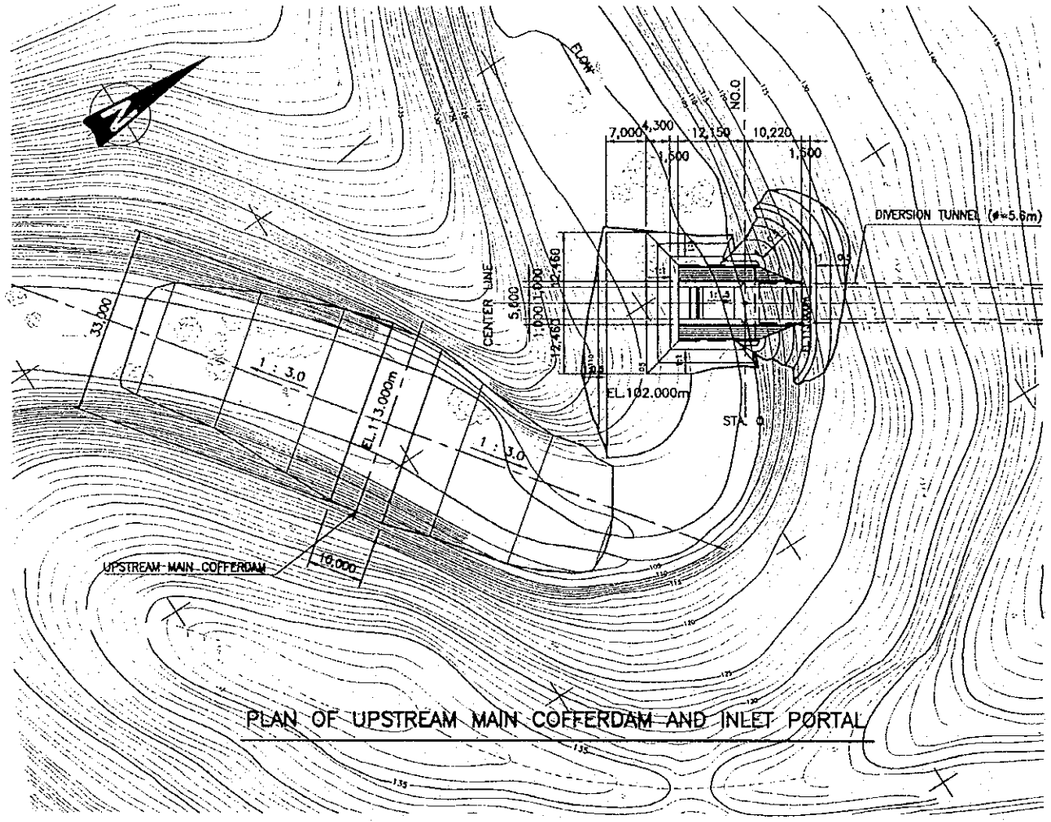
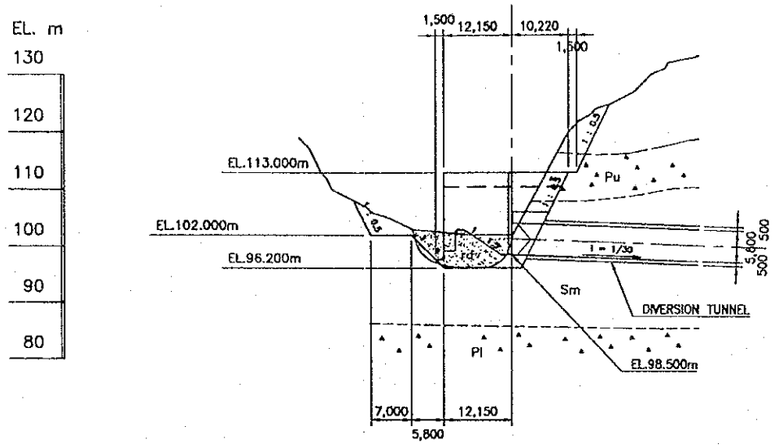
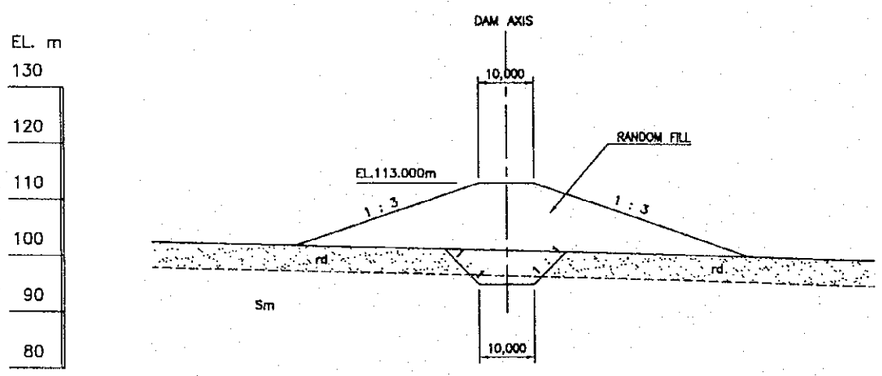


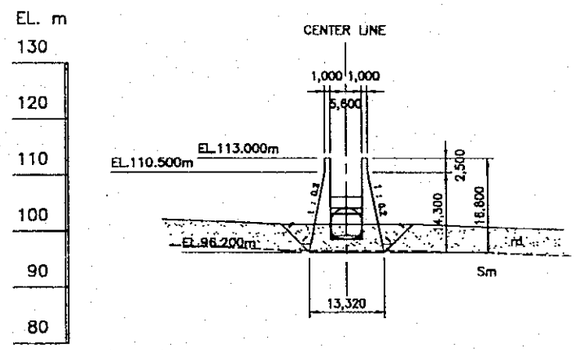
PLAN OF UPSTREAM MAIN COFFERDAM AND INLET PORTAL



LONGITUDINAL SECTION OF UPSTREAM PORTAL



TYPICAL CROSS SECTION OF UPSTREAM MAIN COFFERDAM



TYPICAL SECTION OF UPSTREAM PORTAL

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS, UNLESS OTHERWISE NOTED.
2. CONCRETE FOR UPSTREAM PORTAL SHALL BE OF TYPE D AS PER SPECIFICATION.
3. UPSTREAM MAIN COFFERDAM SHALL BE FOUNDED ON THE IMPERVIOUS ROCK UNIT SO AS TO MINIMIZE WATER LEAKAGE THROUGH THE FOUNDATION.

