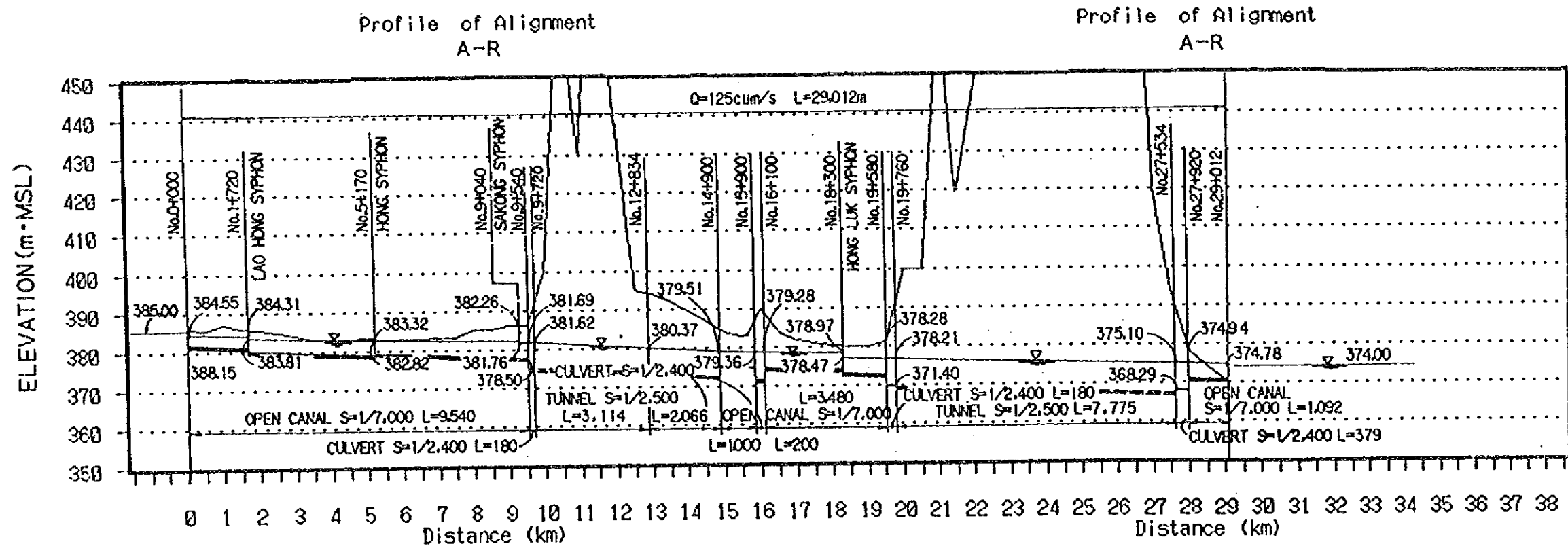
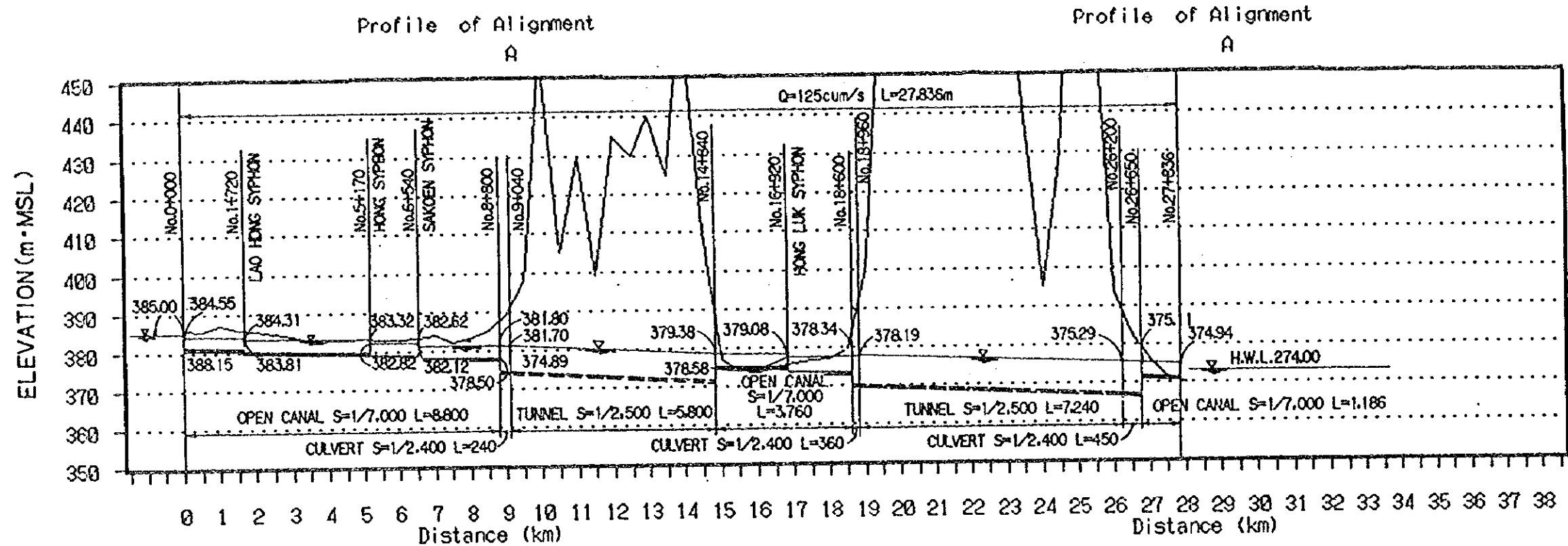
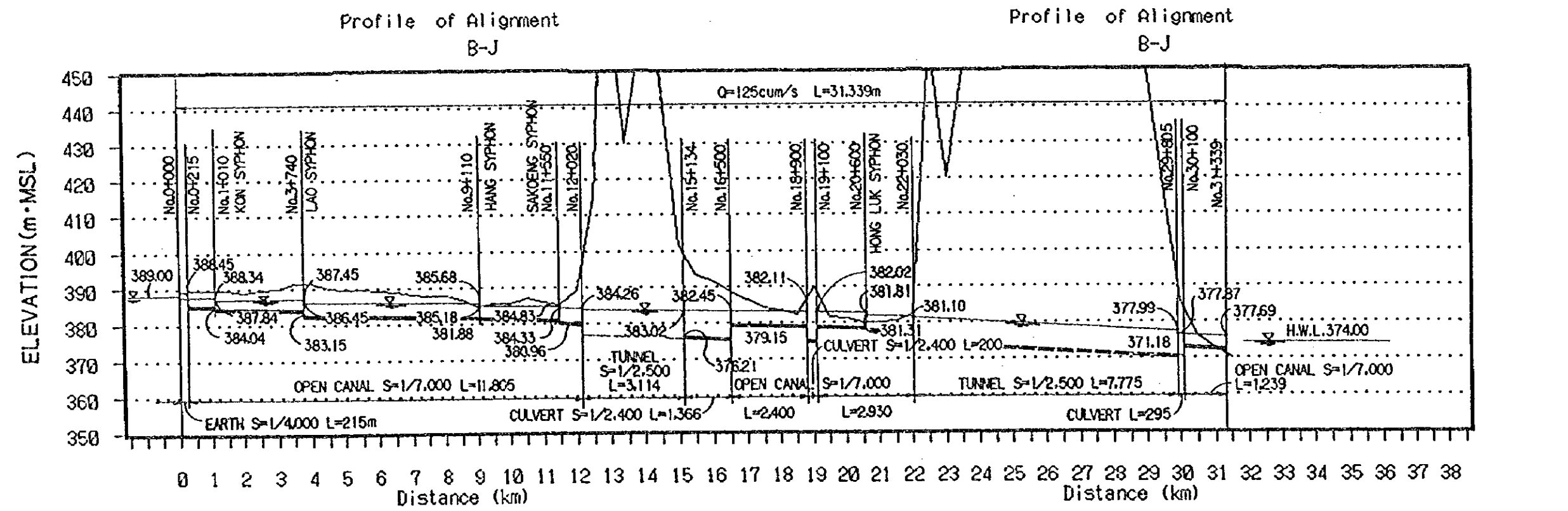
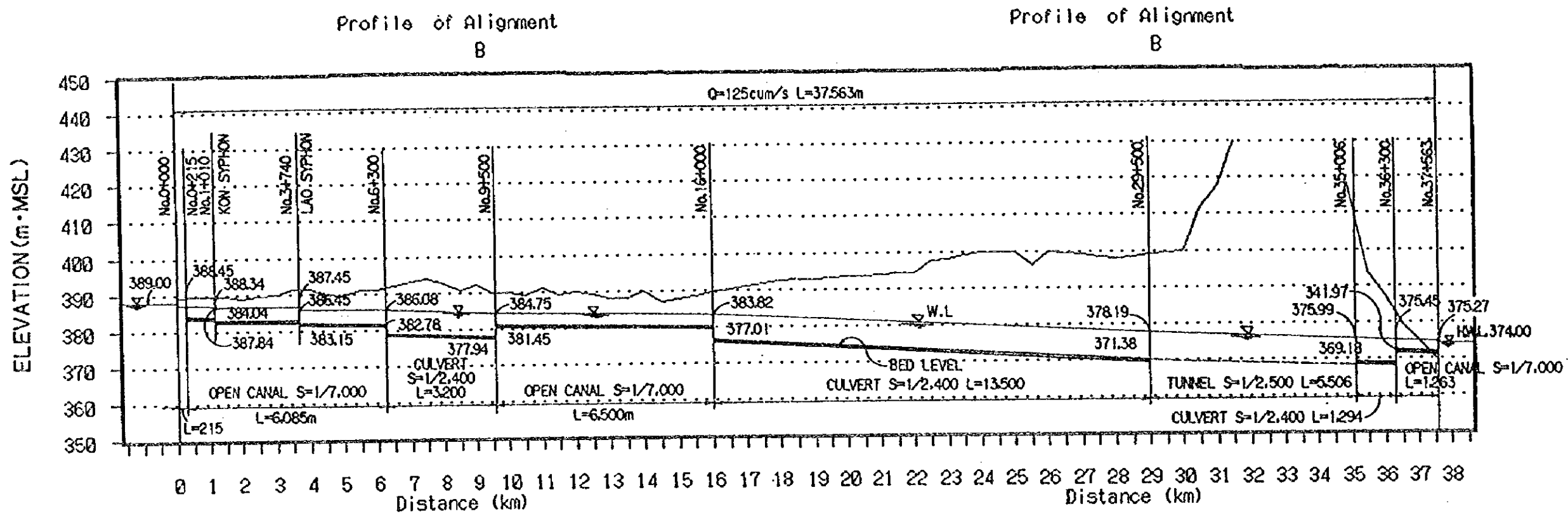


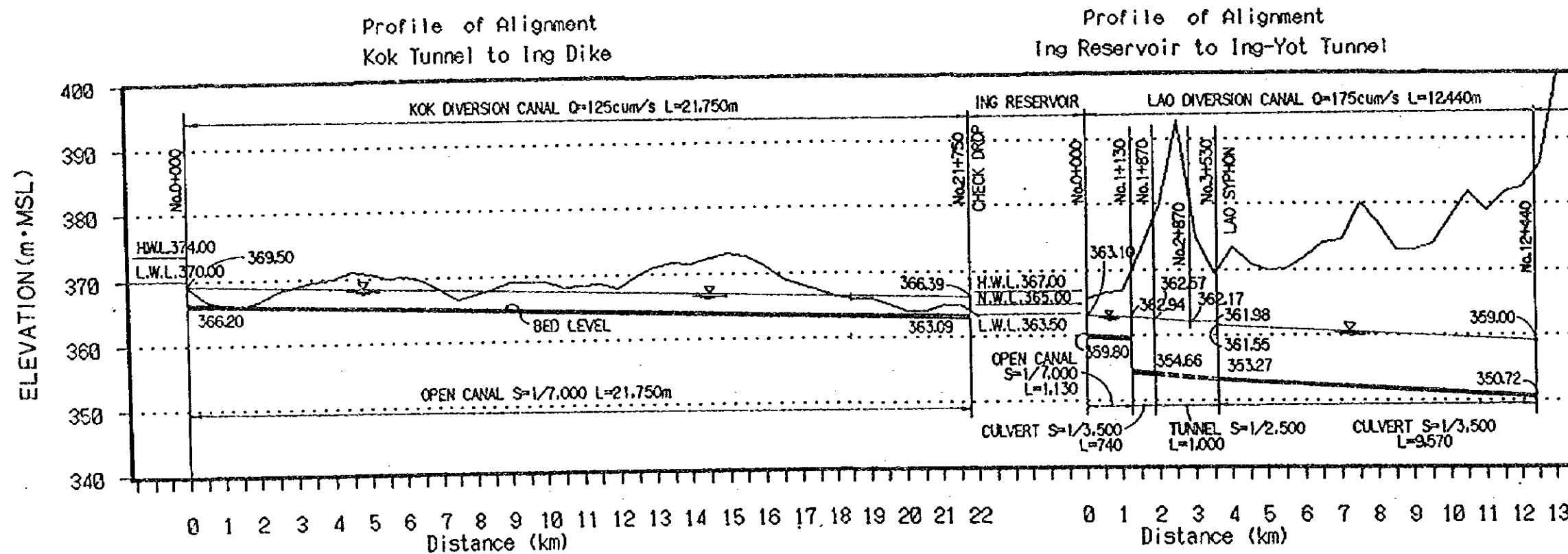
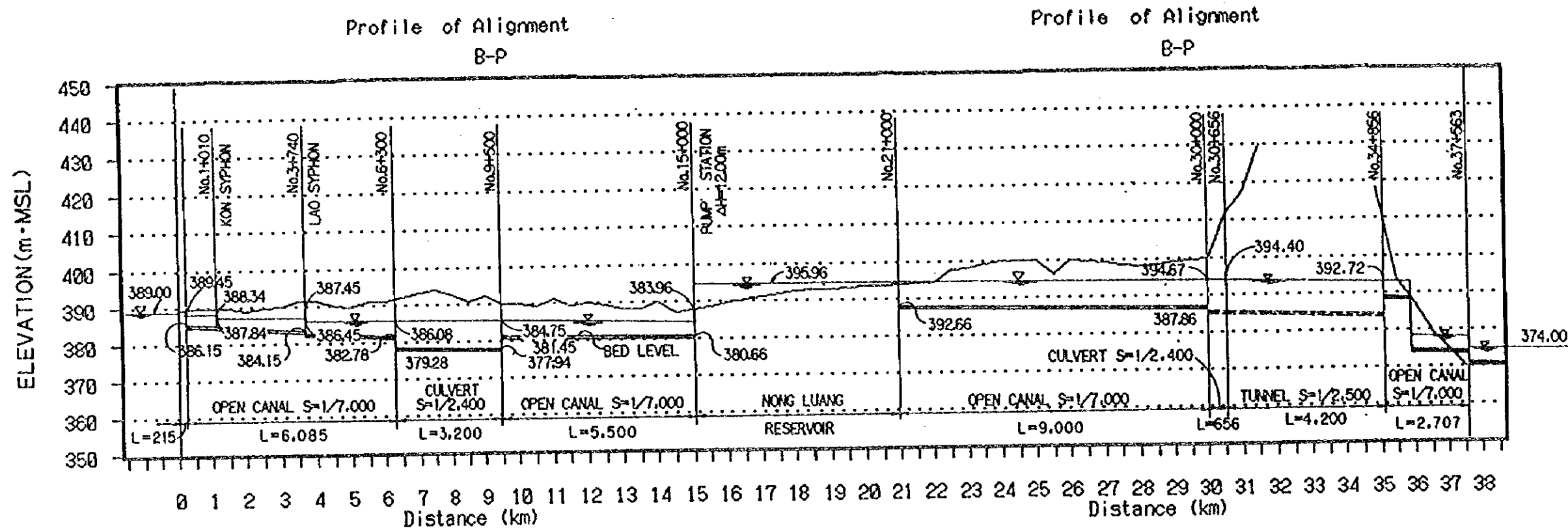
THE STUDY ON THE KOK-ING-NAN WATER DIVERSION PROJECT	
PROFILE OF DIVERSION CANAL ALIGNMENT (1/4) ORIGINAL ROUTE B	Map & Drawing No.
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA) SANYU CONSULTANTS INC. & NIPPON KOEI CO., LTD.	Figure P-12



THE STUDY ON THE KOK-ING-NAN WATER DIVERSION PROJECT	
PROFILE OF DIVERSION CANAL ALIGNMENT (2/4) ROUTE A AND ROUTE A-R	Map & Draw- ing No.
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	
SANYU CONSULTANTS INC. & NIPPON KOEI CO., LTD.	
Figure P-13	



