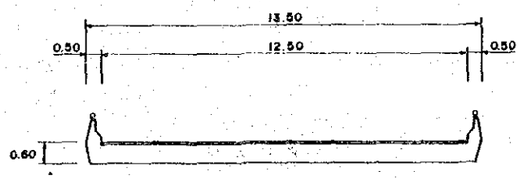
ELEVATION
SCALE 1:200



PLAN
SCALE 1:200

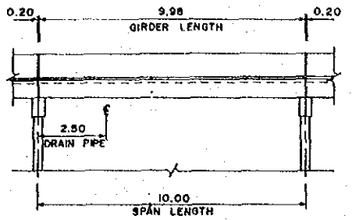


CROSS SECTION OF A2
SCALE 1:200



SECTION A–A
SCALE 1:100

JICA RDSR STUDY	
KRABI – KHANOM ROUTE From Krabi to Khanom	SHEET NO 59 OF 61
REINFORCED CONCRETE SLAB BRIDGE	



SECTION A-A
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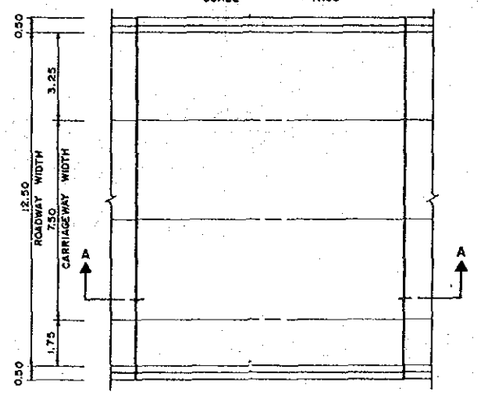

PLAN
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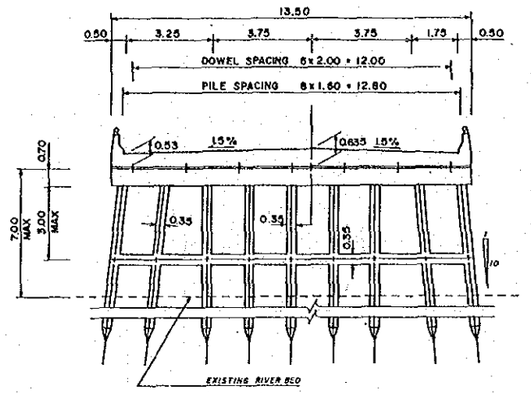
BRIDGE LIST
(Number of Bridge by Road Section and Pier Type)

Bridge Length (m)	A		B		C1		C2		C2	
	H	L	H	L	H	L	H	L	H	L
10	7	2	5	1	2	5		1	2	8
20	4	7	4	3	5	4			1	3
30	1	1	3	3	4	3				2
40		1							2	
50					1	1			1	
60										1
70										1
80					1					
90	1									
100									1	1
120									1	
170	1									
220										
Total	15	11	12	7	13	13		1	8	14
	26		19		26		1		22	



PILE BENT ELEVATION
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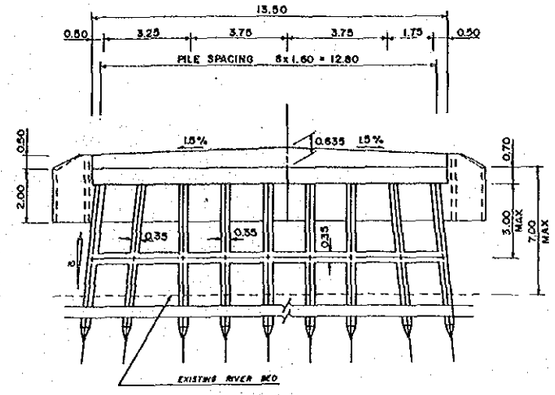
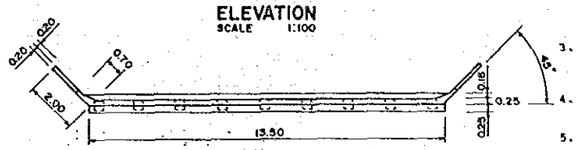
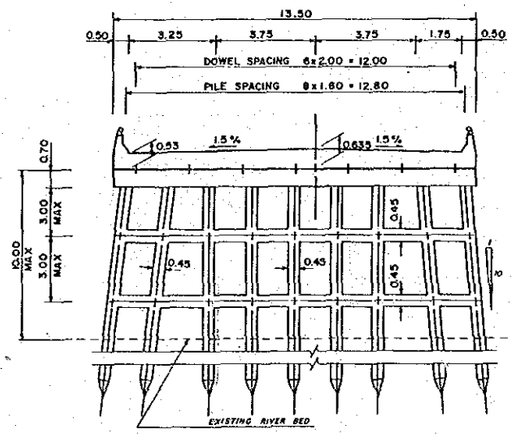


ELEVATION
SCALE 1:100



PLAN
SCALE 1:100

TYPE-L



PILE BENT ELEVATION
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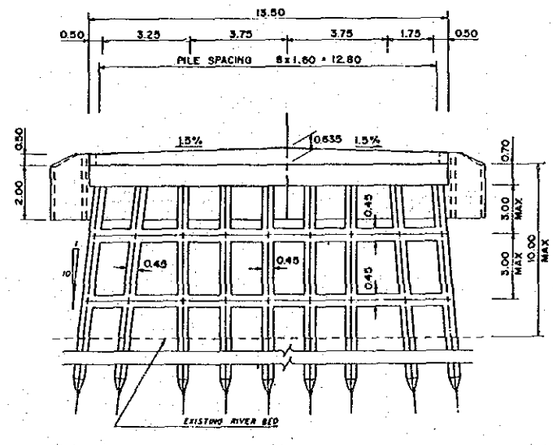

ELEVATION
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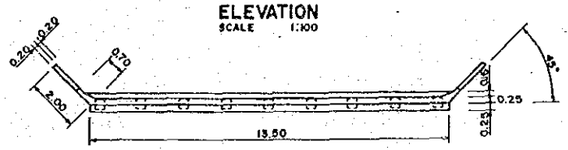