REFERENCE DRAWINGS

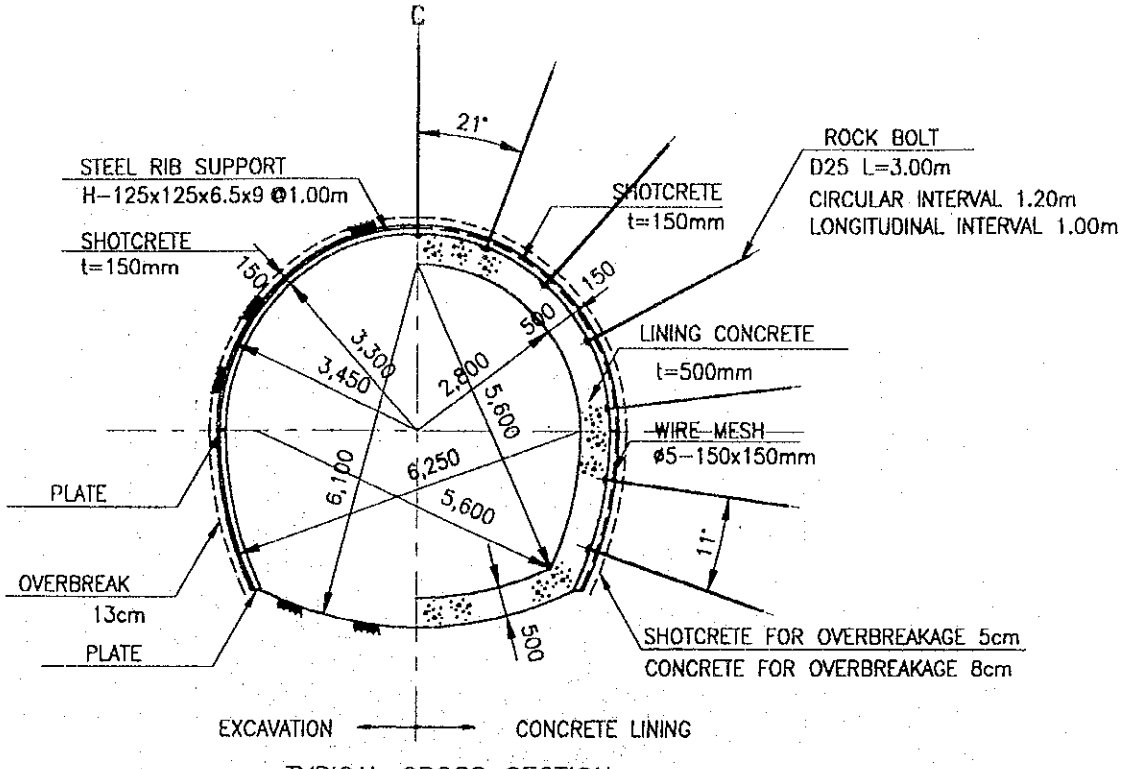
JD-P1-DF-Pl-1 DIVERSION FACILITIES - LAYOUT PLAN
JD-P1-DF-Up-2 UPSTREAM PORTAL - CONCRETE OUTLINE

LEGEND

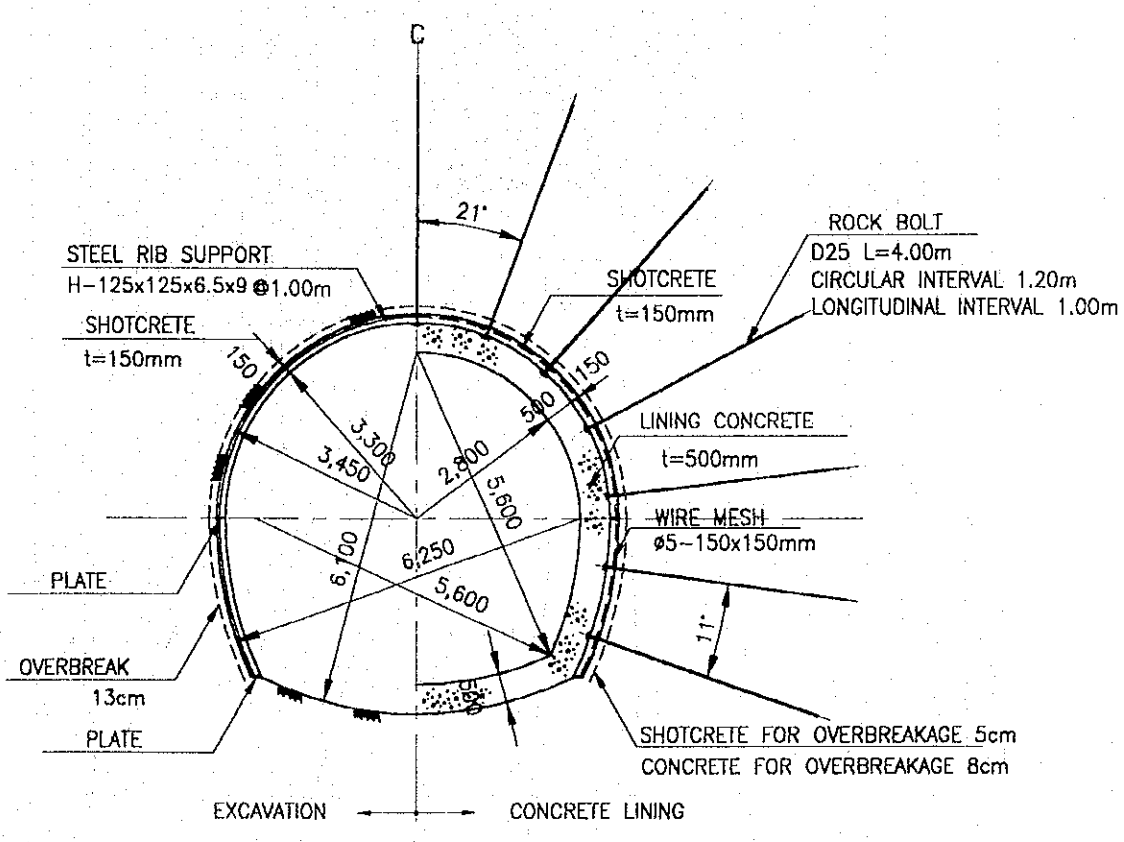
rd : RIVER DEPOSIT
td : TALUS DEPOSIT
Pu : UPPER PYROCLASTIC ROCK UNIT
Sm : MIDDLE SEDIMENTARY ROCK UNIT
Pl : LOWER PYROCLASTIC ROCK UNIT

SCALE 0 10 20 30 40 50m

THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA	Fig. 7.5.4 INLET PORTAL OF DIVERSION TUNNEL
JAPAN INTERNATIONAL COOPERATION AGENCY	