THE STUDY ON THE KOK-ING-NAN WATER DIVERSION PROJECT	
PROFILE OF DIVERSION CANAL ALIGNMENT (3/4) ROUTE B AND ROUTE B-J	Map & Draw- ing No.
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	
SANYU CONSULTANTS INC. & NIPPON KOEI CO., LTD.	
Figure P-14	



THE STUDY ON THE KOK-ING-NAN WATER DIVERSION PROJECT	
PROFILE OF DIVERSION CANAL ALIGNMENT (4/4) ROUTE B-P, DOWNSTREAM OF KOK-ING DIVERSION CANAL AND LAO DIVERSION CANAL	Map & Draw. Ing No.
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	
SANYU CONSULTANTS INC. & NIPPON KOEI CO., LTD.	
Figure P-15	

HYDRAULIC PROFILE

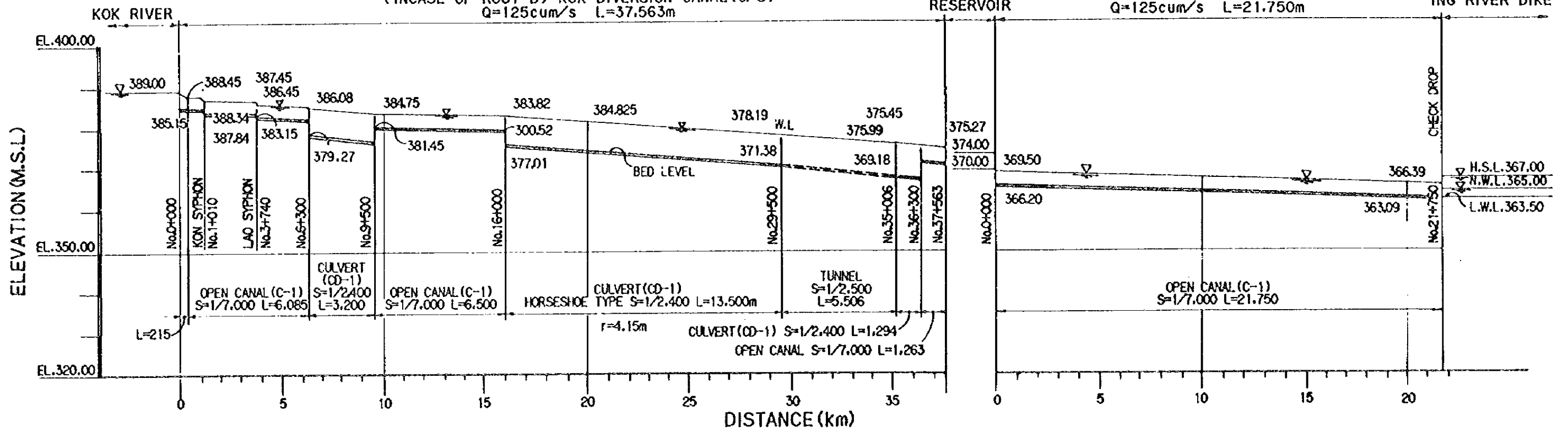
KOK-ING

(IN CASE OF ROOT B) KOK DIVERSION CANAL (U/S)
 $Q=125\text{cum/s}$ $L=37.563\text{m}$

REGULATING RESERVOIR

KOK DIVERSION CANAL (U/S)
 $Q=125\text{cum/s}$ $L=21.750\text{m}$

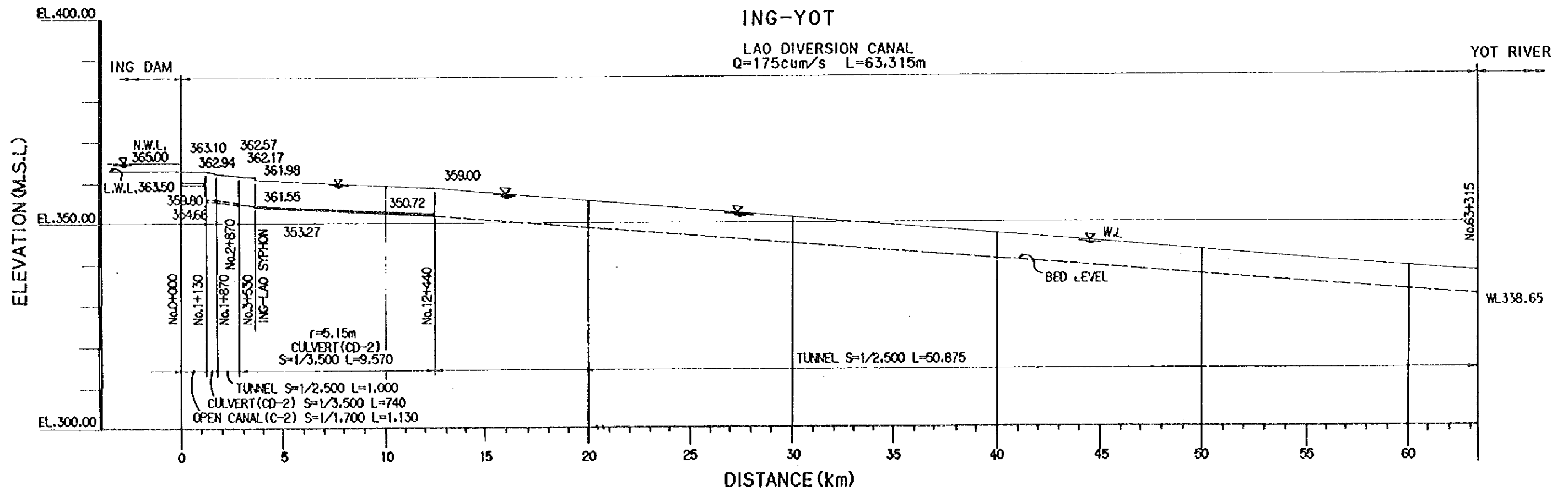
ING RIVER DIKE



ING-YOT

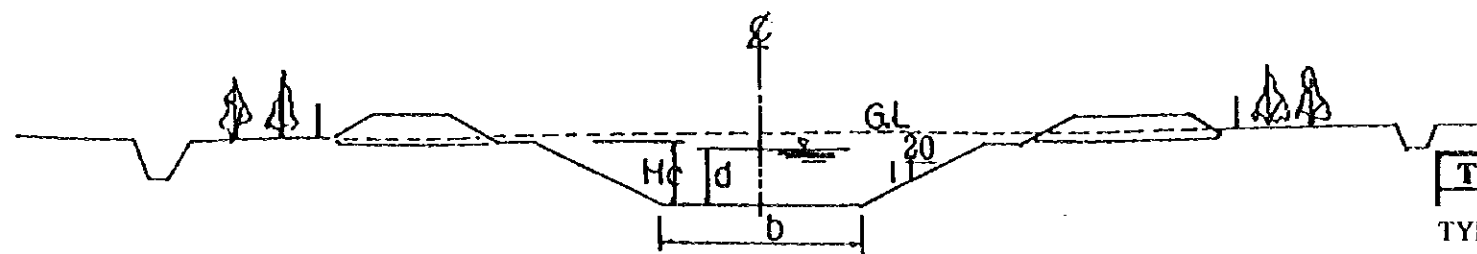
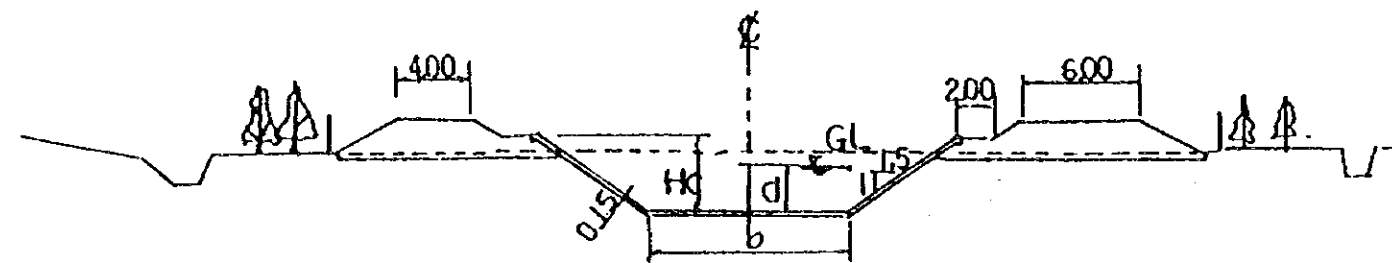
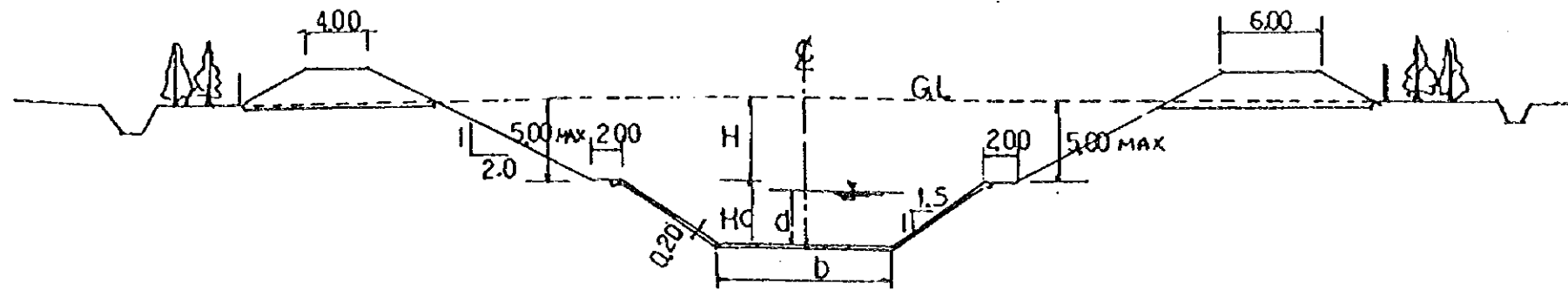
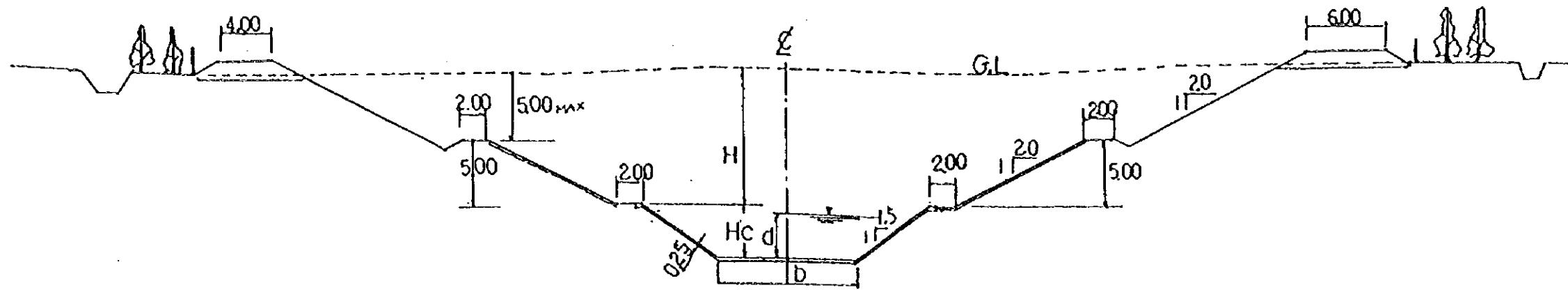
LAO DIVERSION CANAL
 $Q=175\text{cum/s}$ $L=63.315\text{m}$

YOT RIVER



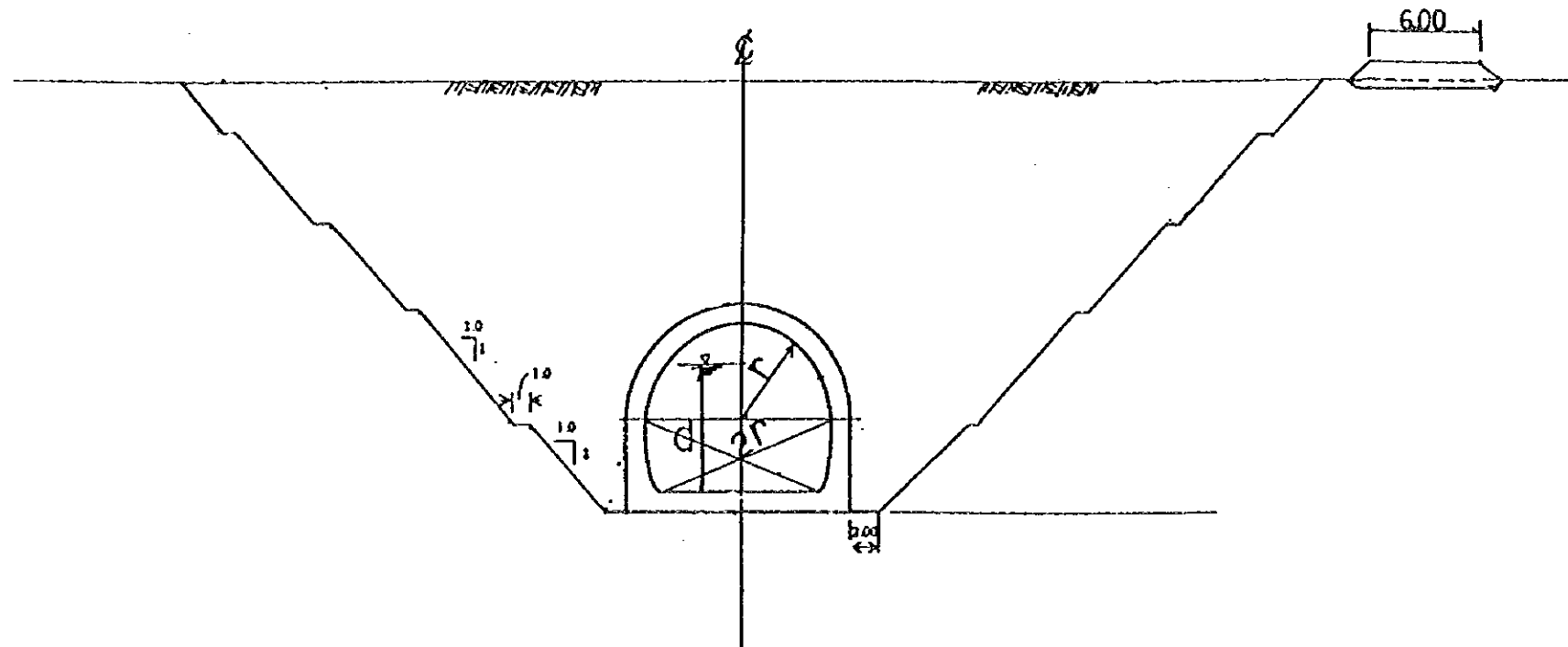
THE STUDY ON THE KOK-ING-NAN WATER DIVERSION PROJECT	
HYDRAULIC PROFILE	Map & Draw- ing No.
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	
SANYU CONSULTANTS INC. & NIPPON KOEI CO., LTD.	Figure P-16

Typical Cross Section (1/2)



THE STUDY ON THE KOK-ING-NAN WATER DIVERSION PROJECT	
TYPICAL CROSS SECTION (1/2) (OPEN CANAL)	Map & Draw- ing No.
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	Figure P-17
SANYU CONSULTANTS INC. & NIPPON KOEI CO., LTD.	