PLAN
SCALE 1:100

TYPE-H

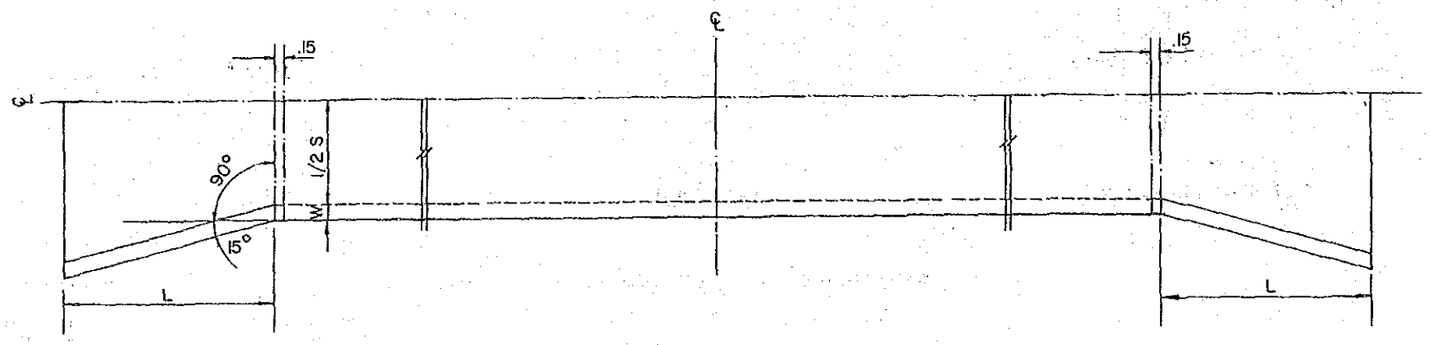
NOTES :

1. DESIGN STRESSES :
   a) CONCRETE , f_c = 70 KSC.
   b) STEEL , f_s = 1,400 KSC. (INTERMEDIATE GRADE)
   f_s = 1,200 KSC. (STRUCTURAL GRADE)
2. CONCRETE SHALL HAVE MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF 210 KG/CM^2 FOR .15 X .15 X .15 CUBE AT 28 DAYS. AND APPROXIMATE MIX DESIGN PER CUBIC METER IS SUGGESTED AS FOLLOWS :

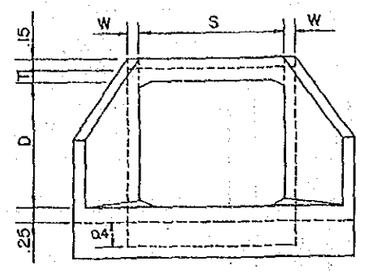
PORTLAND CEMENT, MIN.	350 KG.
SAND	0.43 M^3
CRUSHED ROCK OR GRAVEL	0.86 M^3
CONCRETE SLUMP, MAX	10 CM.

3. CLEAR CONCRETE COVER FOR TOP REINFORCEMENT IN SLAB BRIDGE SHALL BE 3.5 CM. ELSEWHERE OF SLAB BRIDGE AND SIDEWALK SHALL BE 2.5 CM.
4. ALL CONCRETE EXPOSED CORNERS SHALL HAVE 2 CM. CHAMFER UNLESS OTHERWISE INDICATED.
5. REBARS #4 OR LARGER SHALL BE INTERMEDIATE GRADE DEFORMED BARS, OTHERS SHALL BE STRUCTURAL GRADE PLAIN BARS UNLESS OTHERWISE INDICATED.
6. LOCATIONS OF LAP SPLICE OF REBARS SHALL BE APPROVED BY THE ENGINEER.
7. LAP LENGTH SHALL NOT BE LESS THAN 40 DIAMETERS OF BIGGER BAR IN CASE OF PLAIN BARS AND 24 DIAMETERS OF BIGGER BAR FOR DEFORMED BARS.
8. IN CASE OF SALINE PROTECTION, HIGH SULPHATE RESISTANT PORTLAND CEMENT TYPE 5 CONFORMED TO AASHTO SPECIFICATIONS SHALL BE USED AND ADDITIONAL CONCRETE COVER OF 2.5 CM. FROM NORMAL CASE ALL AROUND SHALL BE PROVIDED WITHOUT ALTERING THE LOCATIONS OF REBARS.
9. ALL MATERIALS SHALL BE USED UNDER THE APPROVAL OF THE ENGINEER.
10. PAINTING SHALL BE PROVIDED ON ALL SURFACES AT BRIDGE ENDS WHICH EXPOSED TO TRAFFIC. WHITE AND BLACK COLOUR SHALL BE PAINTED ALTERNATELY. WHITE COLOUR SHALL BE LIGHT REFLECTED TYPE.
11. ALL DIMENSIONS SHOWN ARE IN METERS UNLESS OTHERWISE INDICATED.
12. BAR MARK S101 MAY BE TAKEN OUT ONE BAR ON EACH SIDE OF THE BRIDGE WHEREVER THEY PASS THROUGH DRAIN PIPES. IF THE LOCATIONS OF THESE BARS ARE NEAR V-DRIP SUCH THAT CONCRETE COVER IS NOT ADEQUATE, THEY SHALL BE PLACED ON TOP OF ST 101. OTHER BARS WHICH PASS THROUGH DRAIN PIPES SHALL BE BENT ALONG THE PIPES.
13. ALL PIERS WHICH DO NOT HAVE LOG PROTECTION WALLS SHALL BE HAUNCH UNDER THE TOP CROSS BRACING.
14. IF ANY NOTES ON THE DRAWINGS OF PIERS CONTRADICT THE NOTES ON THIS DRAWING, THEY WILL BE SUPERSEDED BY THESE NOTES.
15. THIS DRAWING IS ADAPTED FROM DOH DWG NO. 3 A05-106-14/IA IN CASE OF ANY DISCREPANCY BETWEEN SUCH DRAWINGS ARISES, THE DOH. STANDARD DRAWING WILL PREVAIL UNDER THE APPROVAL OF THE ENGINEER.