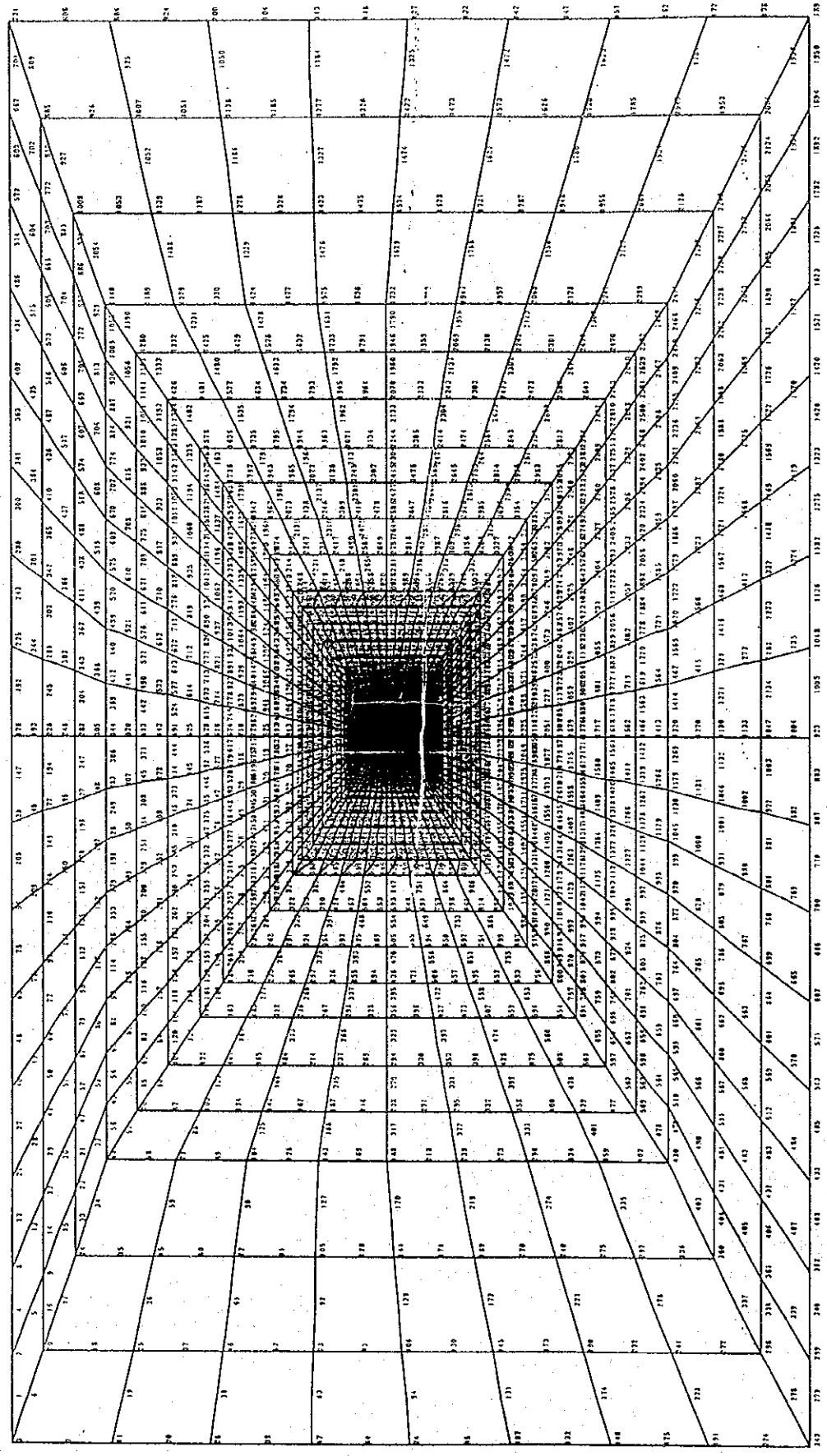


TYPICAL CROSS SECTION



INLET AND OUTLET SECTION

THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA	Fig. 7.5.5 **TYPICAL CROSS SECTION OF DIVERSION TUNNEL**
JAPAN INTERNATIONAL COOPERATION AGENCY	

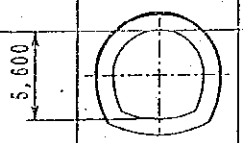


THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 7.5.6
FEM ANALYSI MODEL OF DIVERSION TUNNEL

Depth (m)	Thick (m)	Soil name	Density γ (tf/m³)	F. angle φ (°)	Cohesion c (tf/m²)	D. coeffi. E (tf/m²)	P's ratio ν
		CM-L	2.0	40°	250	100000	0.40
78.0	78.0						
140.0	62.0						