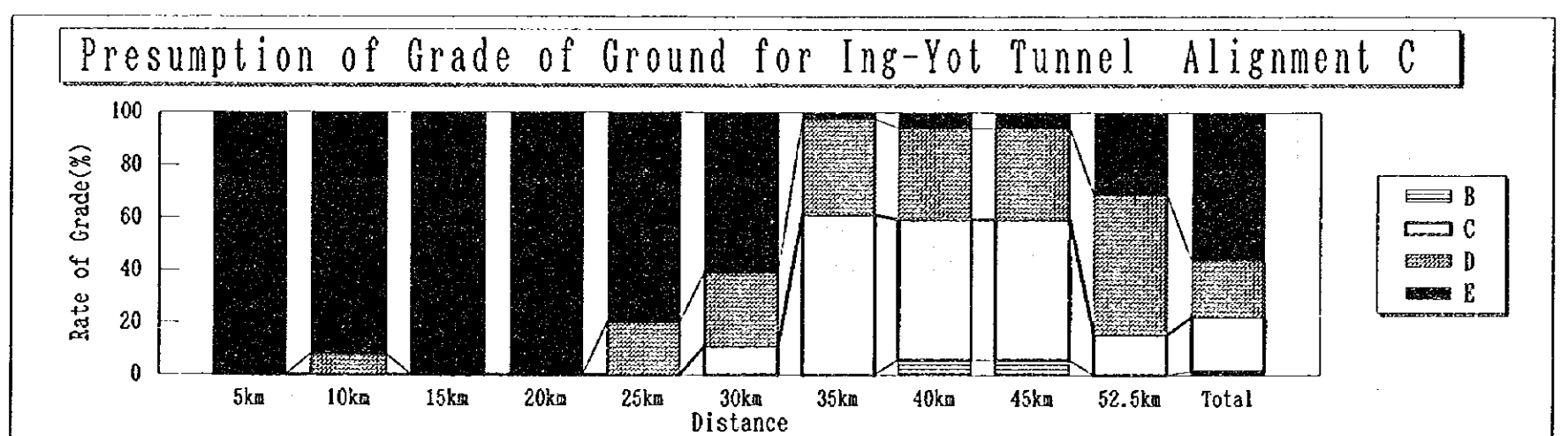
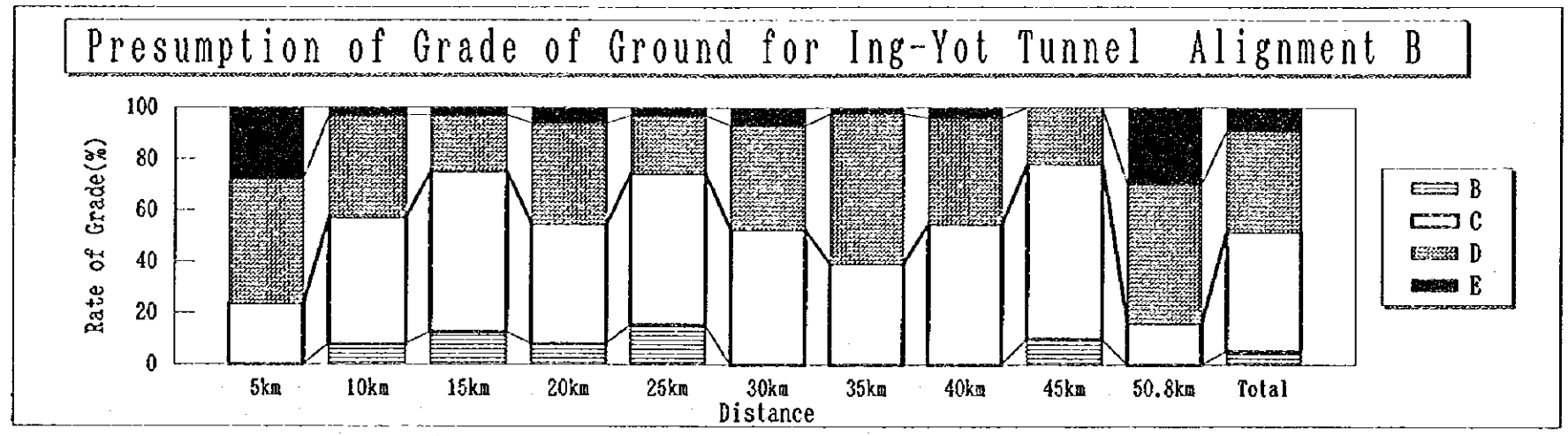
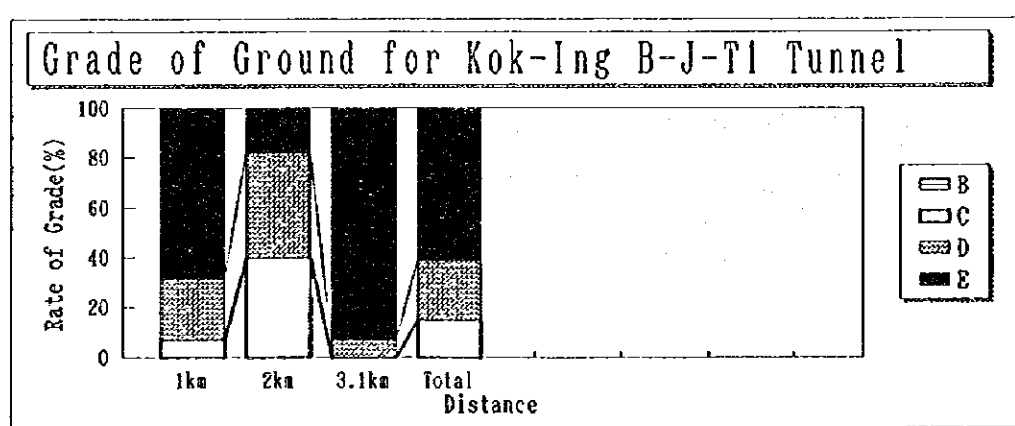
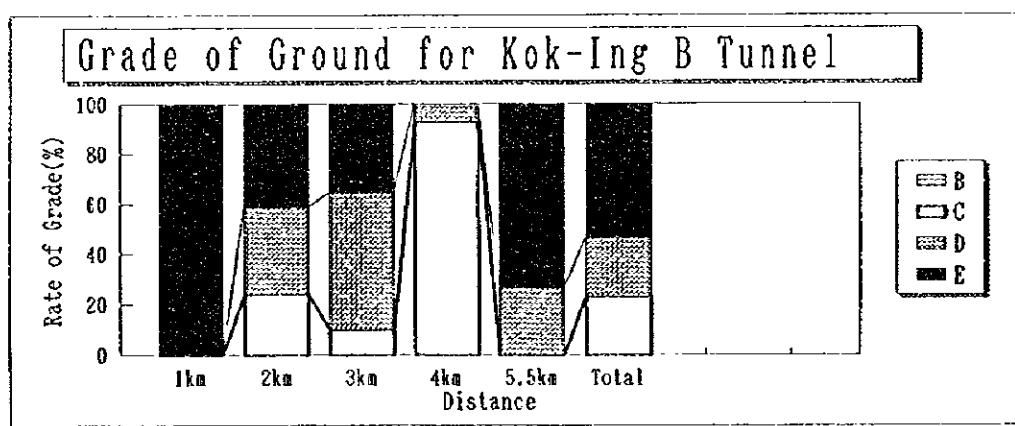
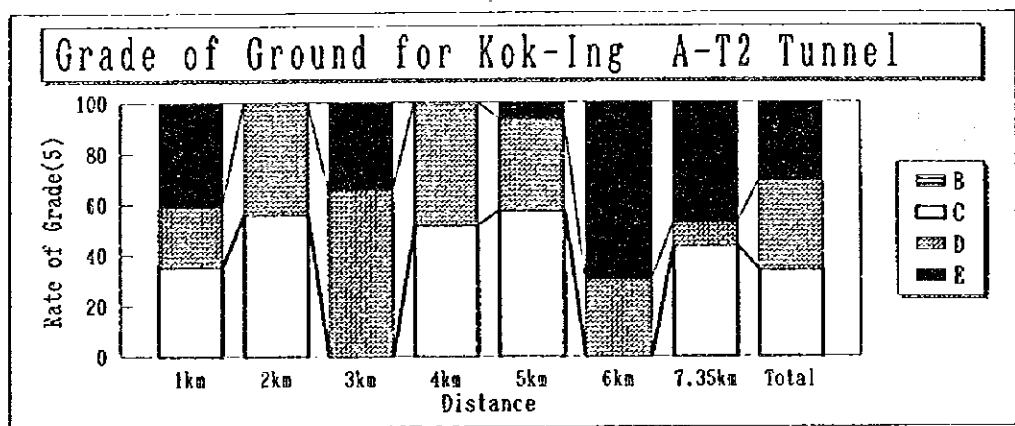
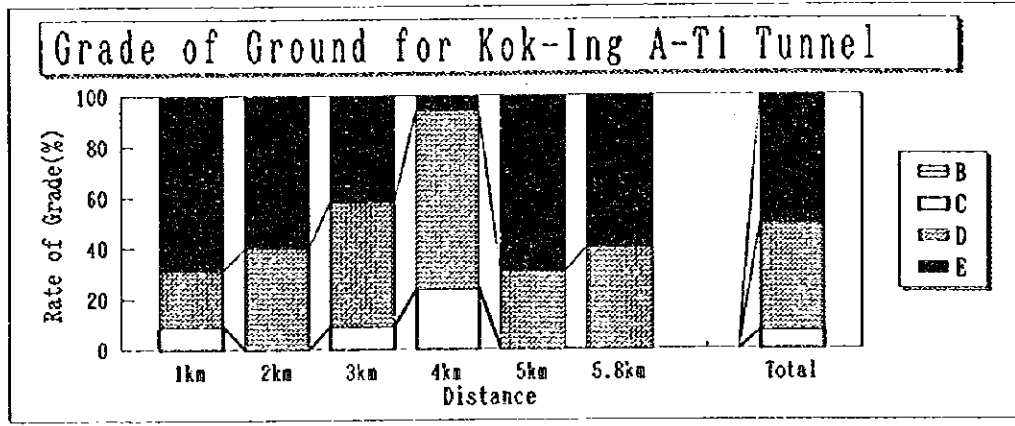
Typical Cross Section(2/2)



Canal & Culvert Section

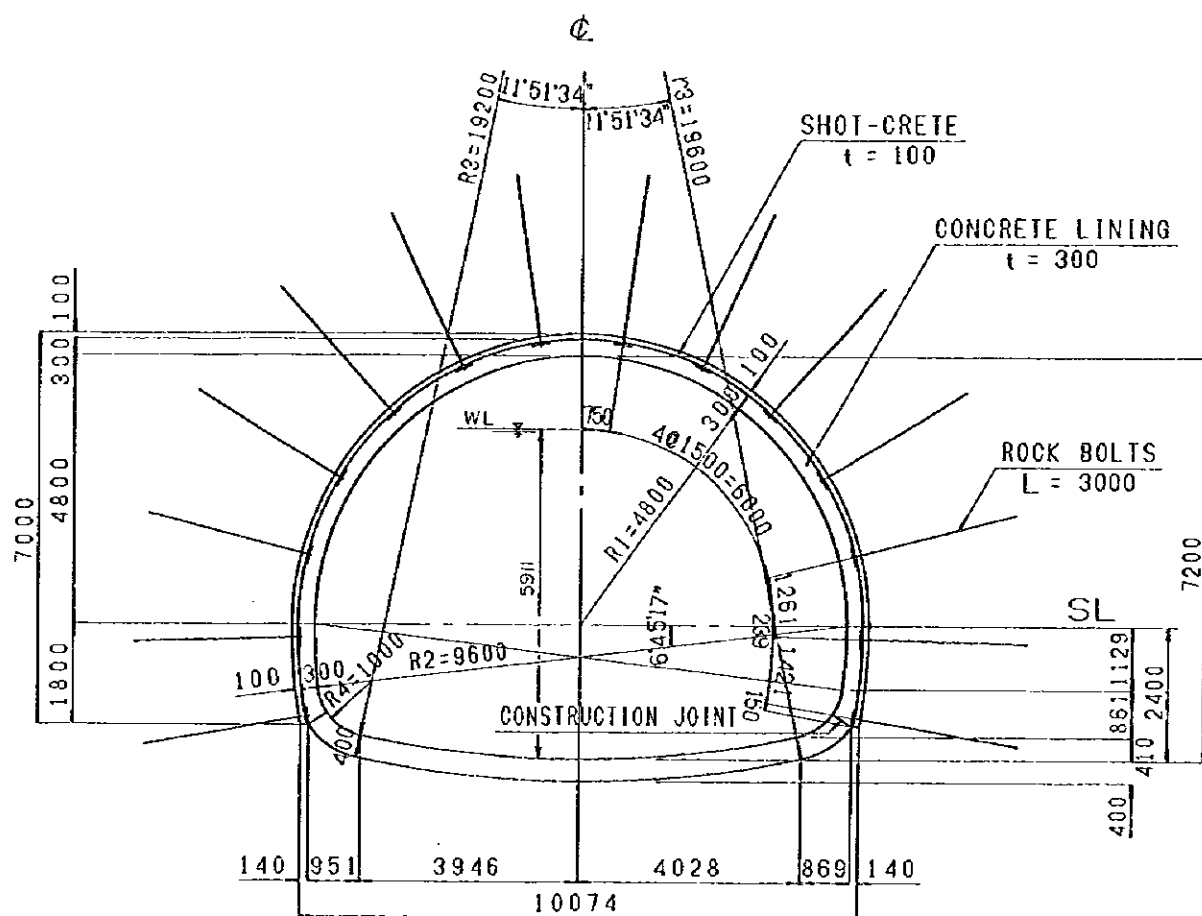
Lining	L/S	b m	d m	z	A sqm	P m	R m	n	S	V m/s	Q cum/s	Hc m	Remarks
KOK-ING	Q=125 cum/s												
E. Lining (Orig)	1/4000	18.00	3.860	2.00	99.28	35.26	2.82	0.025	0.00025	1.26	125.19	4.60	
Conc. Lining	1/7000	20.50	3.304	1.50	84.11	32.41	2.59	0.015	0.00014	1.50	126.55	4.00	
Culvert	1/2400	r=4.15	6.806	-	50.50	19.84	2.55	0.015	0.00042	2.54	128.13		
ING-YOT	Q=175 cum/s												
Conc. Lining	1/7000	29.00	3.304	1.50	112.19	40.91	2.74	0.015	0.00014	1.56	175.14	4.00	
Culvert	1/3500	r=5.05	8.282	-	74.78	24.14	3.10	0.015	0.00029	2.39	179.08		

THE STUDY ON THE KOK-ING-NAN WATER DIVERSION PROJECT	
TYPICAL CROSS SECTION (2/2) (CULVERT)	Map & Drawing No.
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	Figure P-18
SANYU CONSULTANTS INC. & NIPPON KOEI CO., LTD.	



Note : Grade of Ground on route B-J-T2 shall be adopted proportional distribution of A-T2.

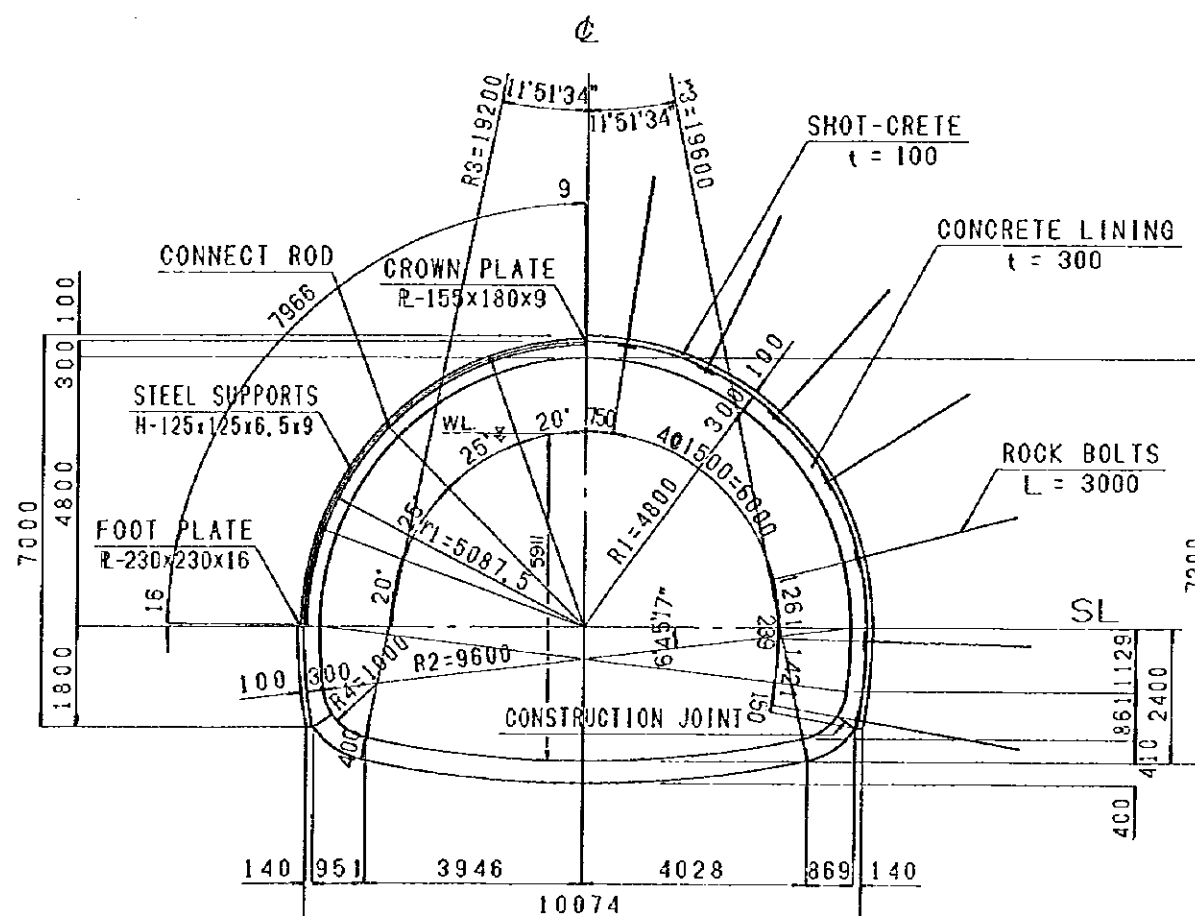
TYPE - C I



Quantity per meter and/or cycle of Type CI

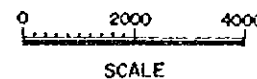
Item	Unit	Qty
Tunnel Excavation	m ³ /m	74.00
Shotcrete	m ² /m	19.60
Rock Bolt	Nos./m	14
Steel Arch Supporting	ton/cycle	-
Concrete Lining	m ³ /m	14.00
Reinforcement	ton/m	-