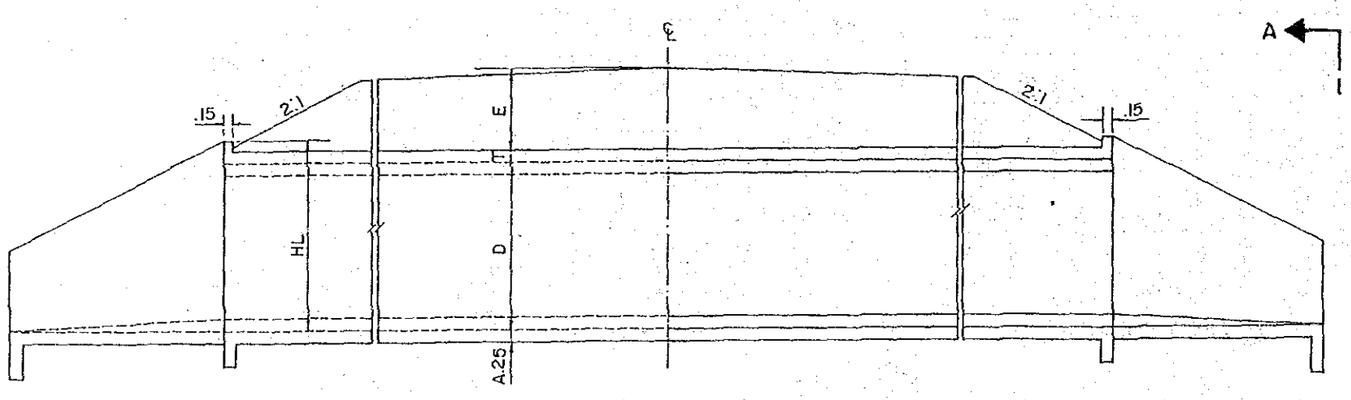
BOX CULVERT



HALF LONGITUDINAL PLAN

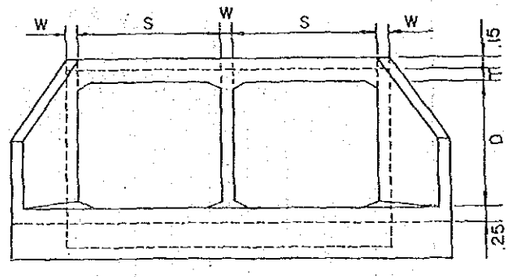


SINGLE TYPE



HALF LONGITUDINAL ELEVATION

HALF LONGITUDINAL SECTION

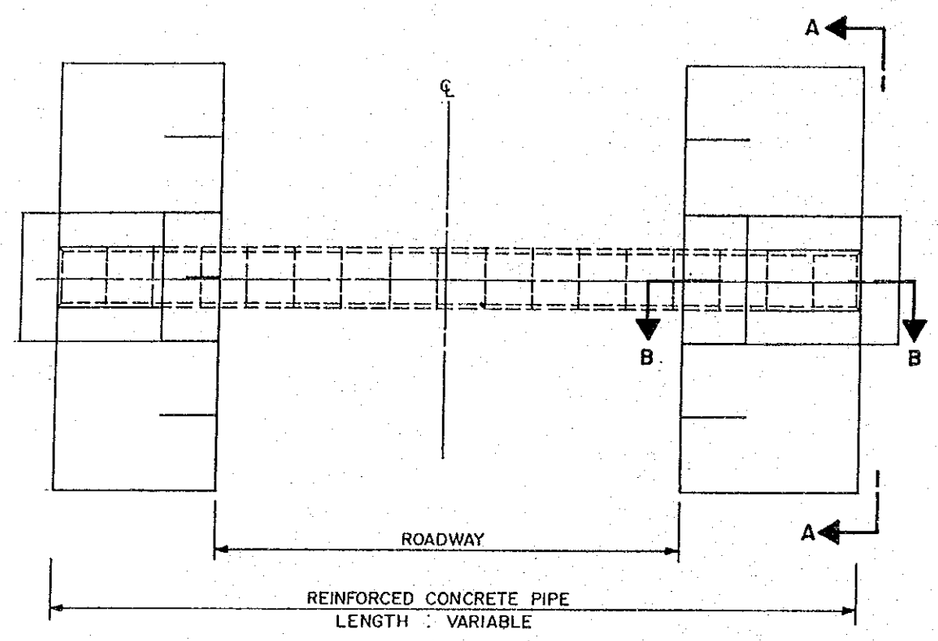


DOUBLE TYPE

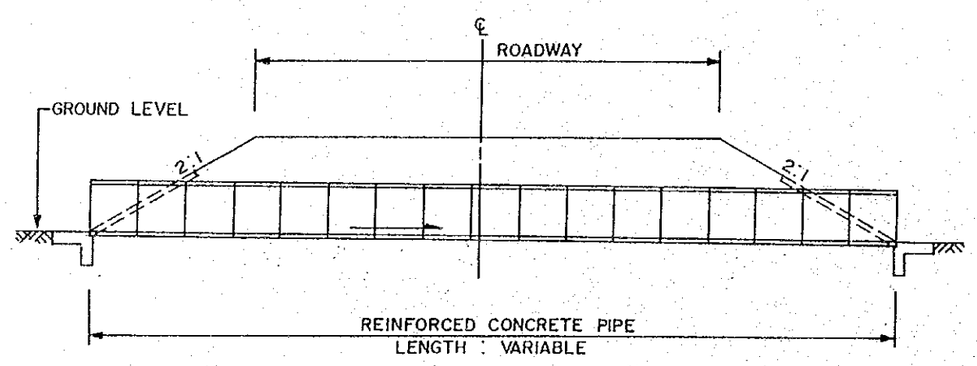
SECTION A–A

JICA RDSR STUDY	
KRABI – KHANOM ROUTE From Krabi to Khanom	SHEET NO. 61 OF 61
PIPE CULVERT	