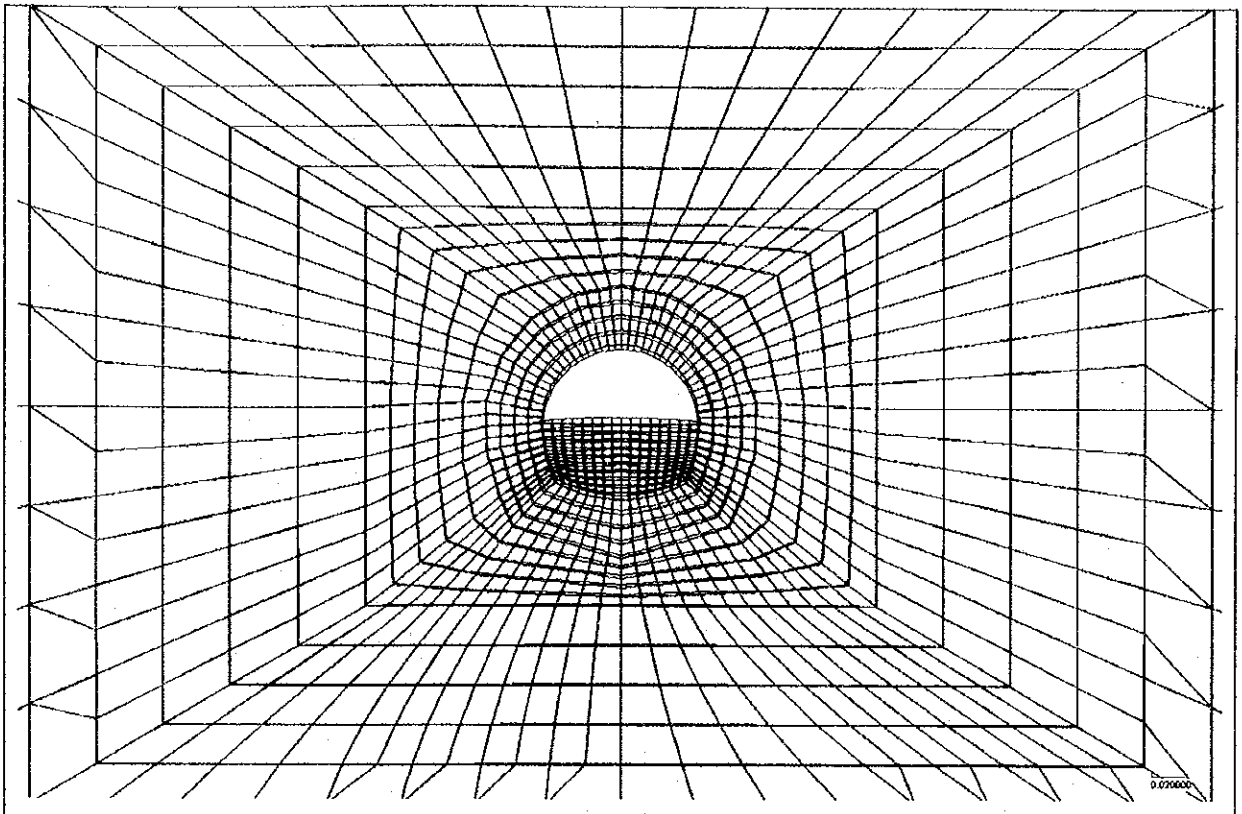


THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA

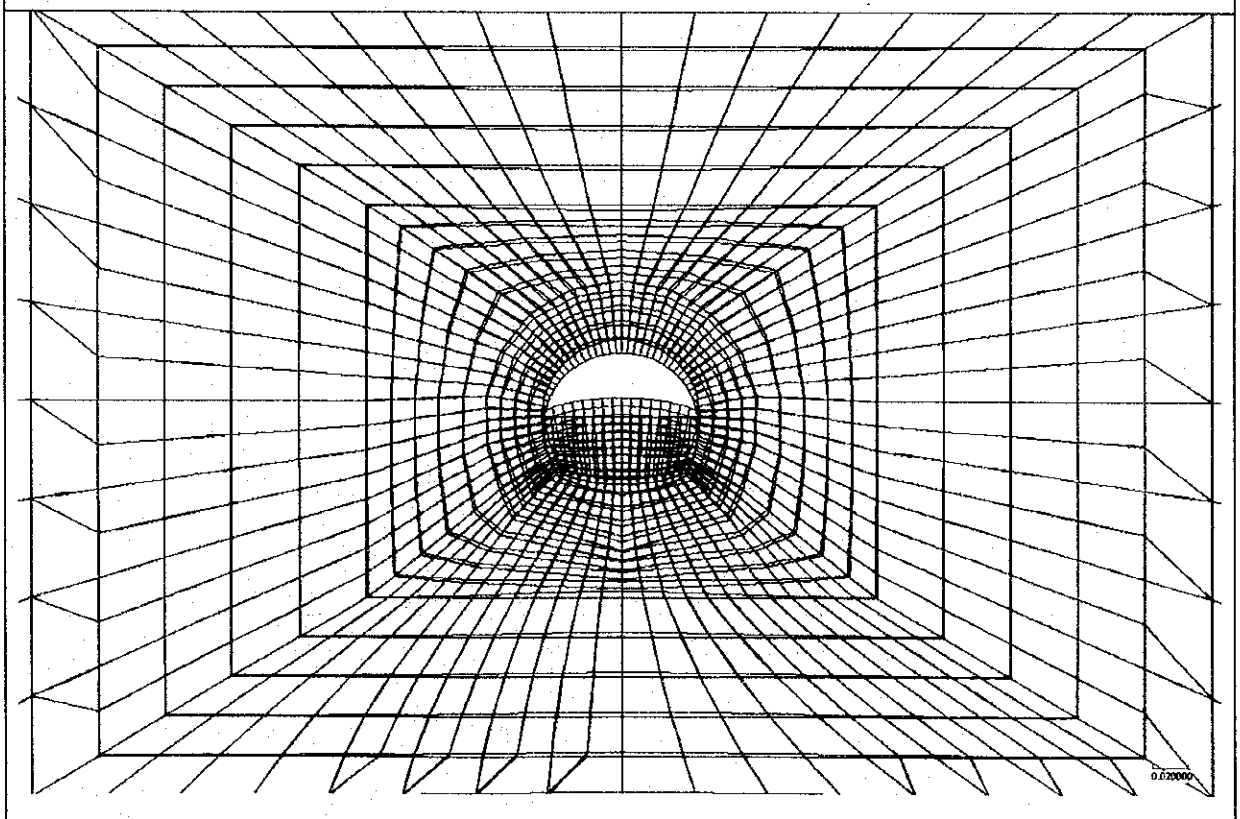
JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 7.5.7
PROPERTIES OF ROCK MASS AROUND DIVERSION TUNNEL

THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA	Fig. 7.5.8 ANALYSIS STEPS FOR DIVERSION TUNNEL
JAPAN INTERNATIONAL COOPERATION AGENCY	



STEP－2

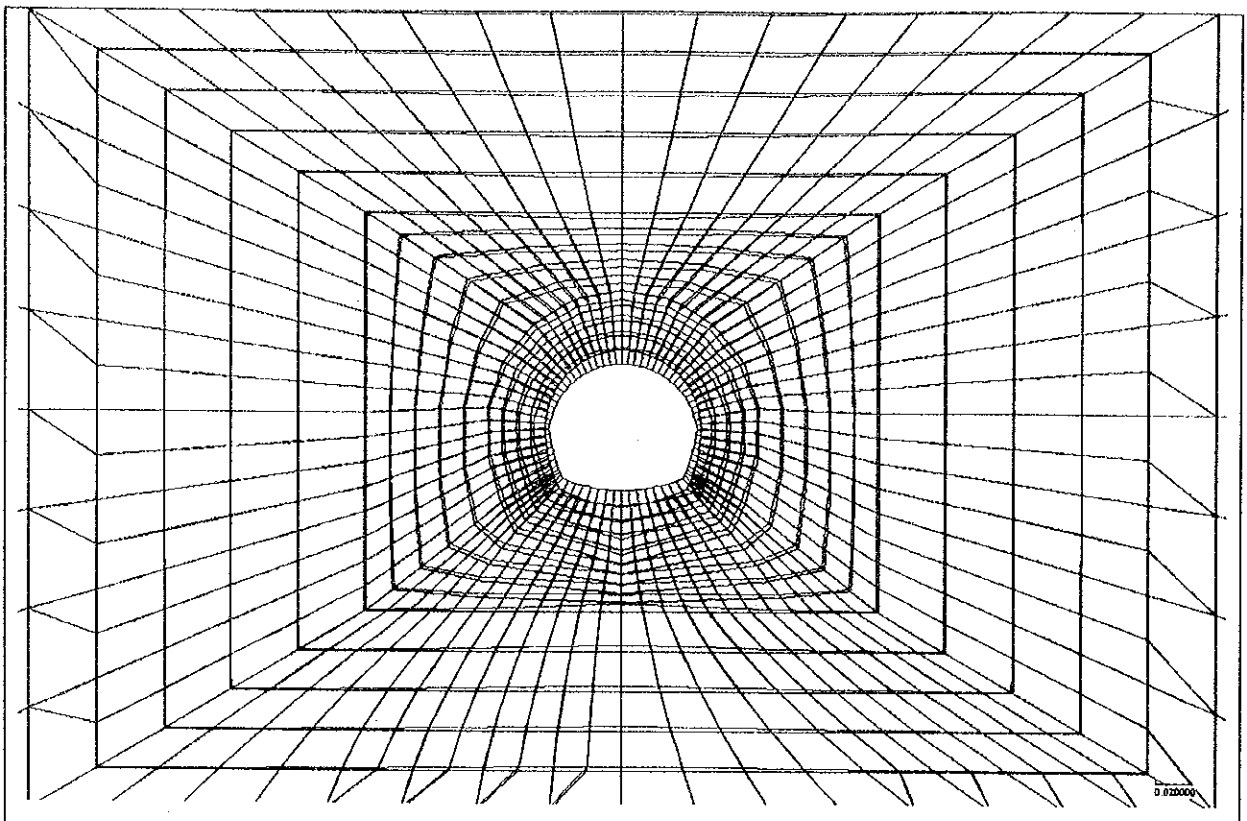


STEP－3

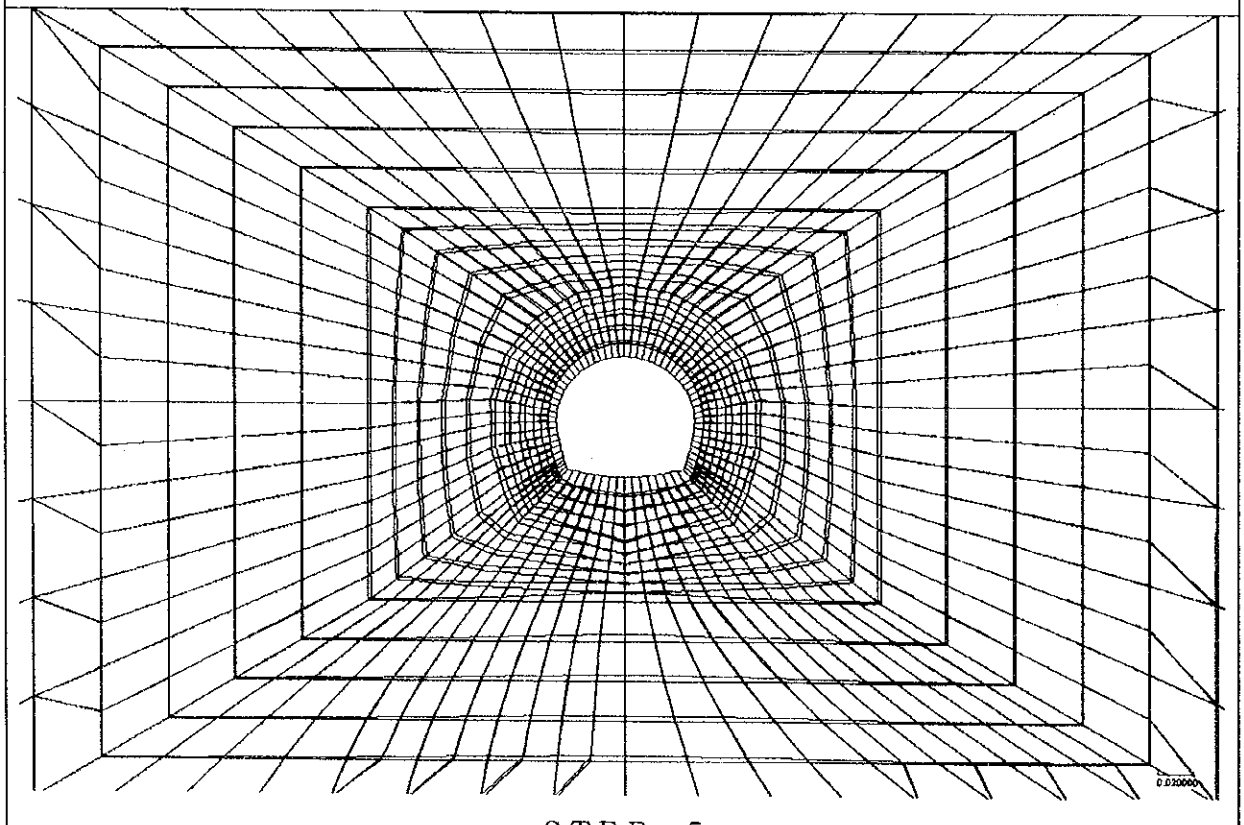
THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 7.5.9 (1/2)
RESULTS OF FEM ANALYSIS (DEFORMATION MAP)