TYPE - C II

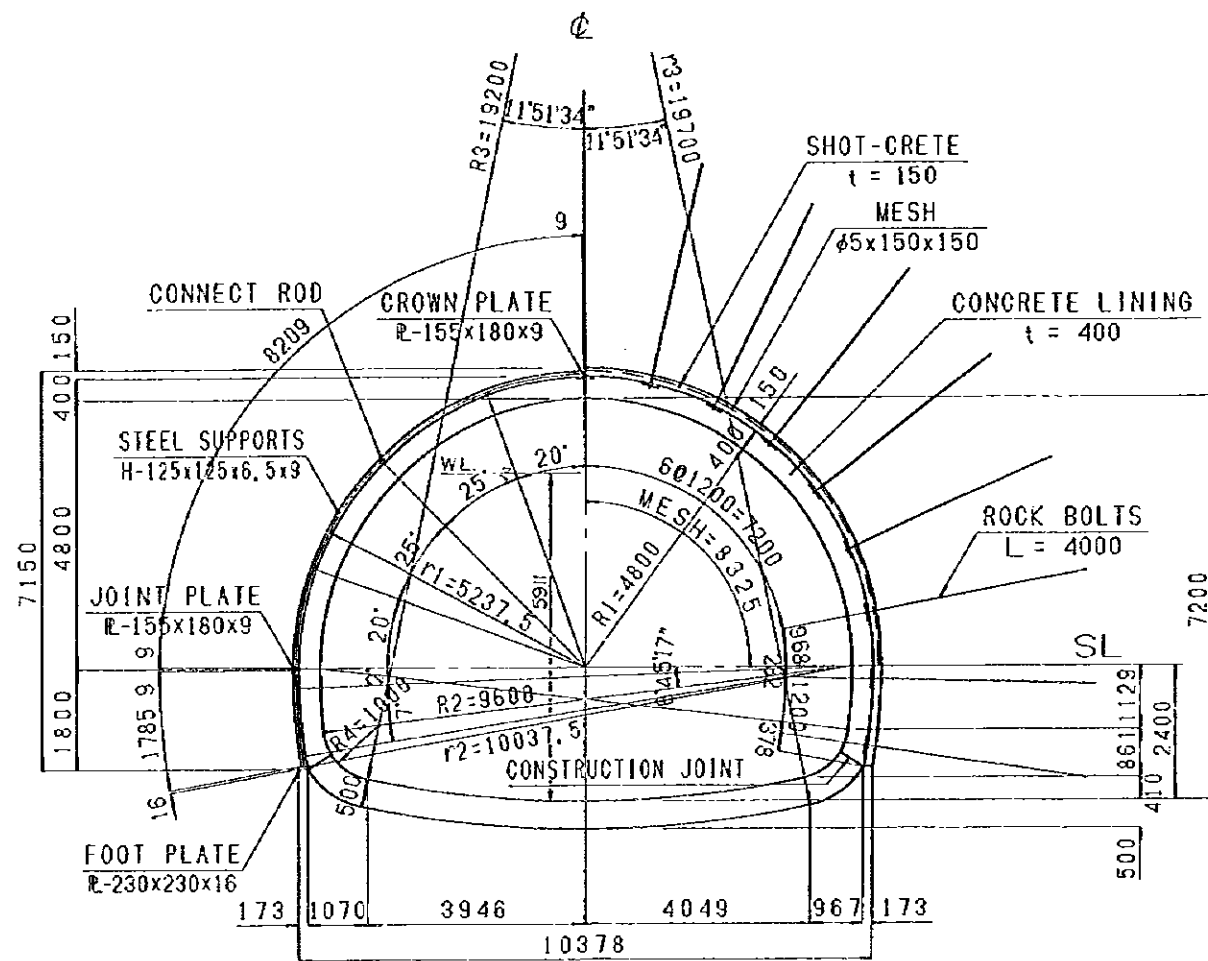


Quantity per meter and/or cycle of Type CII

Item	Unit	Qty
Tunnel Excavation	m ³ /m	73.60
Shotcrete	m ² /m	19.60
Rock Bolt	Nos./m	14
Steel Arch Supporting	ton/cycle	0.38
Concrete Lining	m ³ /m	13.20
Reinforcement	ton/m	-



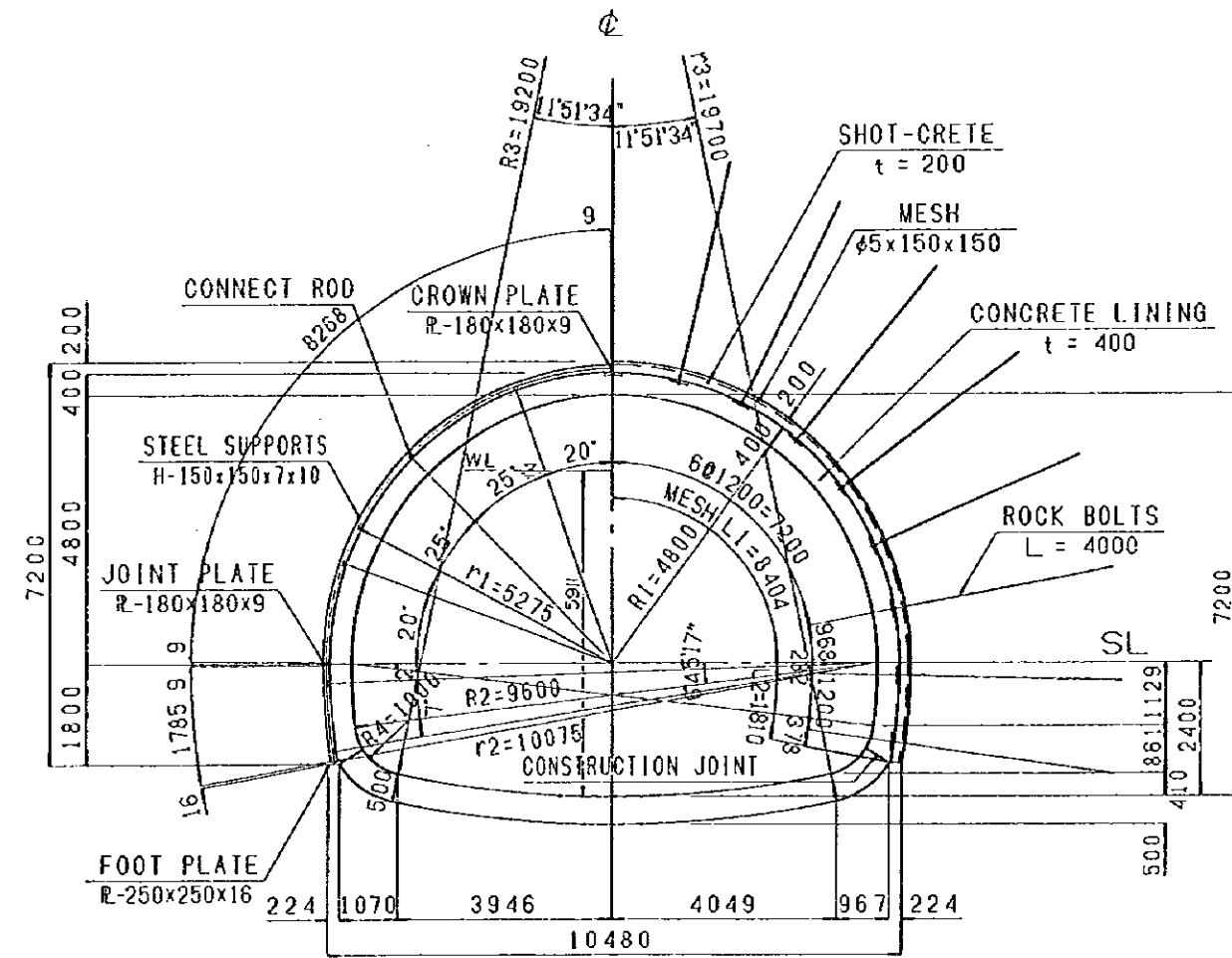
TYPE-D I



Quantity per meter and/or cycle of Type DI

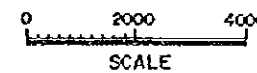
Item	Unit	Q'ty
Tunnel Excavation	m ³ /m	76.70
Shotcrete	m ² /m	20.00
Rock Bolt	Nos./m	17
Steel Arch Supporting	ton/cycle	0.48
Concrete Lining	m ³ /m	15.30
Reinforcement	ton/m	0.92

TYPE-D II

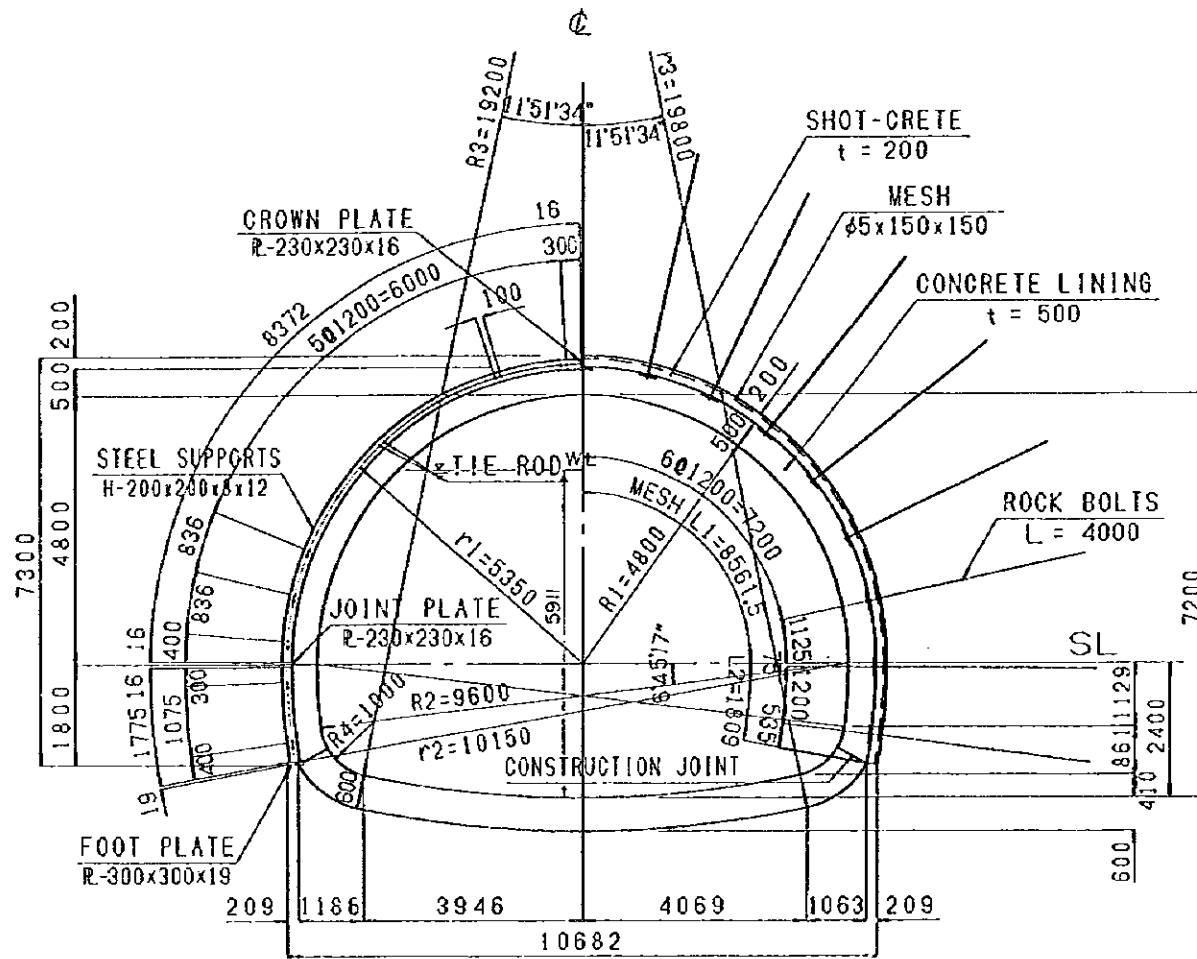


Quantity per meter and/or cycle of Type DII

Item	Unit	Q'ty
Tunnel Excavation	m ³ /m	77.80
Shotcrete	m ² /m	20.00
Rock Bolt	Nos./m	17
Steel Arch Supporting	ton/cycle	0.63
Concrete Lining	m ³ /m	15.30
Reinforcement	ton/m	0.92



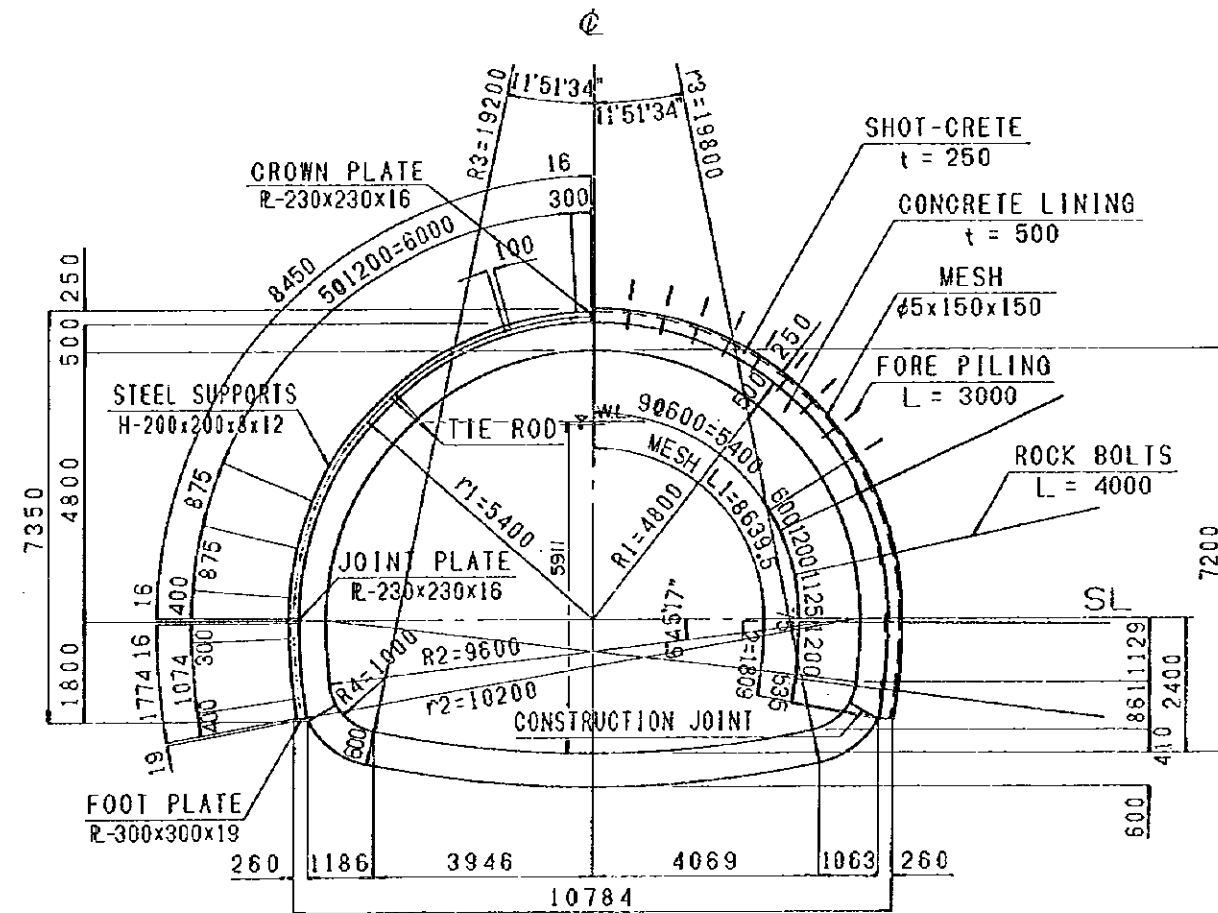
TYPE-E I



Quantity per meter and/or cycle of Type EI

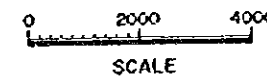
Item	Unit	Qty
Tunnel Excavation	m ³ /m	81.00
Shotcrete	m ² /m	20.30
Rock Bolt	Nos./m	17
Steel Arch Supporting	ton/cycle	1.01
Concrete Lining	m ³ /m	18.40
Reinforcement	ton/m	1.10