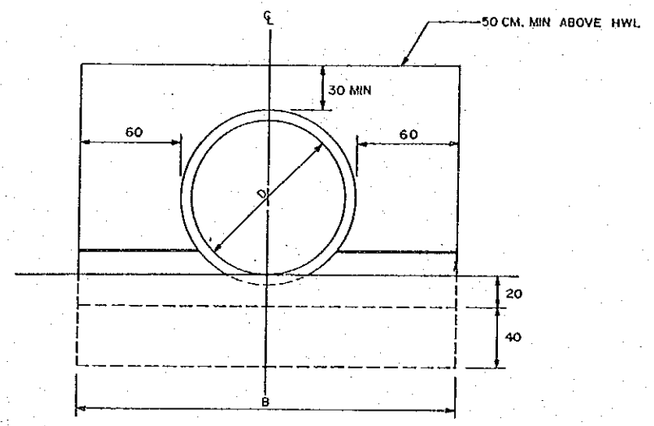
PIPE CULVERT



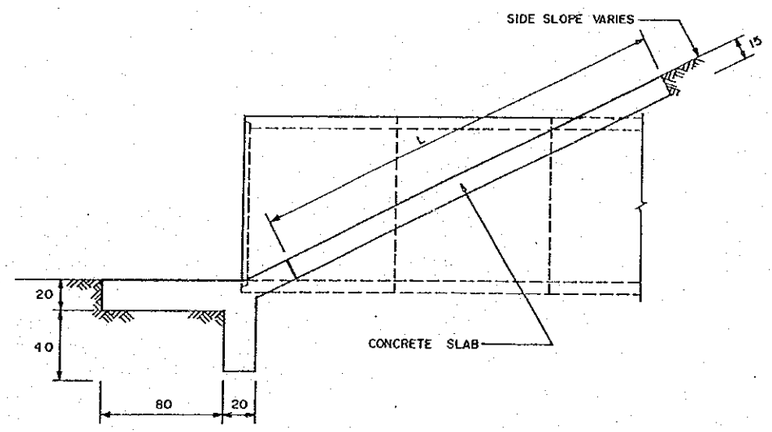
PLAN



PROFILE



SECTION A–A

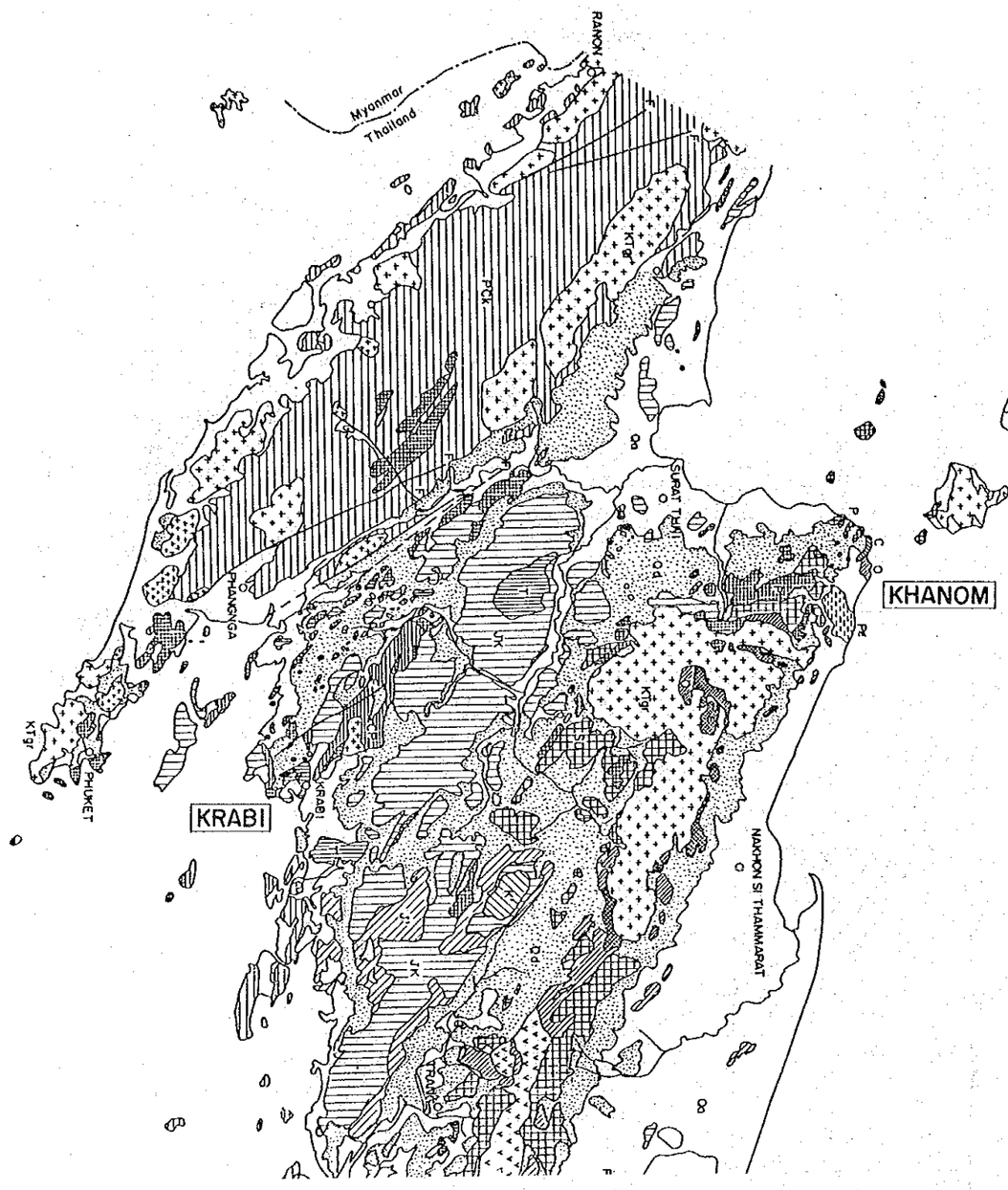


SECTION B–B

III APPENDIX

A1	Geological Map	A-1
A2	Mean Annual Rainfalls	A-2
A3	Conservation Area	A-3
A4	Present Socio-Economic Situations along the Krabi - Khanom Highway Link	A-4
A5	Traffic Survey	A-5
A6	Present Road Network	A-20
A7	Planning Framework of the SSDP	A-25
A8	Traffic Demand Forecast	A-26
A9	Traffic Demand on the Highway Link	A-30
A10	Location Map of Materials	A-31
A11	Results of Soil Survey	A-31