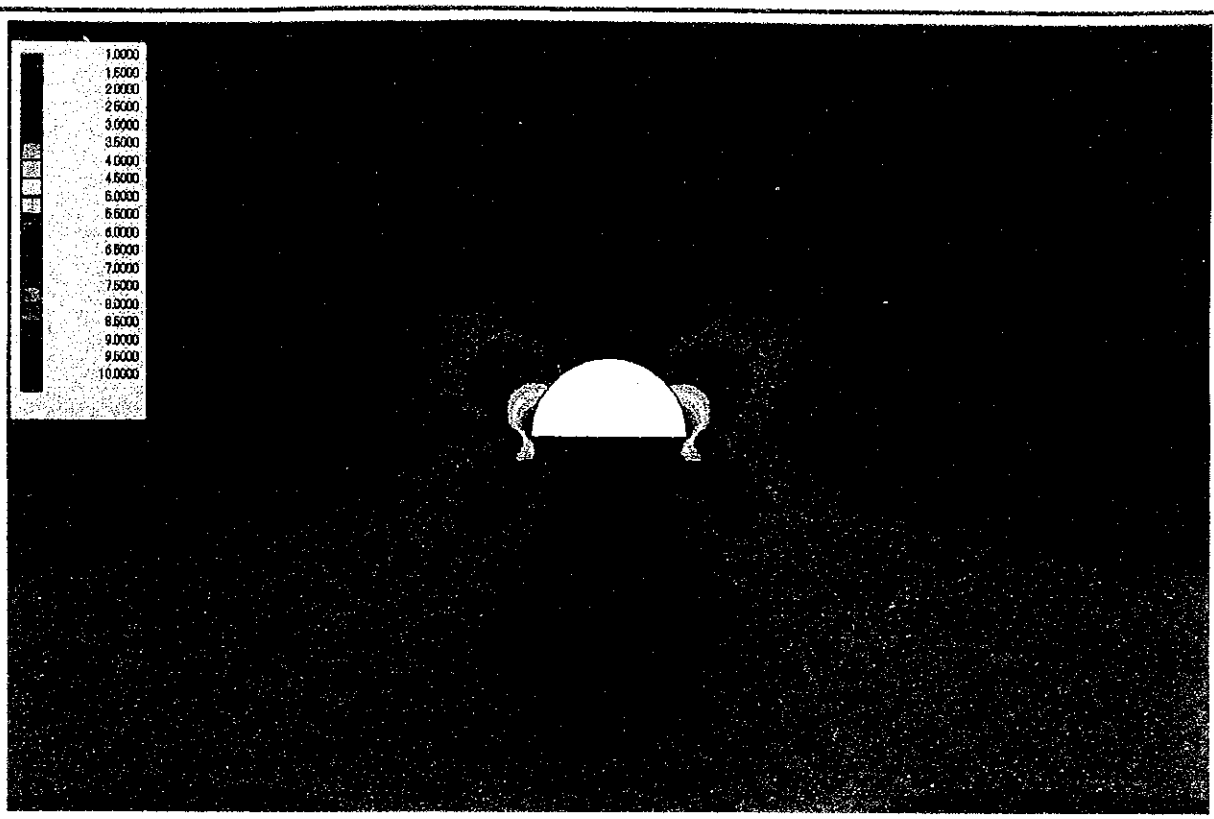


STEP－4

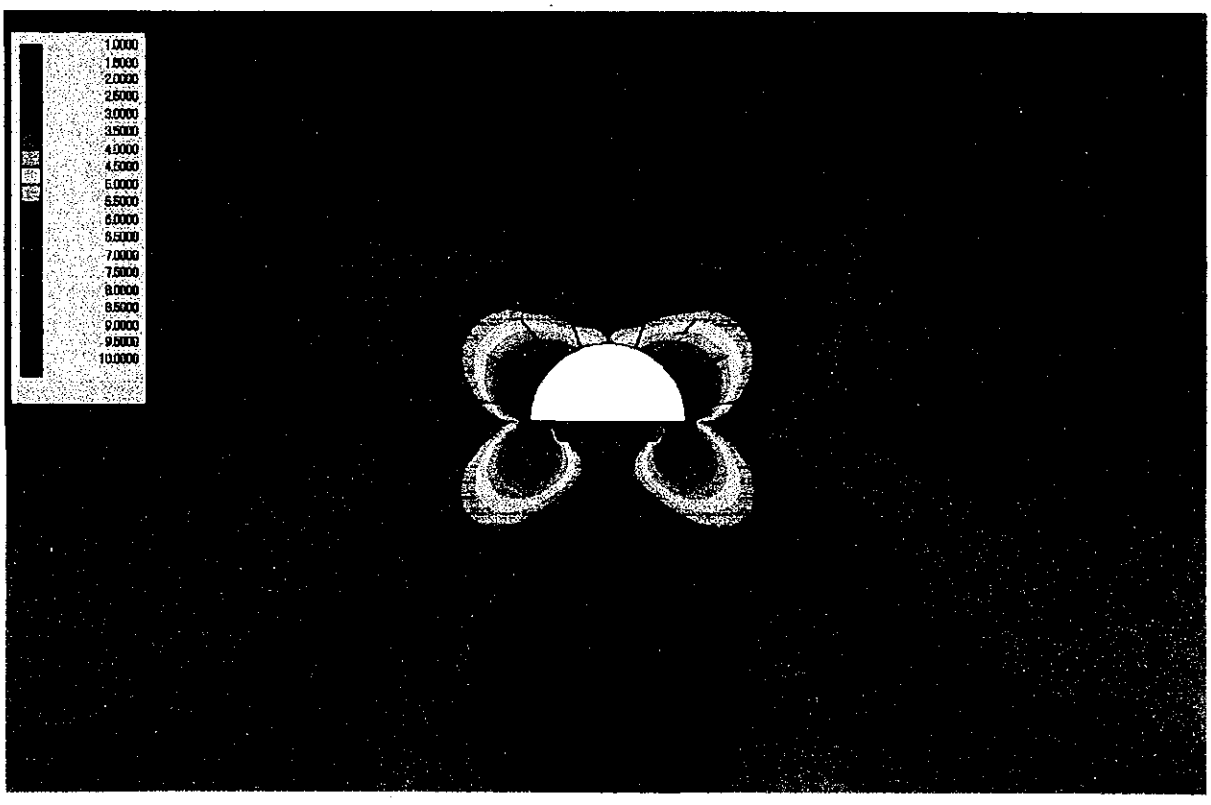


STEP－5

THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA	Fig. 7.5.9 (2/2) RESULTS OF FEM ANALYSIS (DEFORMATION MAP)
JAPAN INTERNATIONAL COOPERATION AGENCY	