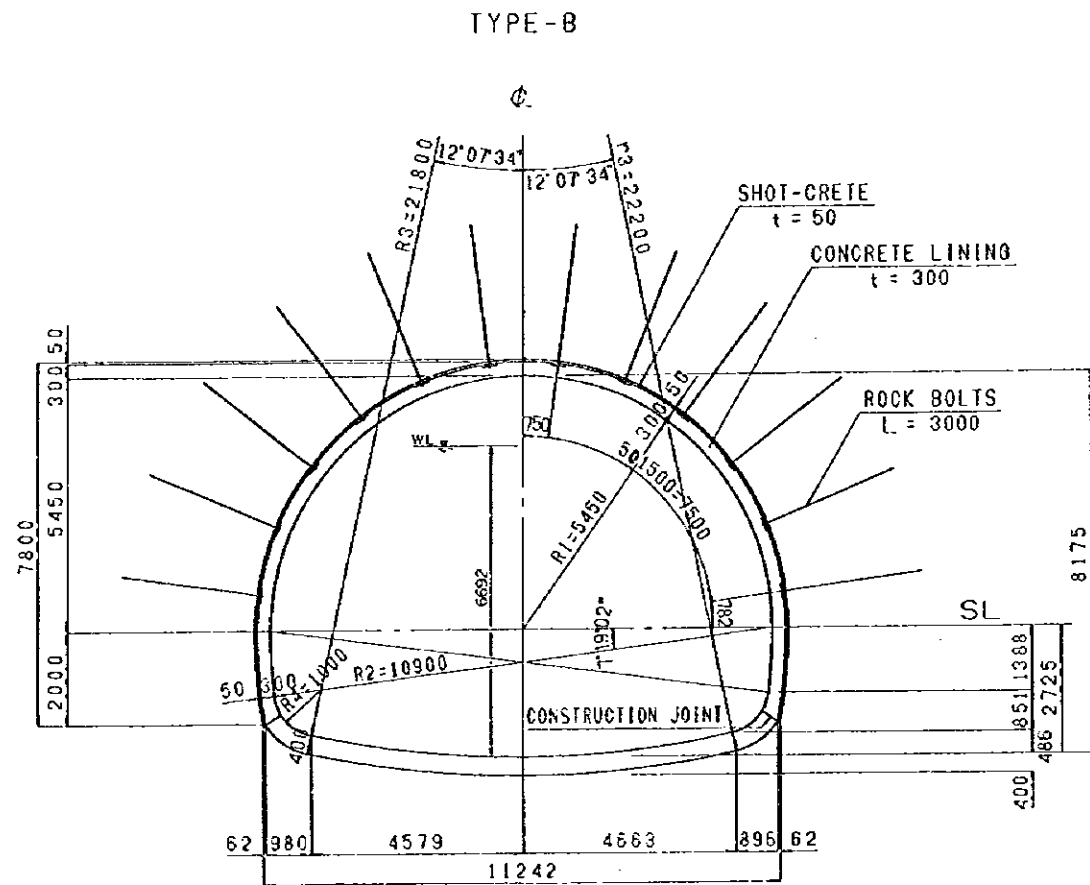
TYPE-E II



Quantity per meter and/or cycle of Type EII

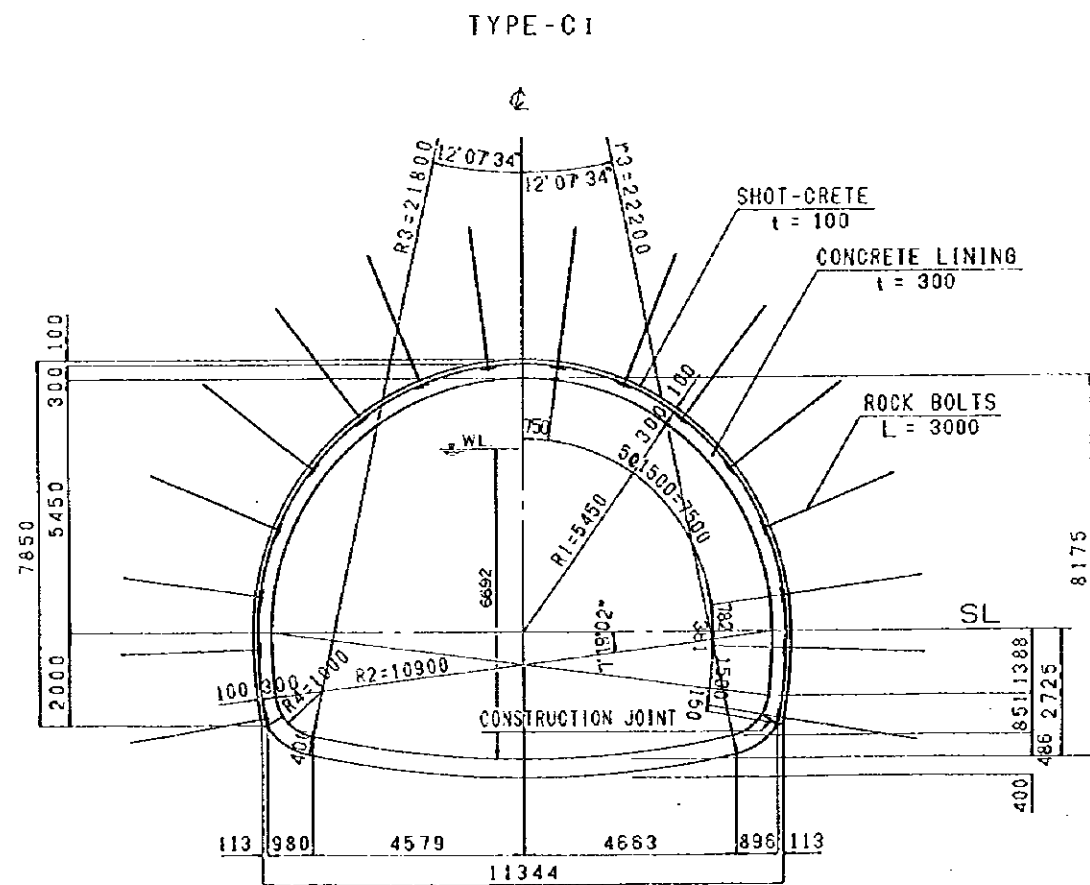
Item	Unit	Qty
Tunnel Excavation	m ³ /m	82.10
Shotcrete	m ² /m	20.30
Rock Bolt	Nos./m	8
Rock Bolt (Forpiling)	Nos./m	18
Steel Arch Supporting	ton/cycle	1.02
Concrete Lining	m ³ /m	18.40
Reinforcement	ton/m	1.10





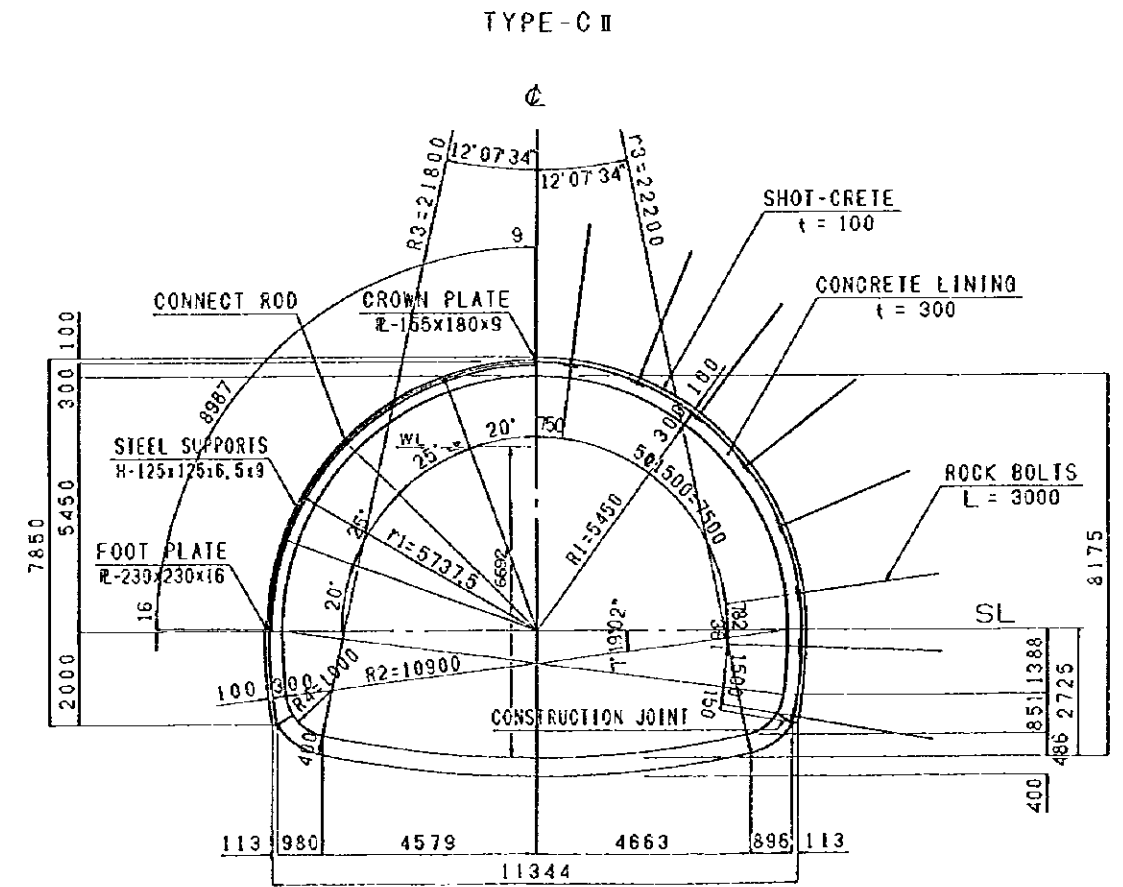
Quantity per meter and/or cycle of Type B

Item	Unit	Qty
Tunnel Excavation	m ³ /m	92.20
Shotcrete	m ² /m	22.10
Rock Bolt	Nos./m	12
Steel Arch Supporting	ton/cycle	-
Concrete Lining	m ³ /m	16.70
Reinforcement	ton/m	-



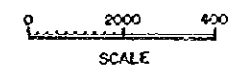
Quantity per meter and/or cycle of Type C I

Item	Unit	Qty
Tunnel Excavation	m ³ /m	92.70
Shotcrete	m ² /m	22.10
Rock Bolt	Nos./m	16
Steel Arch Supporting	ton/cycle	-
Concrete Lining	m ³ /m	15.80
Reinforcement	ton/m	-

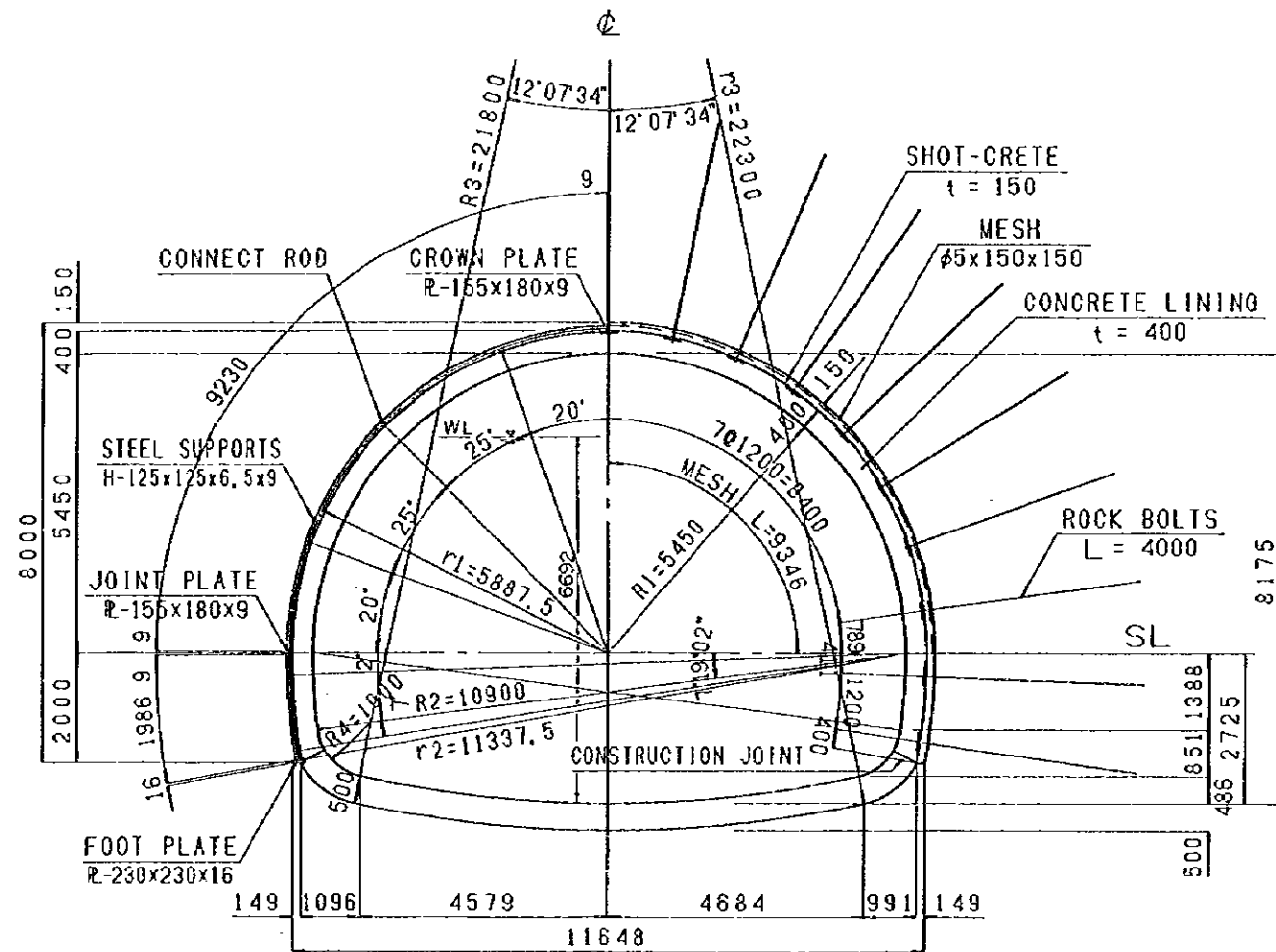


Quantity per meter and/or cycle of Type C II

Item	Unit	Qty
Tunnel Excavation	m ³ /m	92.20
Shotcrete	m ² /m	22.10
Rock Bolt	Nos./m	16
Steel Arch Supporting	ton/cycle	0.43
Concrete Lining	m ³ /m	14.90
Reinforcement	ton/m	-