A1 Geological Map



EXPLANATION

SEDIMENTARY AND IGNEOUS ROCKS

Geological time		Group and formation		Symbols		Description
CENOZOIC	Quaternary		Alluvium		Qa	Clay Silt, Sand gravel
			Diluvium		Qd	Silt Sand, gravel laterite
	Tertiary		Krabi group		T	Sand stone, Shale Conglomerate
MESOZOIC	Cretaceous		Khorat group		K'	Sandstone Shale
	Jurassic				JK	Siltstone Sandstone, Conglomerate Limestone dolomite
					J'	Sandstone Siltstone Limestone
	Triassic		Lamporg group		R	Shale Siltstone Limestone
PALAEOZOIC	Permian		Rat Buri group		P	Limestone, interbedded With Sandstone and shale.
					CP	Sandstone, Shale, bedded Chert, and Conglomerate
					CPk	Sandstone, Shale Pebbly Sandstone, Mudstone and grey wacke
	Carboniferous				C	Mudstone, Sandstone, Shale, bedded chert.
	Devonian Silurian		Tona osi group		SD	Sandstone, Shale, Chert, metatuff Schist, quartzite, mudstone.
	Ordvician		Thung song group		O	Limestone with orgillaceous layer
	Cambrian		Tarutao group		Ɛ	Sandstone, shale, quartzite and phyllite
PRE-CAMBRIAN			Phuket. f.		Pɛ	Quartz mica schist para gneiss and augen gneiss