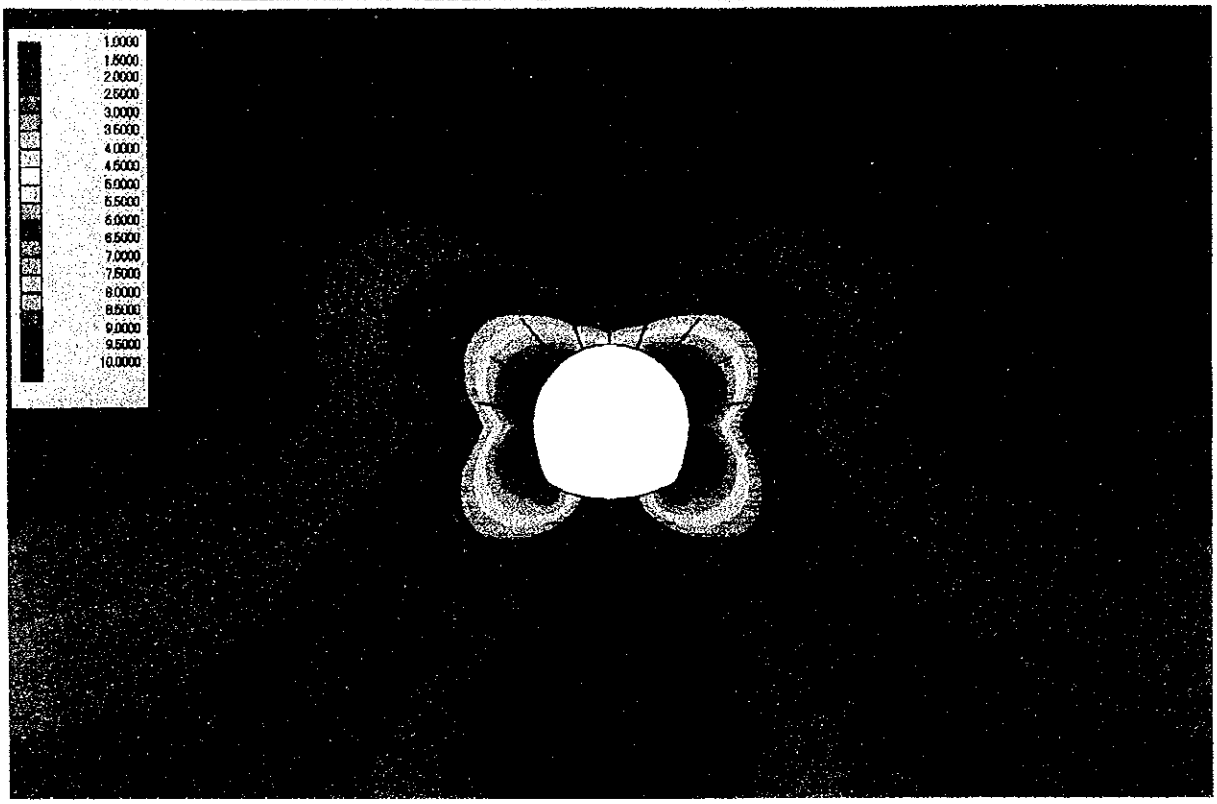


STEP－2

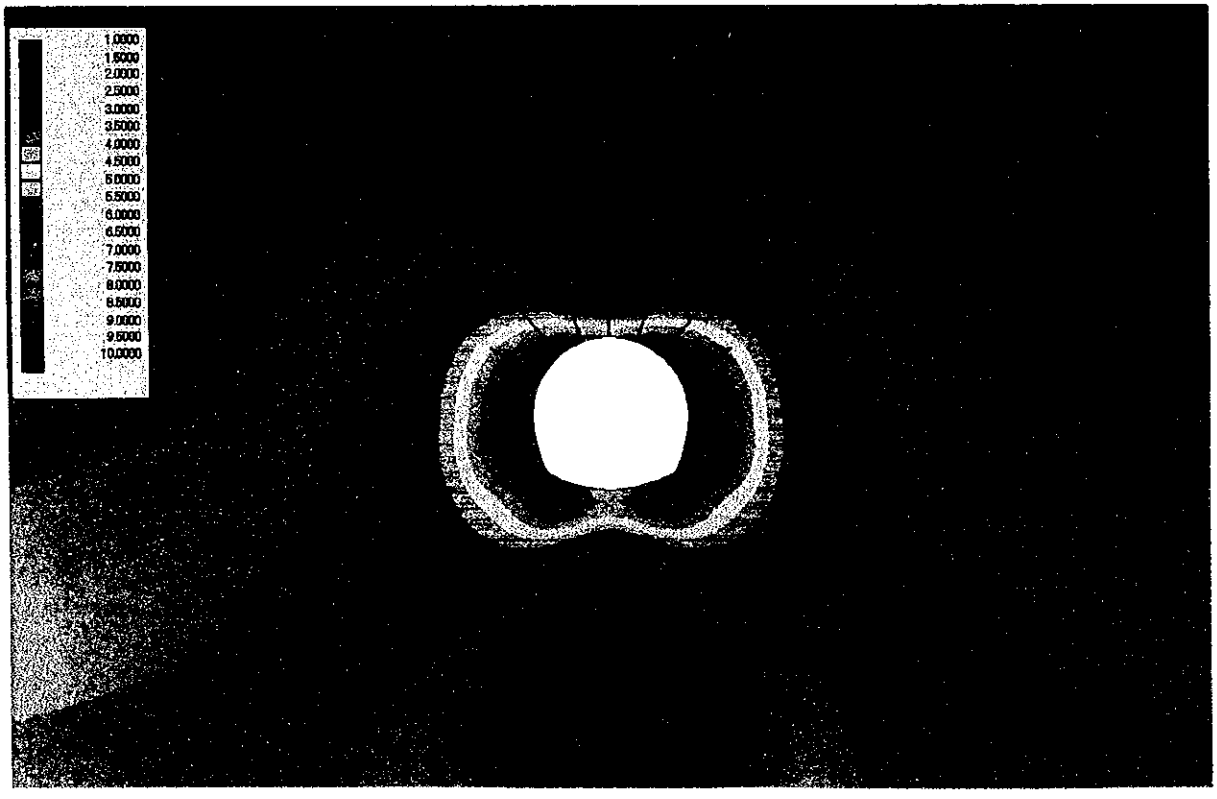


STEP－3

THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA	Fig. 7.5.10 (1/2) RESULTS OF FEM ANALYSIS FOR DIVERSION TUNNEL (CONTOUR LINE MAP OF FRACTURE SAFETY FACTOR)
JAPAN INTERNATIONAL COOPERATION AGENCY	