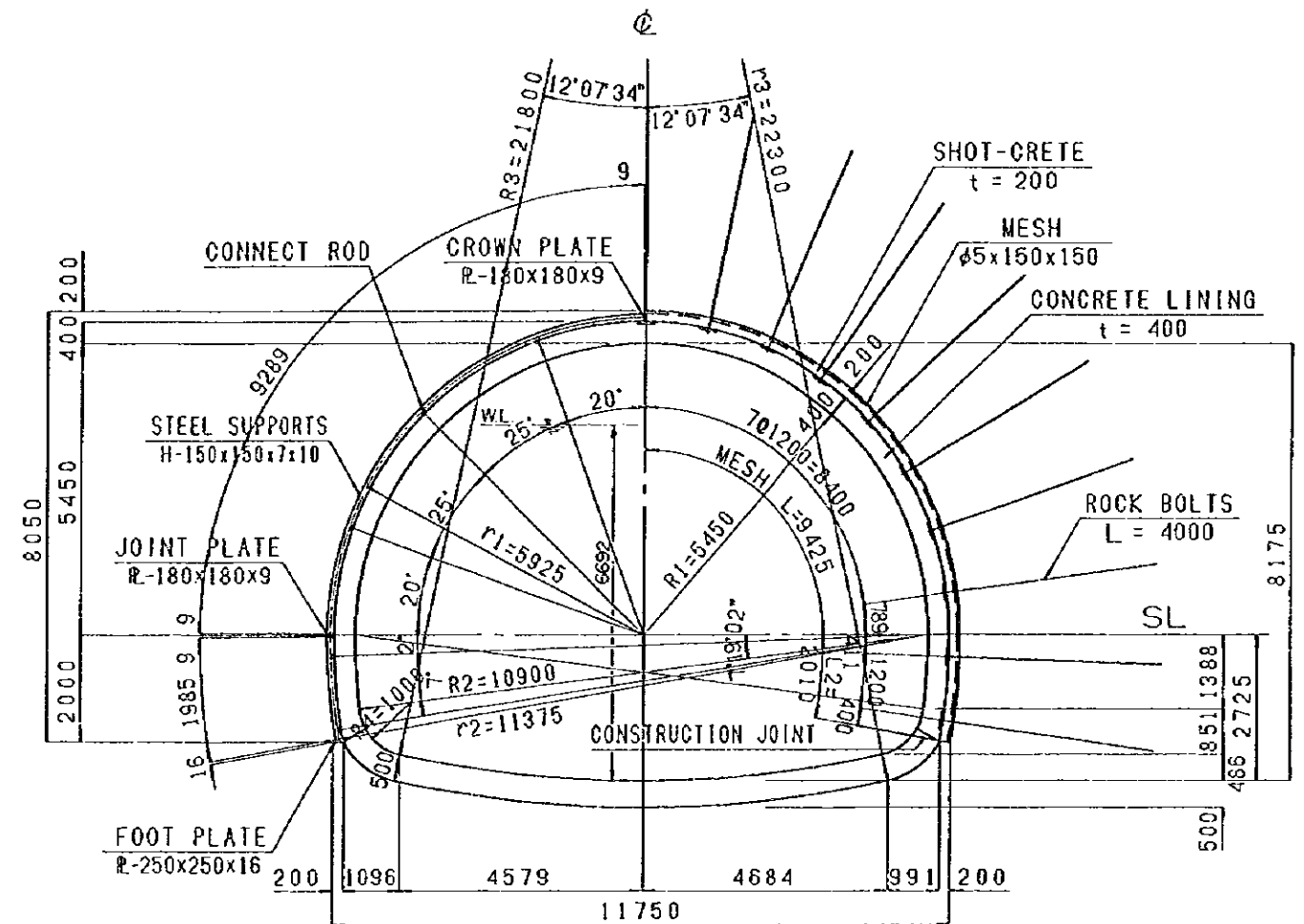
TYPE-D I



Quantity per meter and/or cycle of Type DI

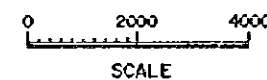
Item	Unit	Qty
Tunnel Excavation	m ³ /m	95.70
Shotcrete	m ² /m	22.40
Rock Bolt	Nos./m	19
Steel Arch Supporting	ton/cycle	0.53
Concrete Lining	m ³ /m	17.20
Reinforcement	ton/m	1.03

TYPE-D II

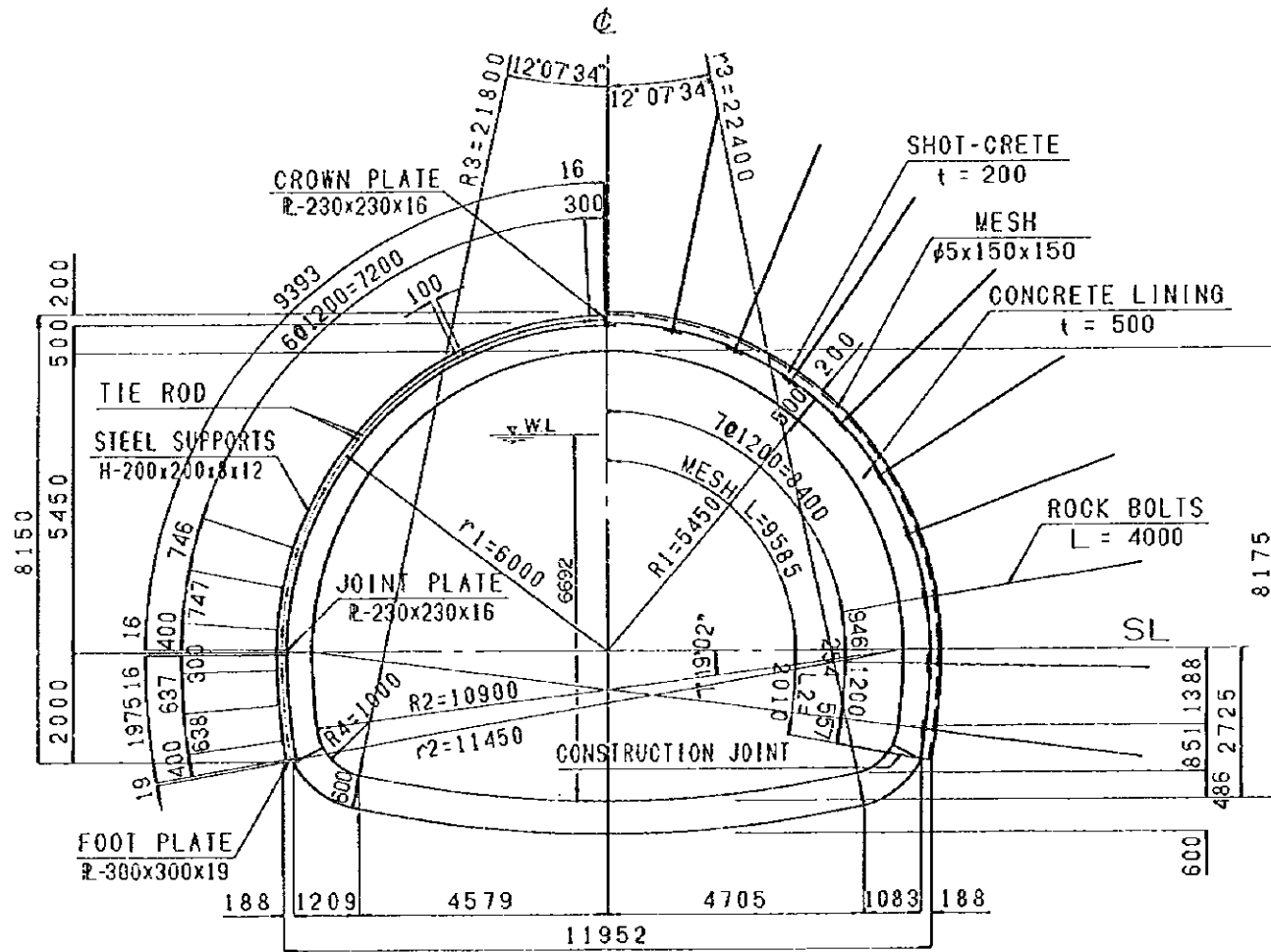


Quantity per meter and/or cycle of Type DII

Item	Unit	Qty
Tunnel Excavation	m ³ /m	96.90
Shotcrete	m ² /m	22.40
Rock Bolt	Nos./m	19
Steel Arch Supporting	ton/cycle	0.71
Concrete Lining	m ³ /m	17.20
Reinforcement	ton/m	1.03



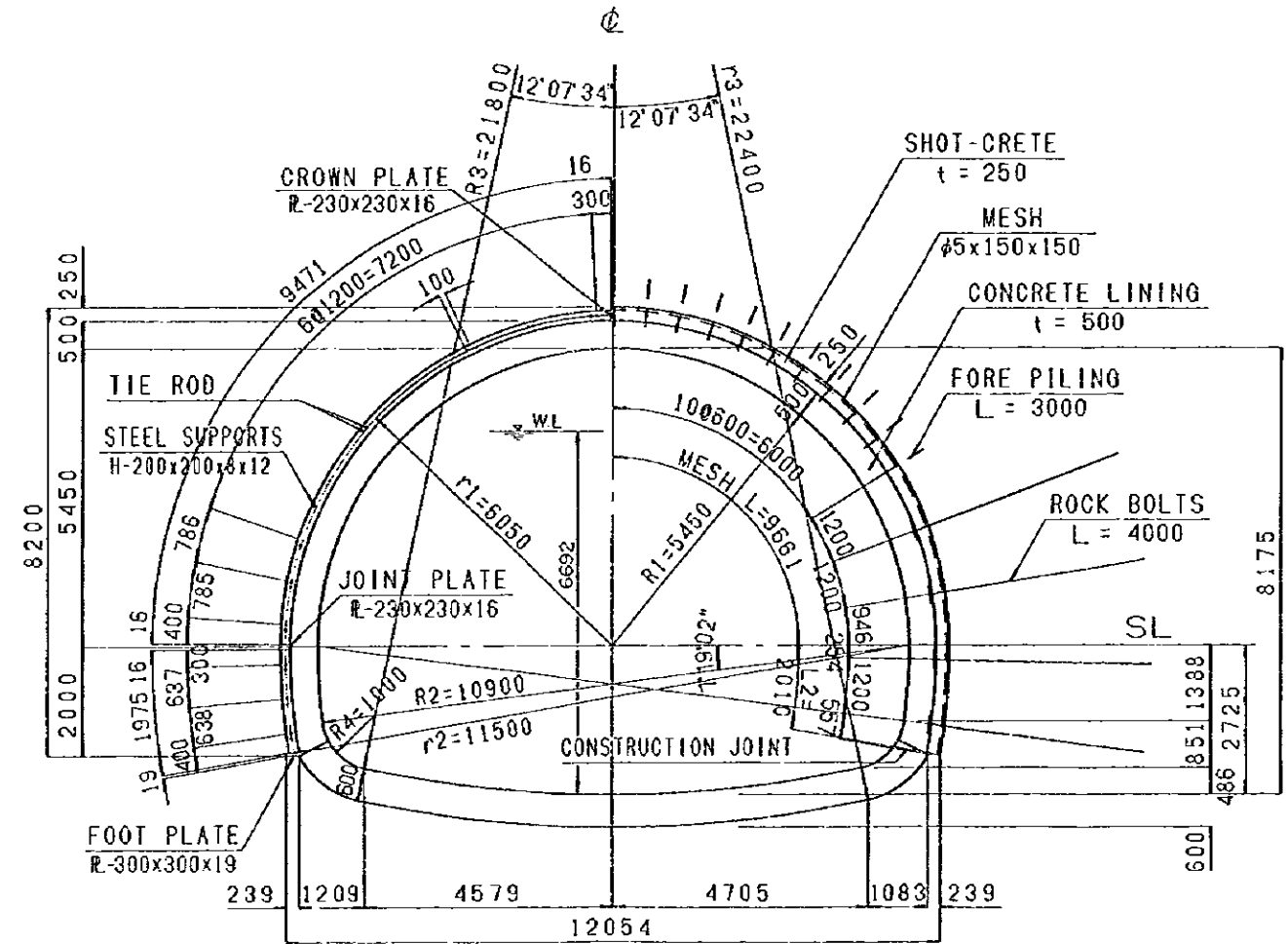
TYPE-E I



Quantity per meter and/or cycle of Type EI

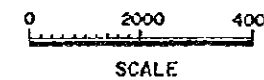
Item	Unit	Qty
Tunnel Excavation	m ³ /m	100.50
Shotcrete	m ² /m	22.70
Rock Bolt	Nos./m	19
Steel Arch Supporting	ton/cycle	1.13
Concrete Lining	m ³ /m	20.70
Reinforcement	ton/m	1.24

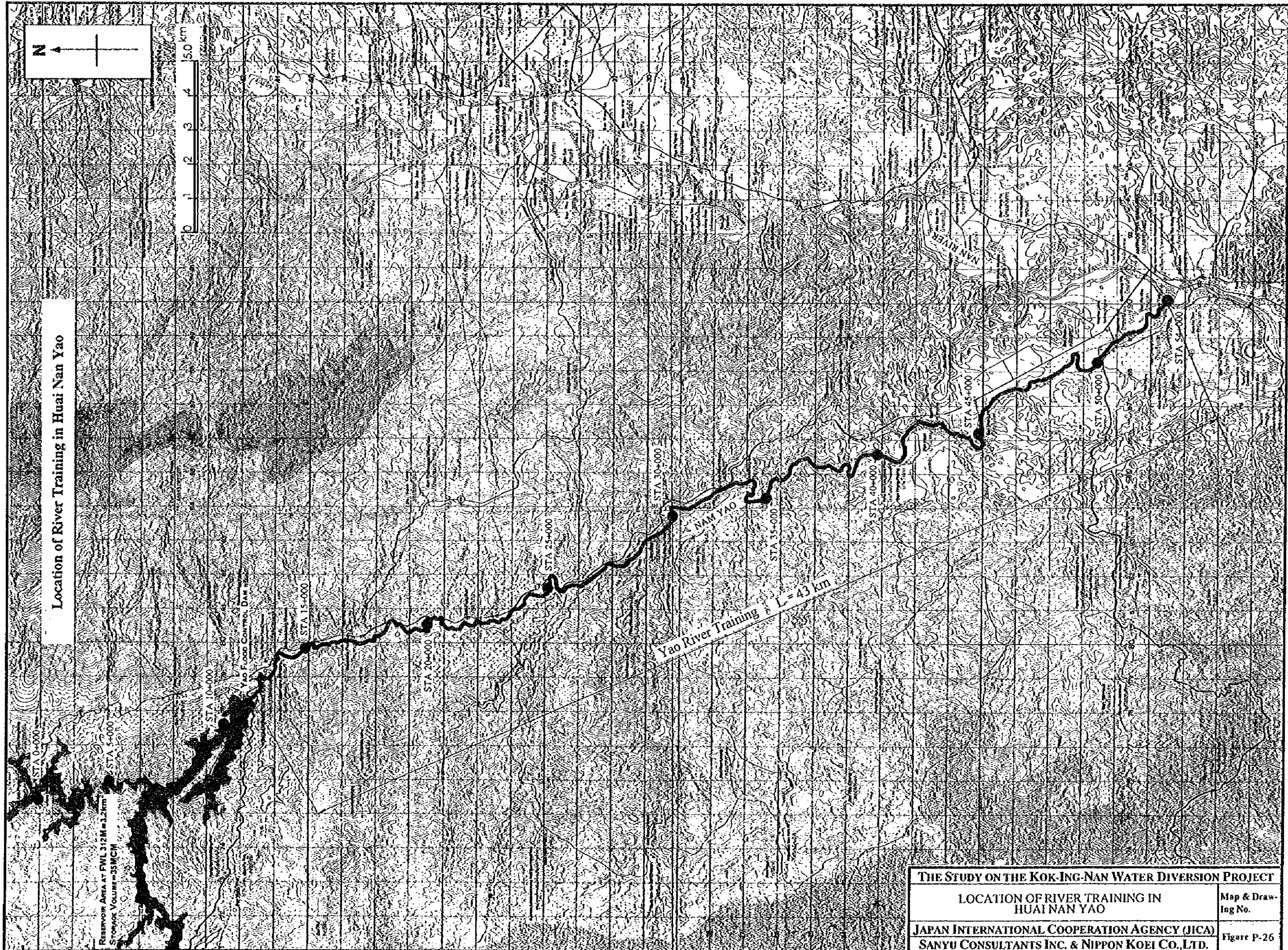
TYPE-E II



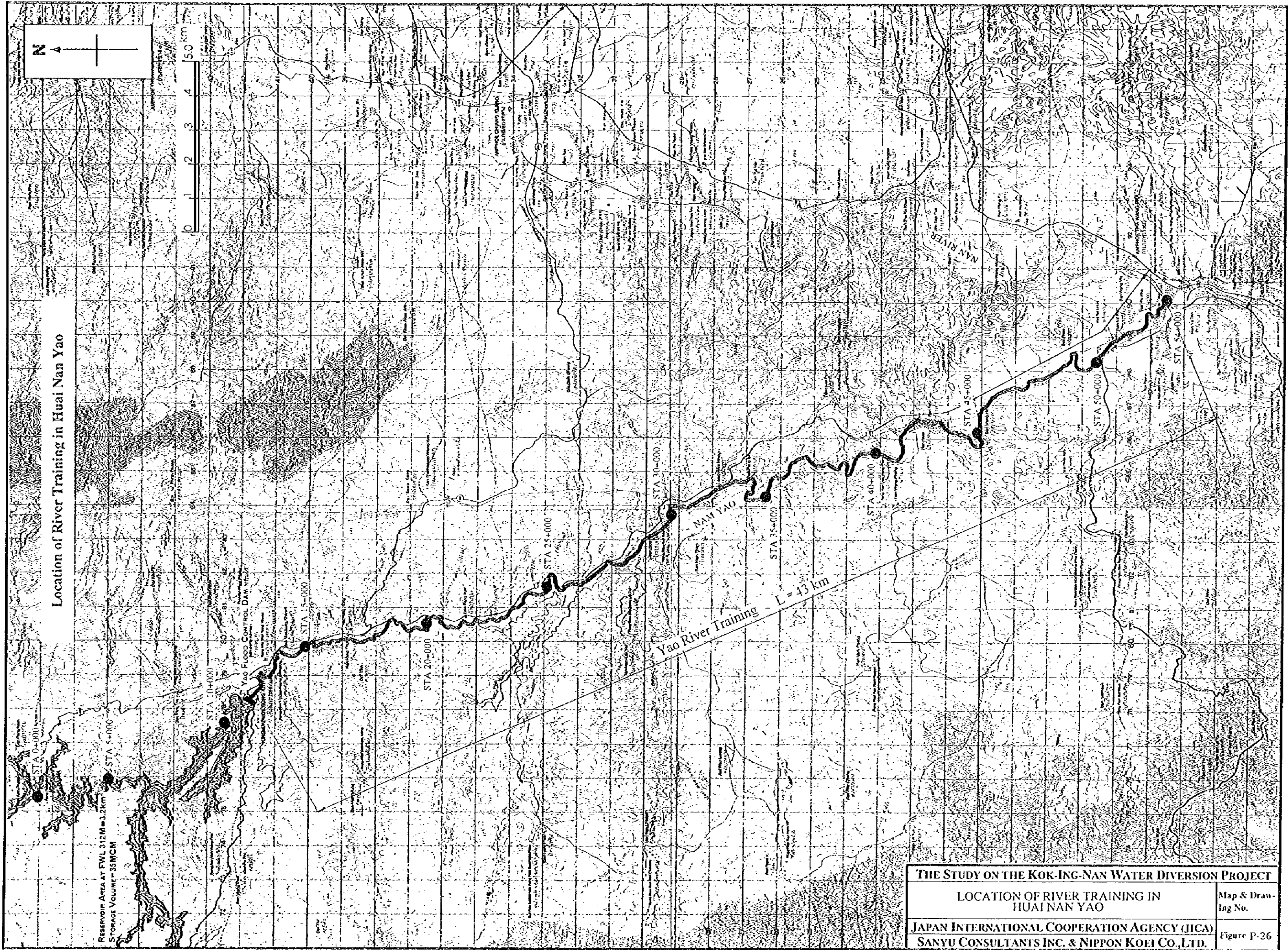
Quantity per meter and/or cycle of Type EII