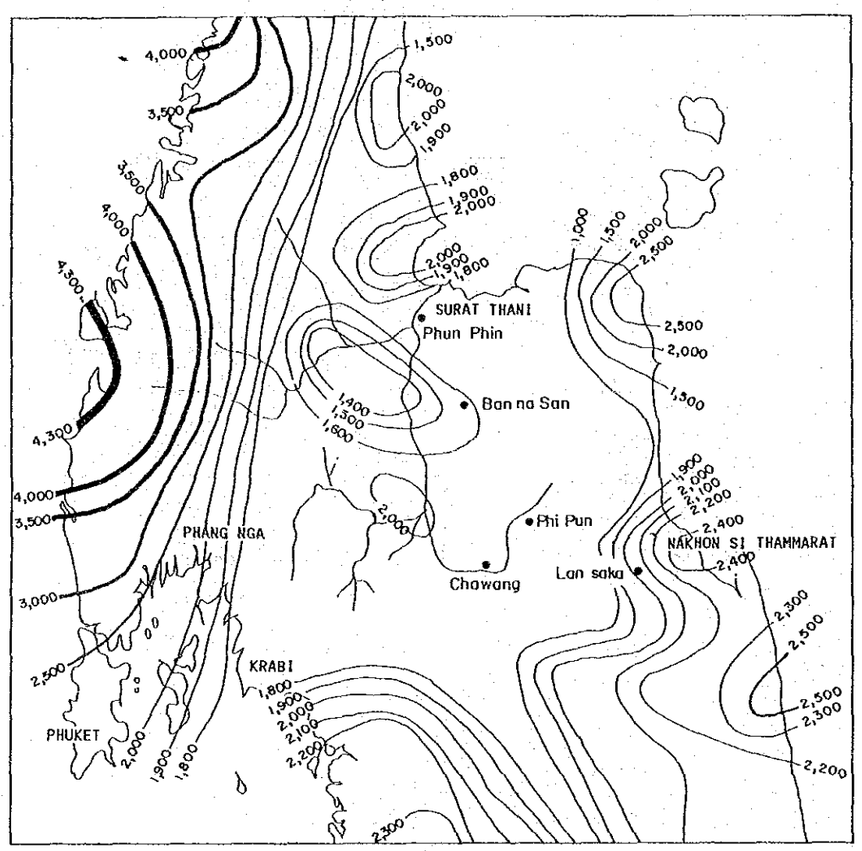
IGNEOUS ROCKS

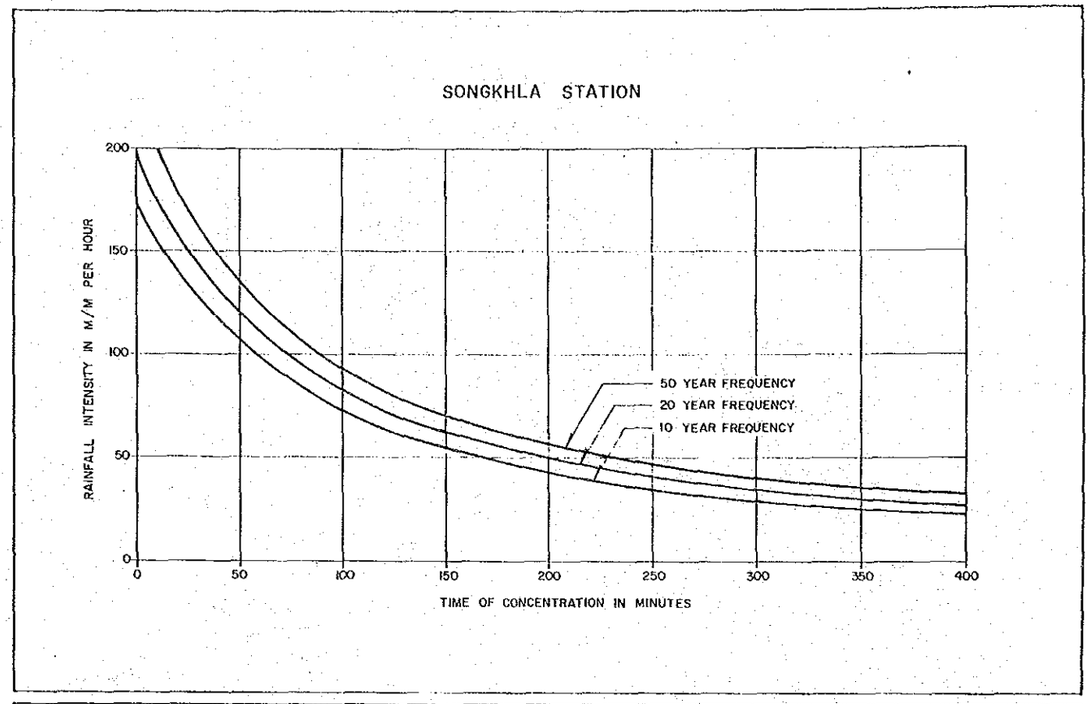
CENOZOIC	Tertiary Cretaceous		KTgr	Porphyritic biotite granite, adamellite muscovite-tourmaline granite
MESOZOIC	Jurassic Triassic		RJgr	Porphyritic biotite granite, adamellite and granodiorite
PALAEOZOIC	Carboniferous		C gr	gneissic granite

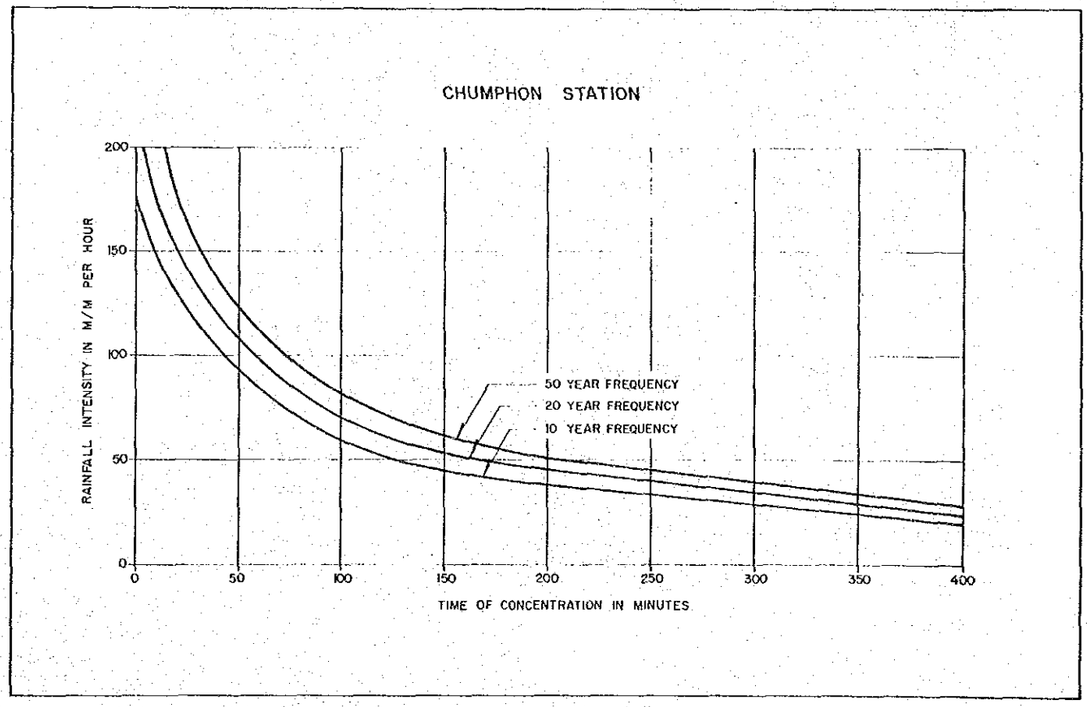
Geological boundary

F Fault (undifferentiated)