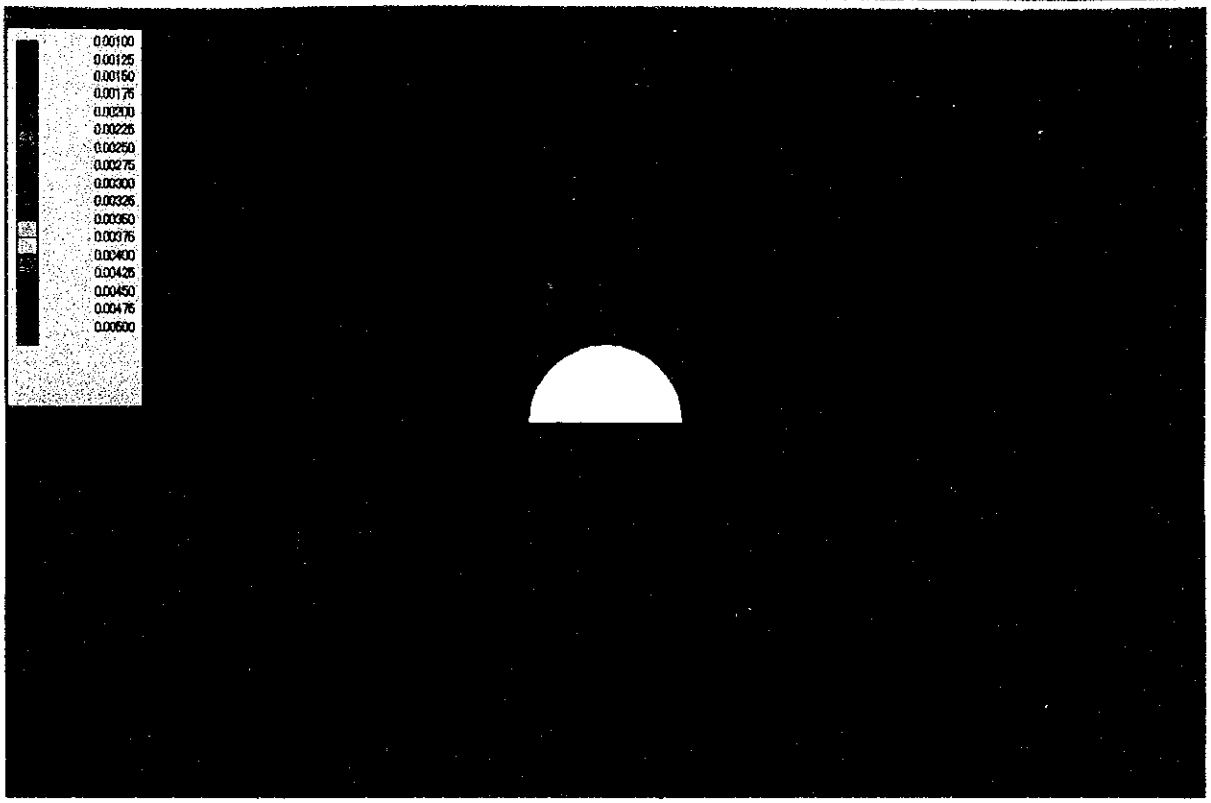


S T E P − 4

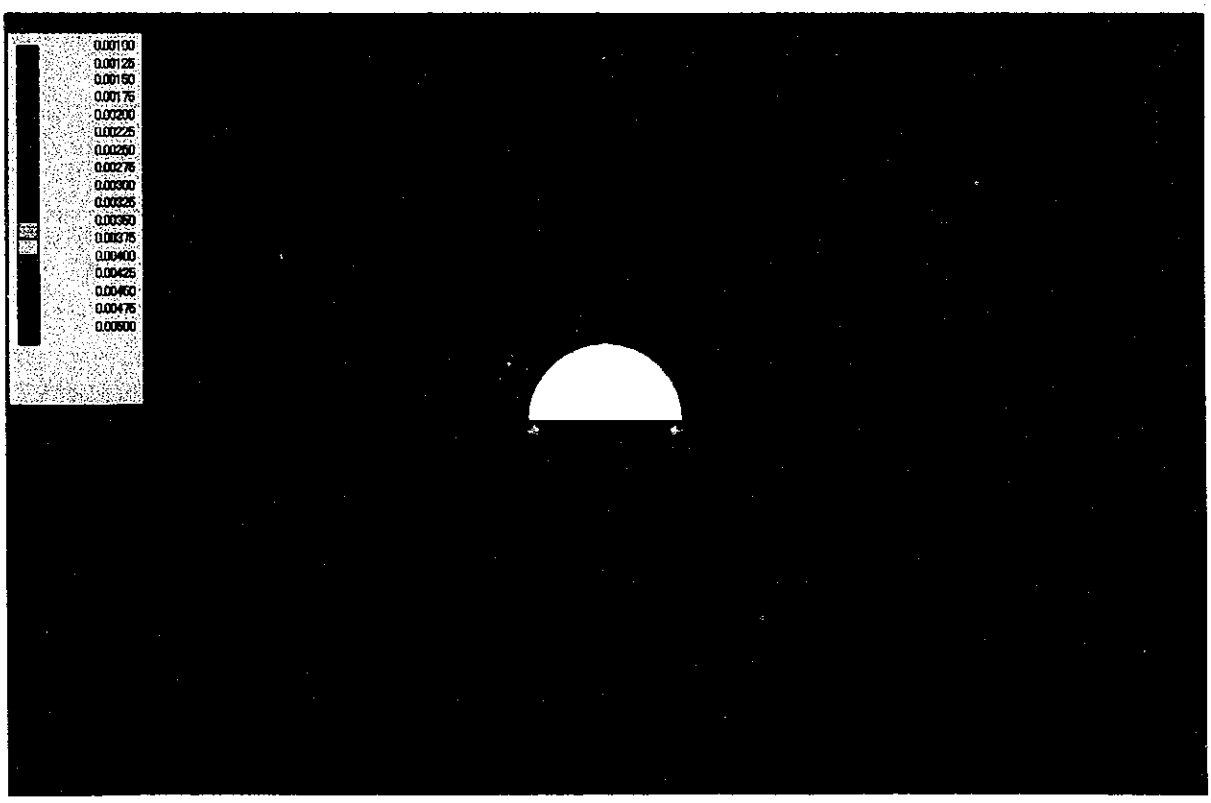


S T E P − 5

THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA	Fig. 7.5.10 (2/2) RESULTS OF FEM ANALYSIS FOR DIVERSION TUNNEL (CONTOUR LINE MAP OF FRACTURE SAFETY FACTOR)
JAPAN INTERNATIONAL COOPERATION AGENCY	