Item	Unit	Qty
Tunnel Excavation	m ³ /m	101.70
Shotcrete	m ² /m	22.70
Rock Bolt	Nos./m	8
Rock Bolt (Forpiling)	Nos./m	22
Steel Arch Supporting	ton/cycle	1.14
Concrete Lining	m ³ /m	20.70
Reinforcement	ton/m	1.24





THE STUDY ON THE KOK-ING-NAN WATER DIVERSION PROJECT	
LOCATION OF RIVER TRAINING IN HUAI NAN YAO	
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	Map & Drawing No.
SANYU CONSULTANTS INC. & NIPPON KOEI CO., LTD.	Figure P-26



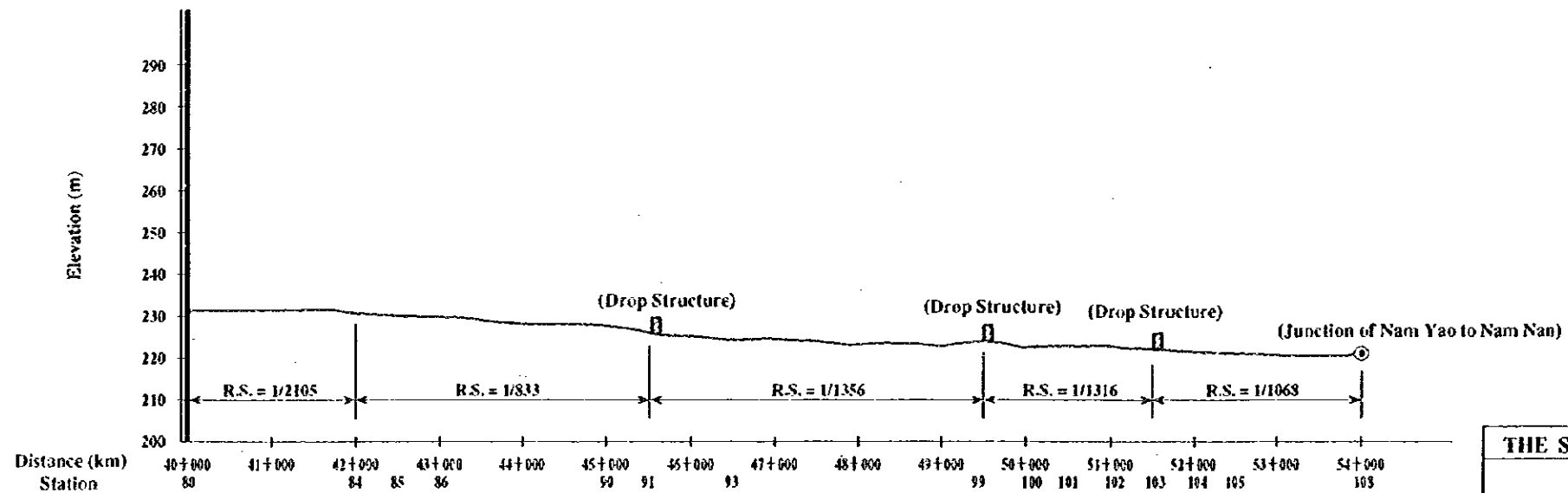
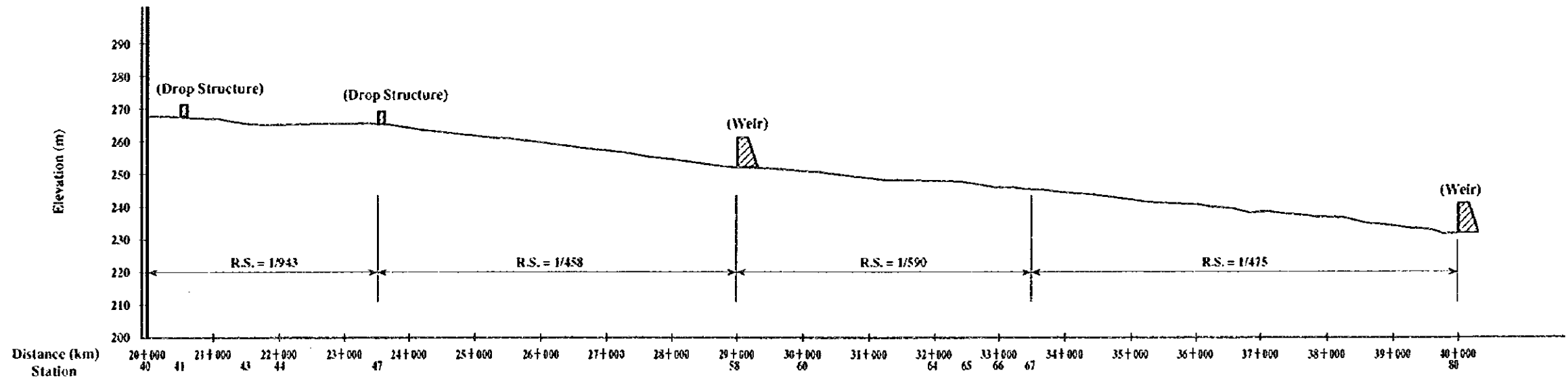
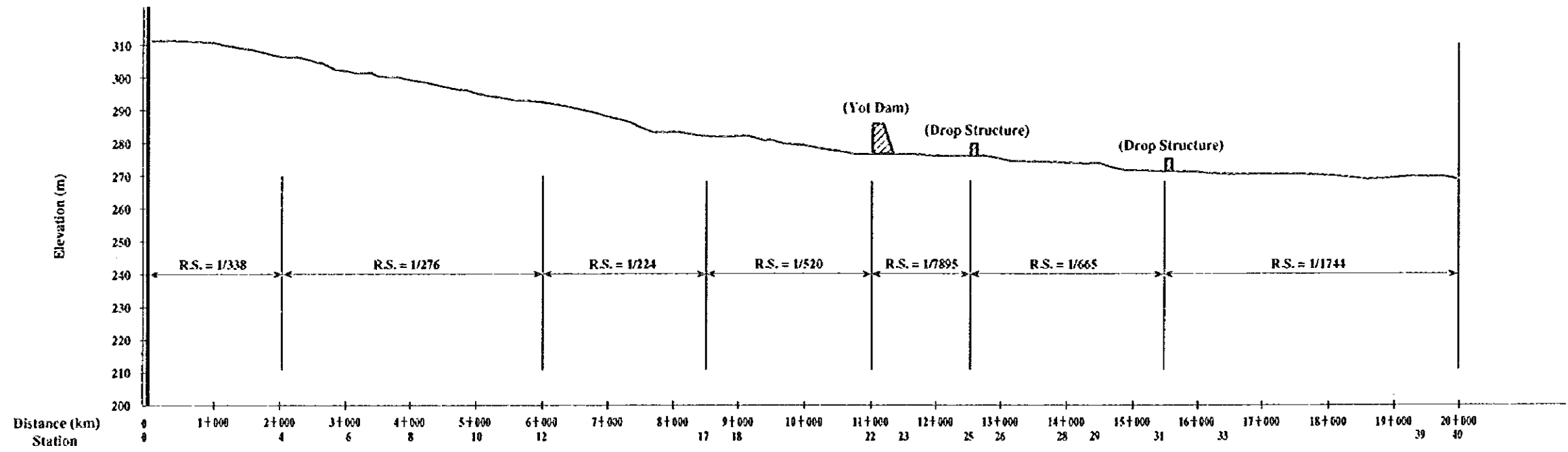
THE STUDY ON THE KOK-ING-NAN WATER DIVERSION PROJECT

LOCATION OF RIVER TRAINING IN
HUAI NAN YAO

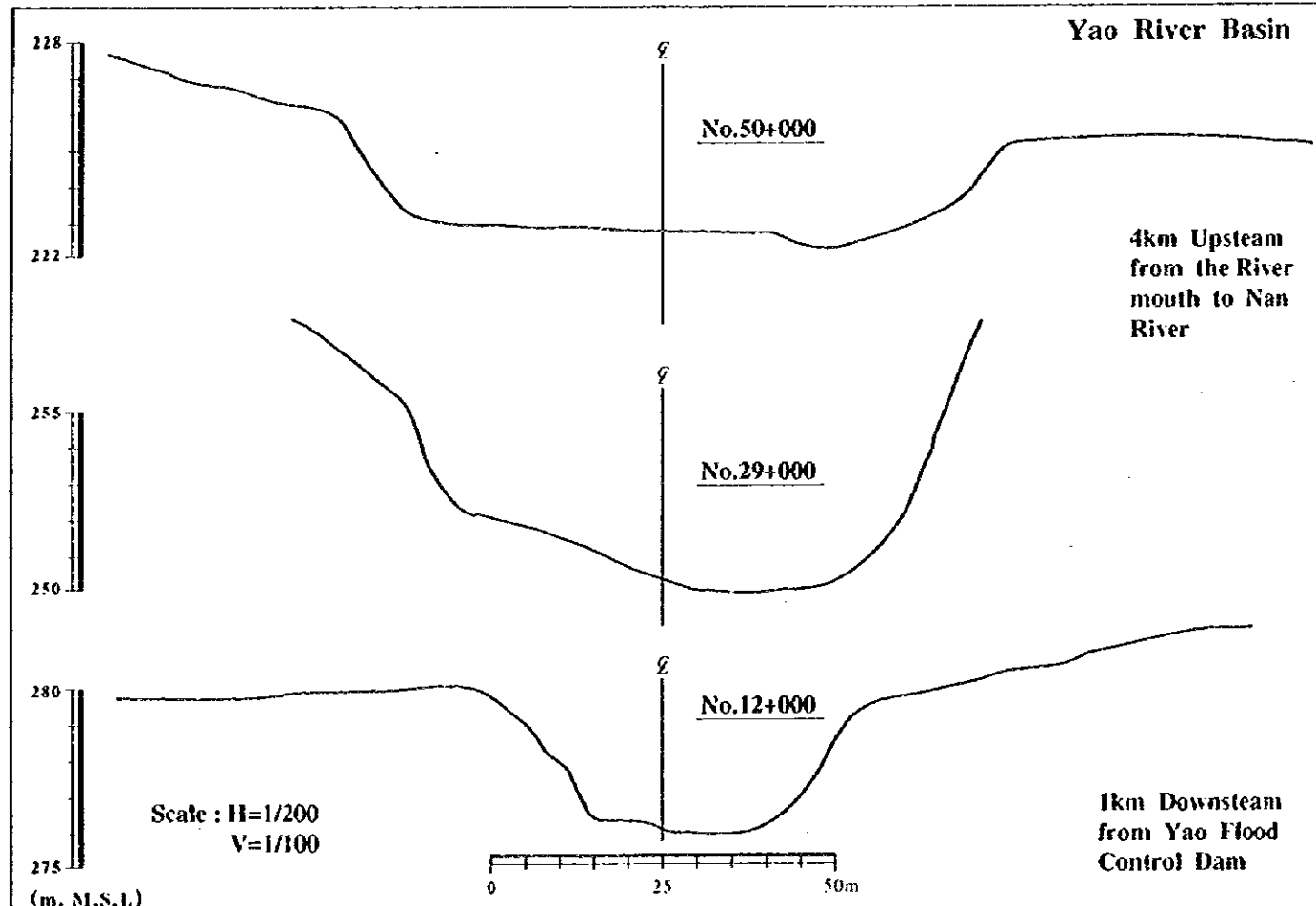
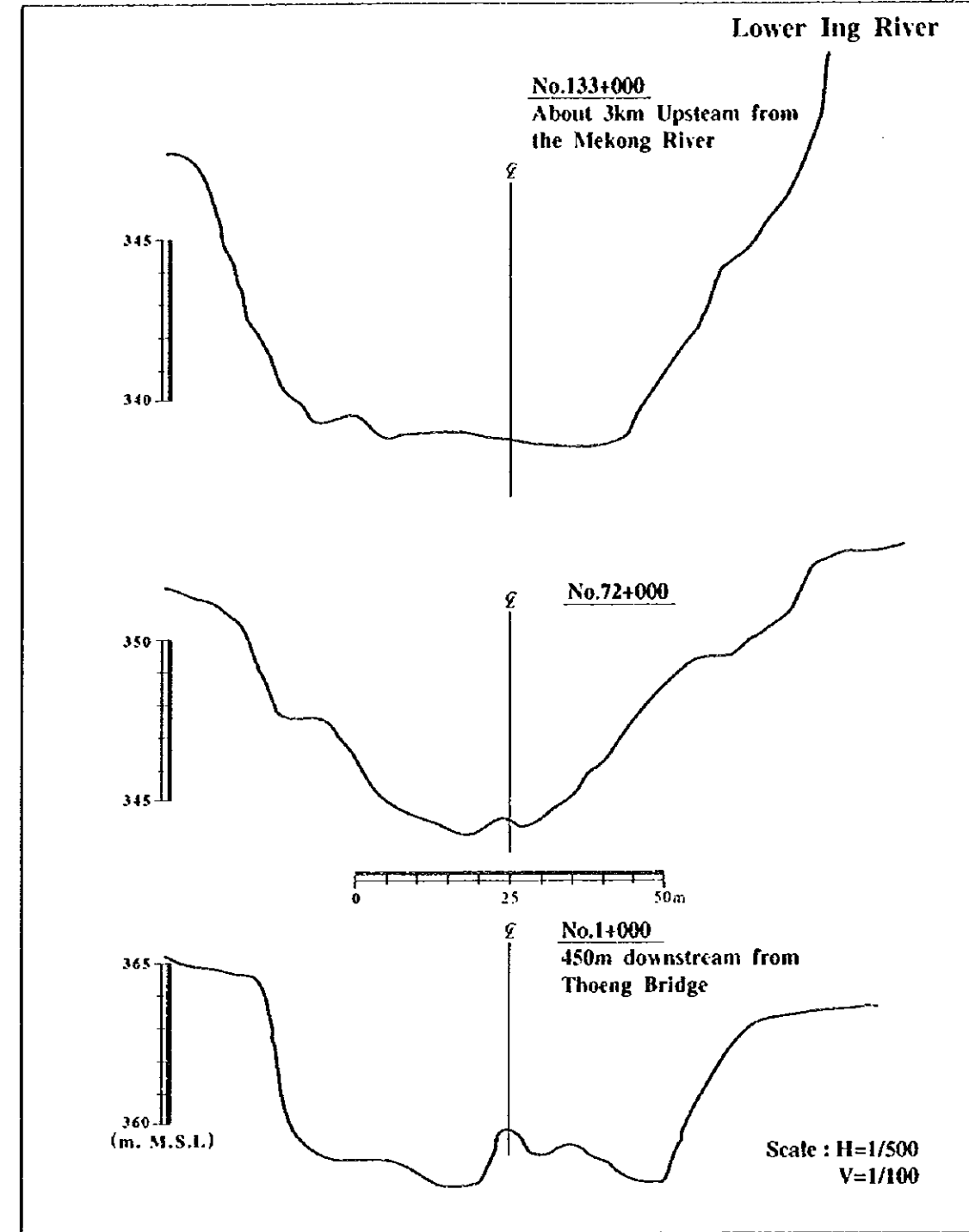
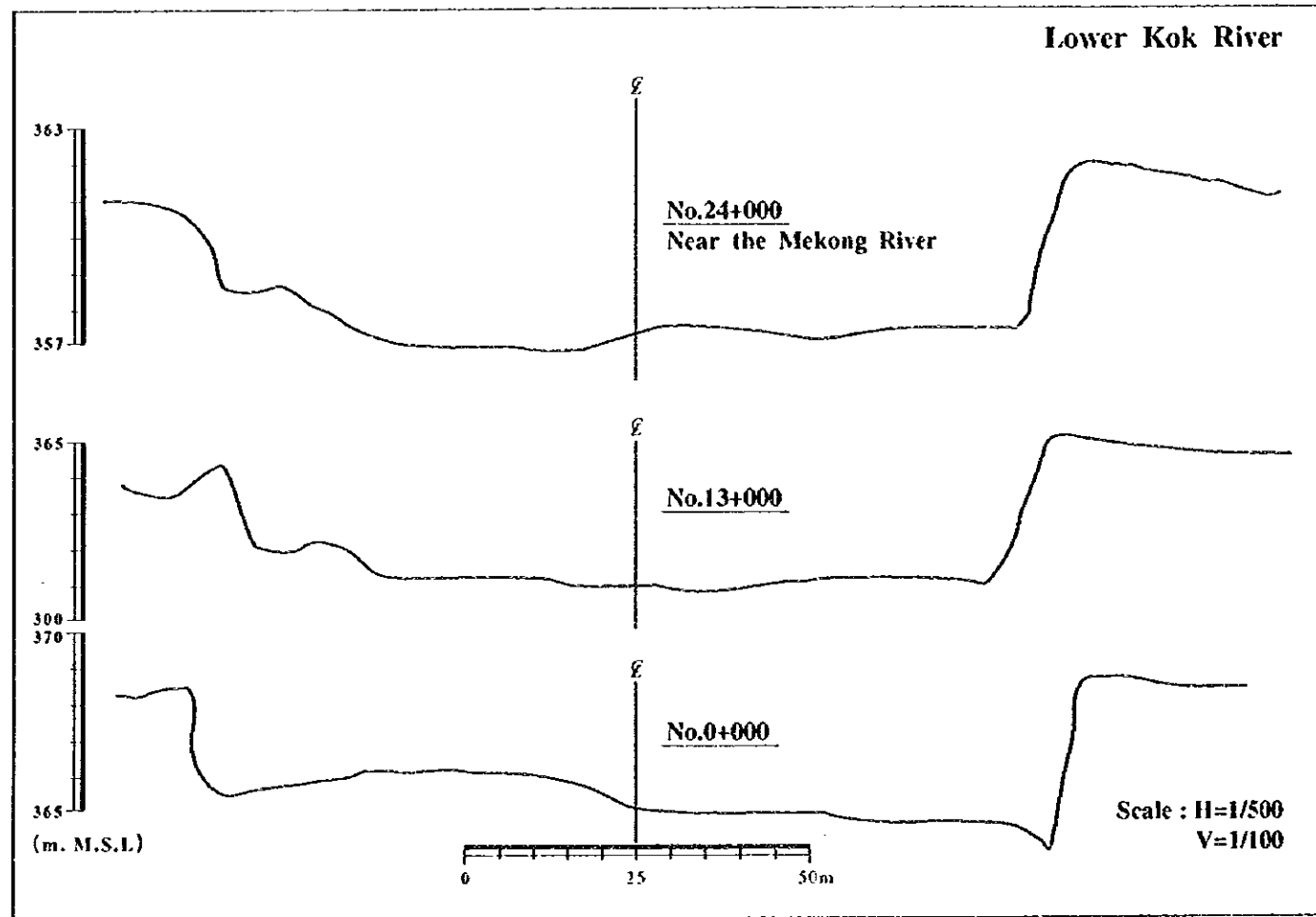
Map & Draw-
ing No.