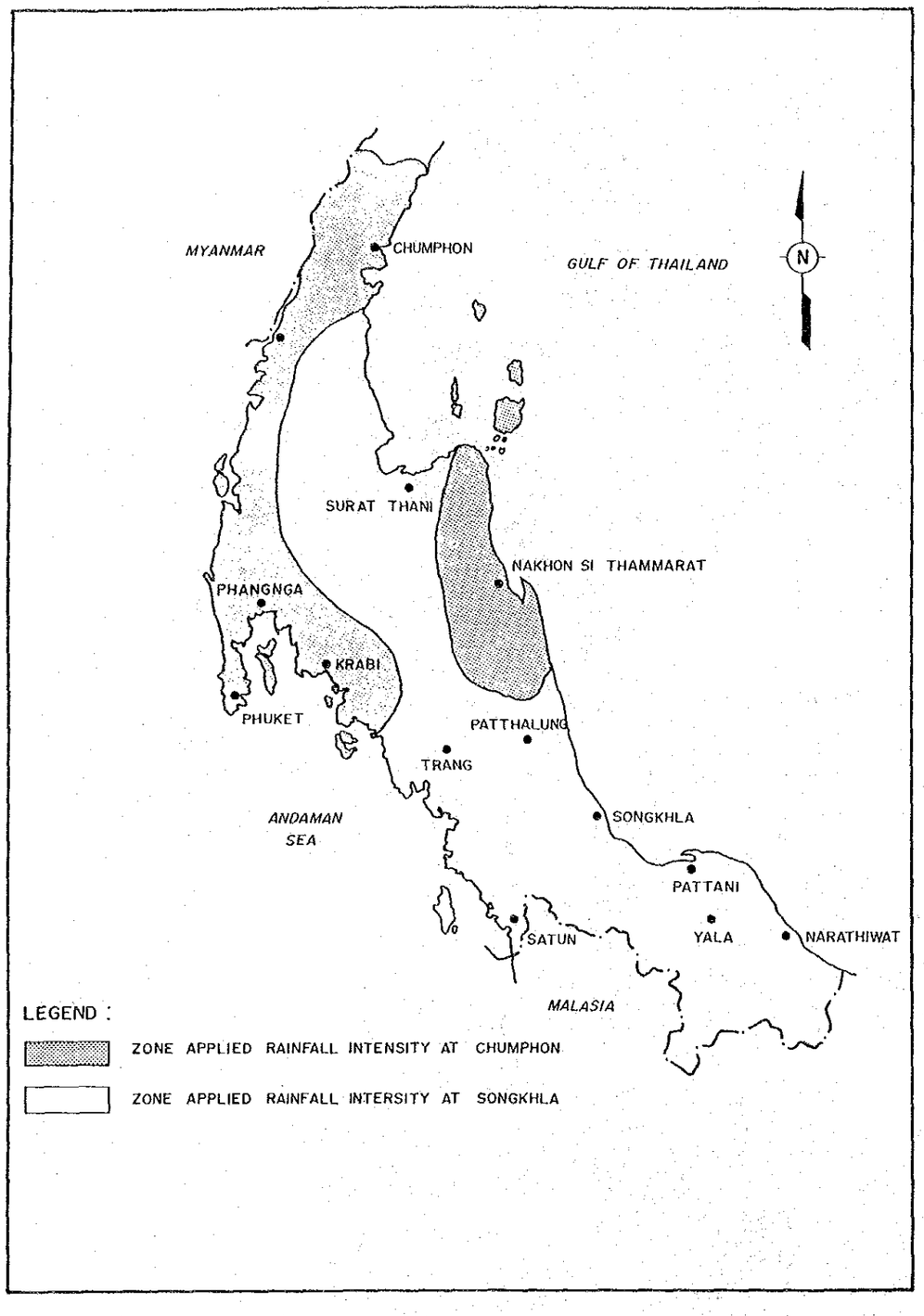
A2 Mean Annual Rainfalls





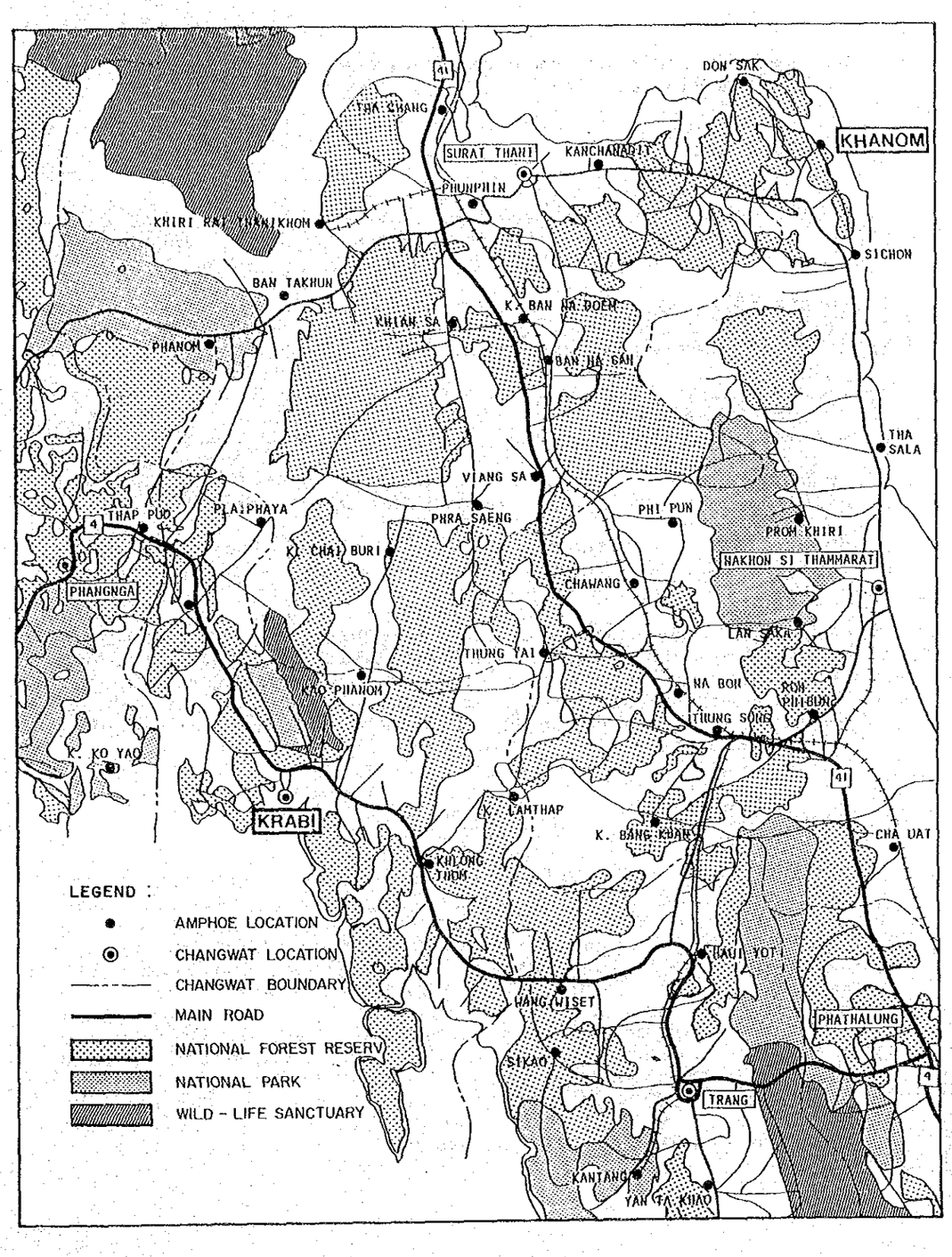


A.2 (2) Rainfall Intensity Curves



A.2 (3) Rainfall Intensity Zoning Map

A3 Conservation Area



A4 Present Socio-Economic Situations along the Krabi - Khanom Highway Link

1. Land Use

Fig. A4-1 illustrates the present land use along the Krabi - Khanom Highway Link. The Highway Link passes three changwats of Krabi, Surat Thani and Nakhon Si Thammarat.

There are three alternative routes based on the way how to pass the Krabi mountain area. After passing the mountains, these three alternatives pass the same alignment to Khanom.

Alternative A goes along the existing highway Route No. 4035. The terrain is mostly flat with hilly portions. Oil palm plantation is the most prevailing land use in this area.

Alternative B goes through the mountain by tunnel. The terrain is hilly. This route passes the midst of wild life sanctuary.

Alternative C goes along the existing highway Route No. 4037, passing many villages along the highway. Most of the terrain is flat with rubber plantations.

Land use along the Highway Link after three alternatives join together shows some difference from place to place. Though rubber plantation is the most conspicuous land use throughout the corridor, paddy fields are another prevailing land use in Khian Sa area, orchard in the southern part of Surat Thani city, and paddy and oil palm in Khanom area.

2. Land Price

Fig. A4-1 also shows land prices along the Highway Link. Range of the land price is considerably wide from the lowest 3,000 baht per rai to the highest 4 million baht. Land prices in Khanom area is considerably higher than the average price, those in Krabi area is slightly lower, and those in the south Surat Thani is considerably lower than the average.

Land prices along the Highway Link have reportedly been hiked this year, particularly in Khanom area. Speculative land transaction need to be addressed. The Land Bridge needs a strip land of about 25,000 rai (200 km x 200 m). If the average land price rises by 25 %, the incremental land acquisition cost would reach 190 million baht (= ฿30,000 x 25,000 rai x 25 %).

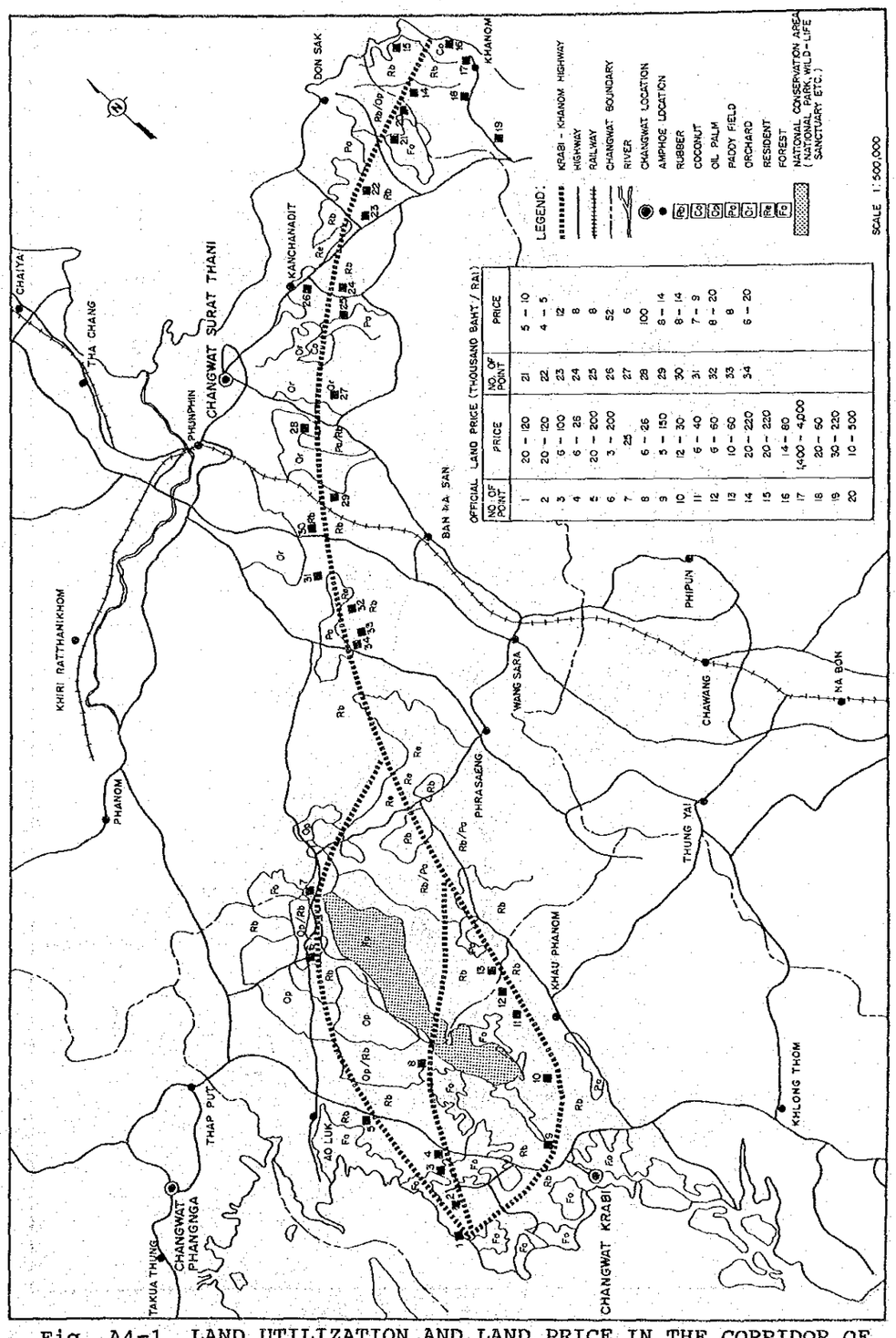


Fig. A4-1 LAND UTILIZATION AND LAND PRICE IN THE CORRIDOR OF KRABI - KHANOM HIGHWAY