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
SANYU CONSULTANTS INC. & NIPPON KOEI CO., LTD.

Figure P-26

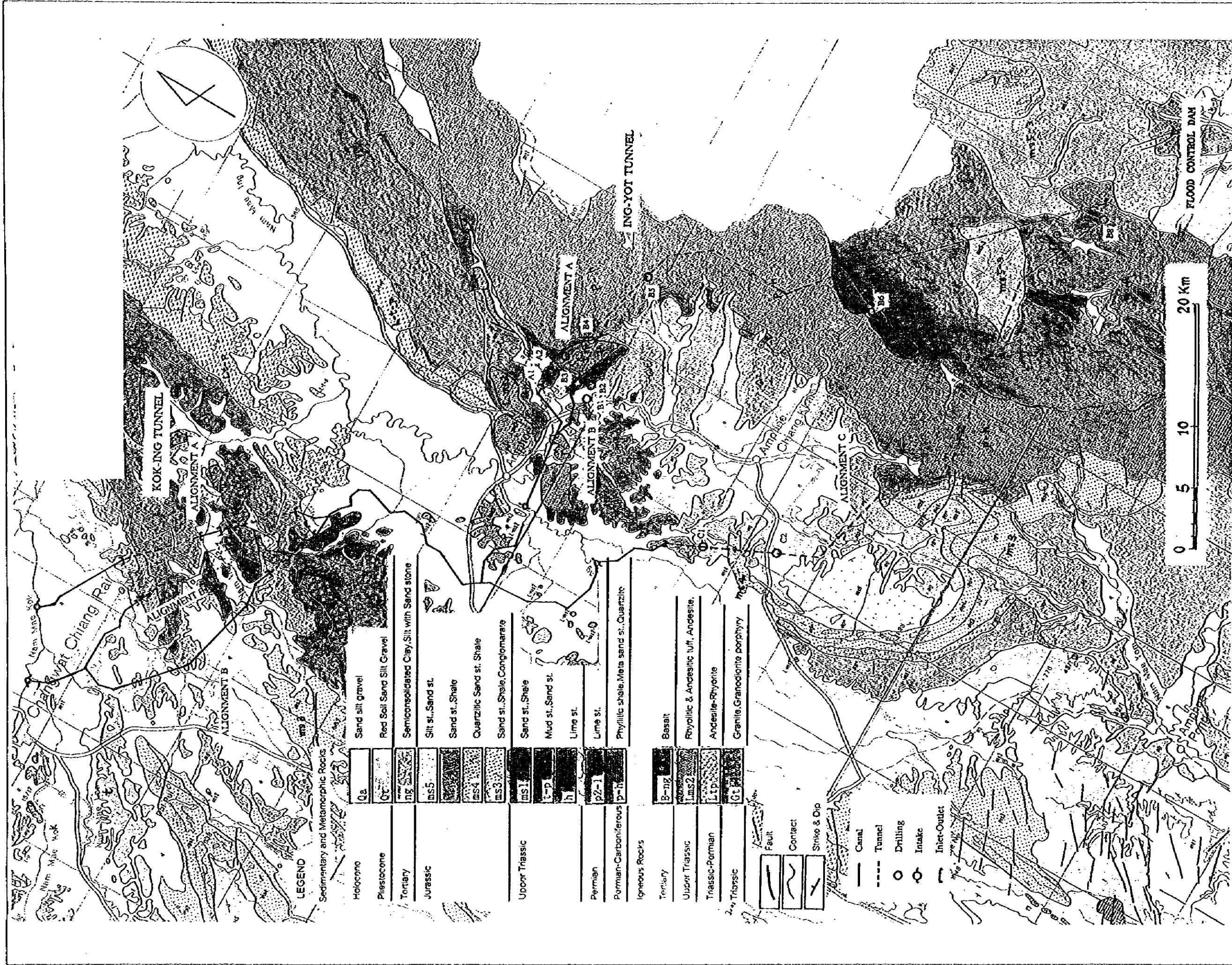


THE STUDY ON KOK-ING-NAN WATER DIVERSION PROJECT	
YAO RIVER PROFILE	
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	MAP & Draw- ing No.
SANYU CONSULTANTS INC. & NIPPON KOEI CO., LTD.	Figure P-27



THE STUDY ON KOK-ING-NAN WATER DIVERSION PROJECT		
TYPICAL CROSS SECTIONS OF THE KOK, ING AND YAO RIVER		MAP & Draw- ing No.
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)		Figure P-28
SANYU CONSULTANTS INC. & NIPPON KOEI CO., LTD.		

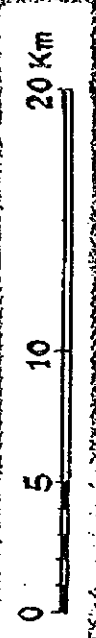
PART V	GEOLOGY
Figure G-1	Geological Map of Kok-Ing-Nan Diversion Canal Route
Figure G-2	Geological Map of Kok-Ing Diversion Canal Route
Figure G-3	Geological Map of Ing-Yot Tunnel Alignment (Chart 1)
Figure G-4	Geological Map of Ing-Yot Tunnel Alignment (Chart 2)
Figure G-5	Geological Map of Ing-Yot Tunnel Alignment (Chart 3)
Figure G-6	Geological Profile of Kok-Ing A No.1 Tunnel Alignment (AT-1)
Figure G-7	Geological Profile of Kok-Ing A No.1 Tunnel Alignment (AT-2)
Figure G-8	Geological Profile of Kok-Ing B Tunnel Alignment (B)
Figure G-9	Geological Profile of Kok-Ing BJ No.1 Tunnel Alignment (BJ-1)
Figure G-10	Geological Profile of Ing-Yot A Tunnel Alignment (North Route) (Chart 1)
Figure G-11	Geological Profile of Ing-Yot A Tunnel Alignment (North Route) (Chart 2)
Figure G-12	Geological Profile of Ing-Yot Tunnel Alignment (North Route) (Chart 3)
Figure G-13	Geological Profile of Ing-Yot Tunnel Alignment (North Route) (Chart 4)
Figure G-14	Geological Profile of Ing-Yot Tunnel Alignment (South Route)



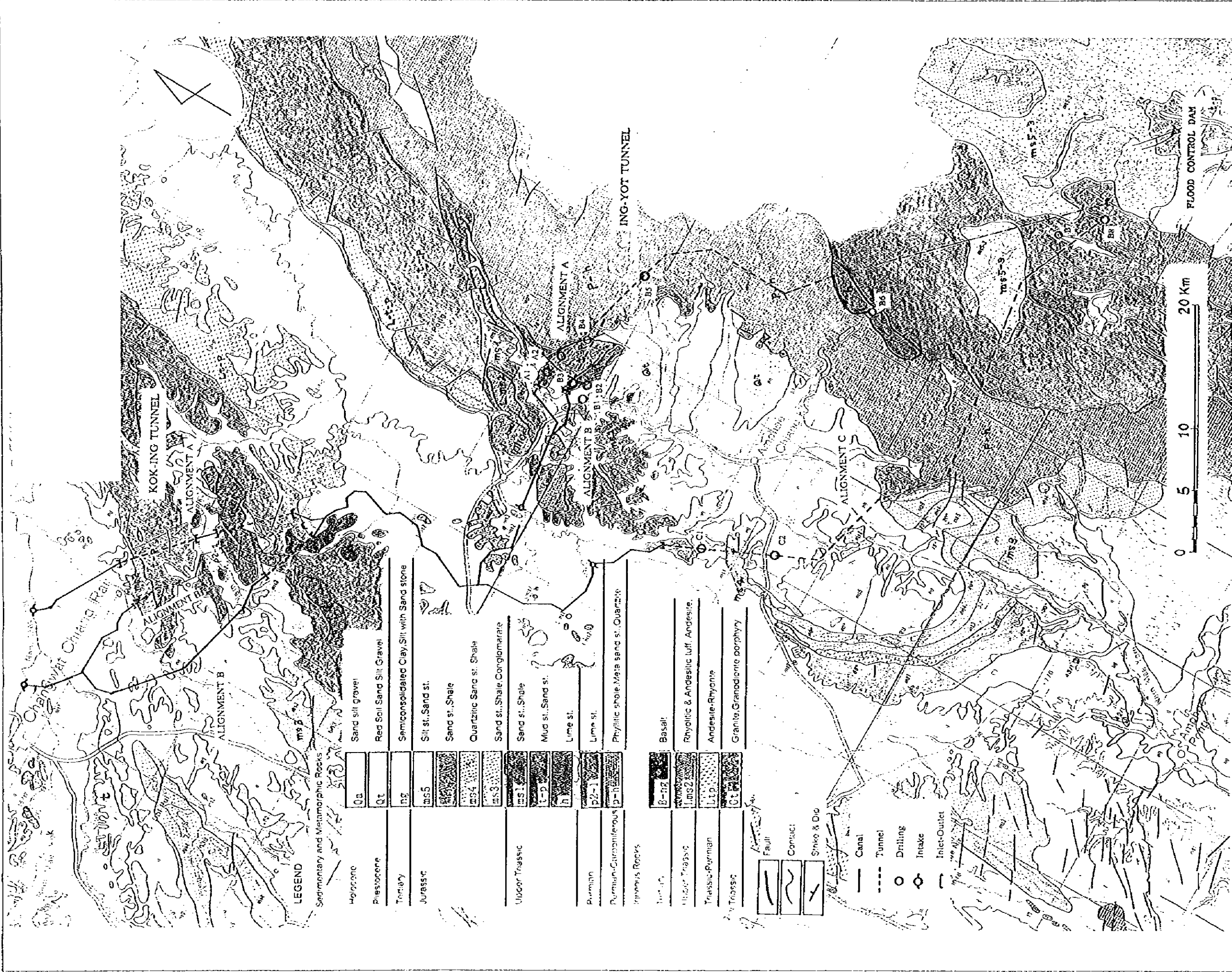
LEGEND
Sedimentary and Metamorphic Rocks

Holocene	Qa	Sand silt gravel
Pleistocene	Qc	Red Soil Sand Silt Gravel
Tertiary	Tg	Semiconsolidated Clay Silt with Sand stone
Jurassic	ms5	Silt st., Sand st.
	ms4	Sand st., Shale
	ms4	Quartzitic Sand st., Shale
	ms3	Sand st., Shale, Conglomerate
	ms1	Sand st., Shale
Upper Triassic	l-p	Mud st., Sand st.
	h	Lime st.
Permian	p2-1	Lime st.
Permian-Carboniferous	p-h	Phyllitic shale, Meta sand st., Quartzite
Igneous Rocks		
Tertiary	B-dg	Basalt
Upper Triassic	Lms2	Rhyolitic & Andesitic tuff, Andesite,
	Lip	Andesite-Rhyolite
Triassic-Permian	Gt	Granite, Granodiorite porphyry
Triassic		

Fault	— — —
Contact	— — —
Strike & Dip	— — —
Canal	—
Tunnel	- - - -
Drilling	○
Intake	⊙
Inter-Outlet	— — —



THE STUDY ON THE KOK-ING-NAN WATER DIVERSION PROJECT
 GEOLOGICAL MAP OF KOK-ING-NAN
 DIVERSION CANAL ROUTE
 JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
 SANYU CONSULTANTS INC. & NIPPON KOEI CO., LTD.
 Map & Drawing No.
 Figure G-1



LEGEND

Sedimentary and Metamorphic Rocks

Holocene	Qa	Sand silt gravel
Pliocene	Qt	Red Soil Sand Silt Gravel
Tertiary	Tg	Semiconsolidated Clay, Silt with Sand stone
Jurassic	ms5	Silt st. Sand st.
	ms4	Sand st. Shale
	ms3	Quartzitic Sand st. Shale
	ms1	Sand st. Shale Conglomerate
Upper Triassic	ts1	Sand st. Shale
	ts2	Mud st. Sand st.
	ts3	Lime st.
Permian	ps1	Lime st.
	ps2	Phyllitic shale, Meta sand st., Quartzite

igneous Rocks

Tertiary	B-112	Basalt
Upper Triassic	ts2	Rhyolitic & Andesitic tuff, Andesite.
	ts3	Andesite-Rhyolite
Triassic-Permian	Gt	Granite, Granodiorite porphyry

Fault	
Contact	
Strike & Dip	
Canal	
Tunnel	
Drilling	
Intake	
Inlet-Outlet	

THE STUDY ON THE KOK-ING-NAN WATER DIVERSION PROJECT
 GEOLOGICAL MAP OF KOK-ING-NAN
 DIVERSION CANAL ROUTE
 JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
 SANYU CONSULTANTS INC. & NIPPON KOEI CO., LTD.
 Map & Draw-
 Ing No.
 Figure G-1