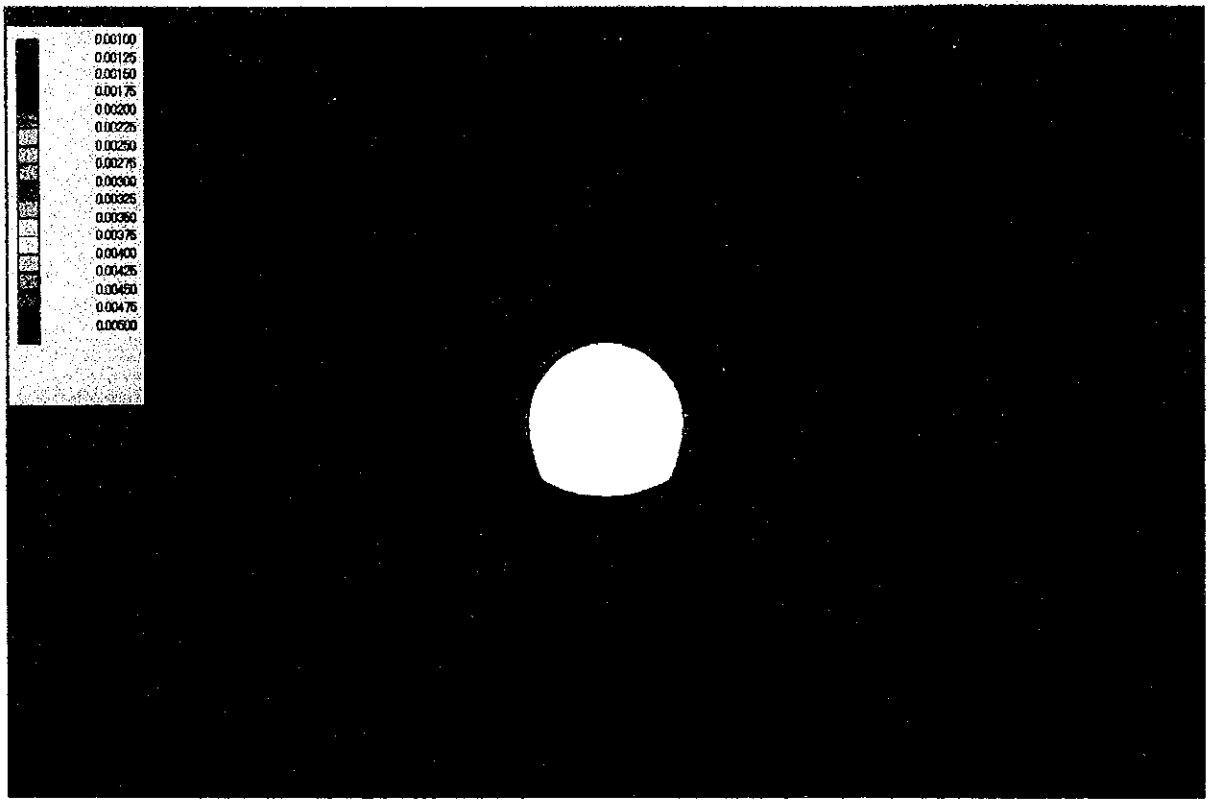


STEP－2

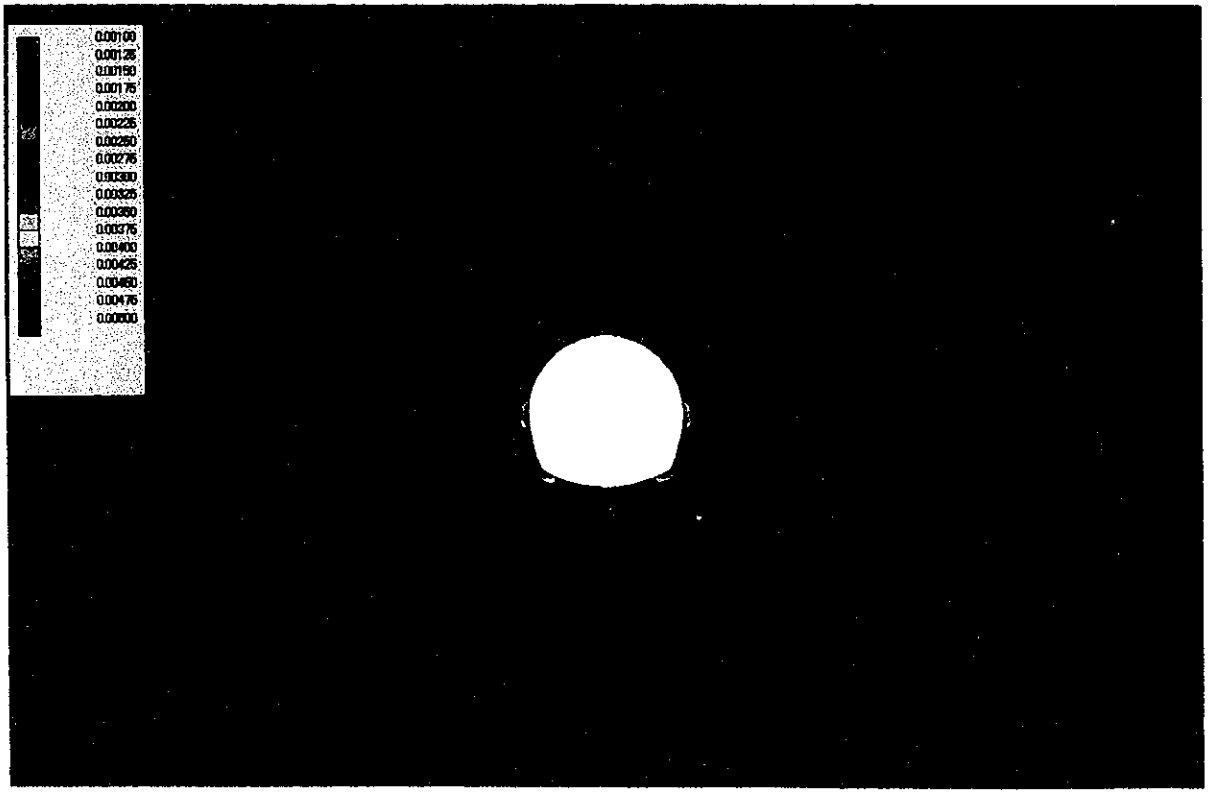


STEP－3

THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA	Fig. 7.5.11 (1/2) RESULTS OF FEM ANALYSIS FOR DIVERSION TUNNEL (CONTOUR LINE MAP OF MAXIMUM SHEAR STRAIN)
JAPAN INTERNATIONAL COOPERATION AGENCY	

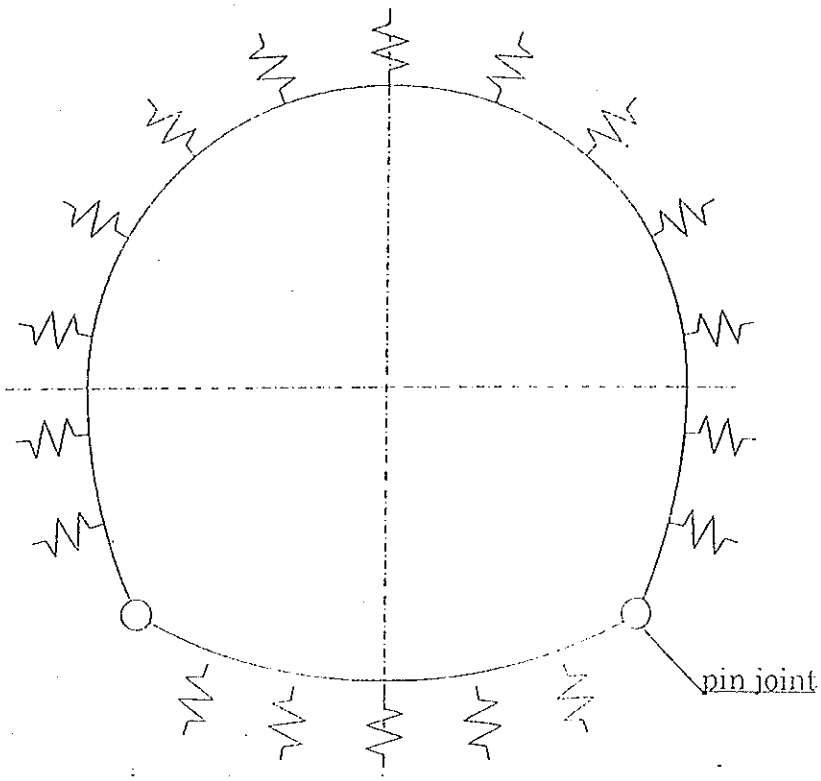


STEP－4



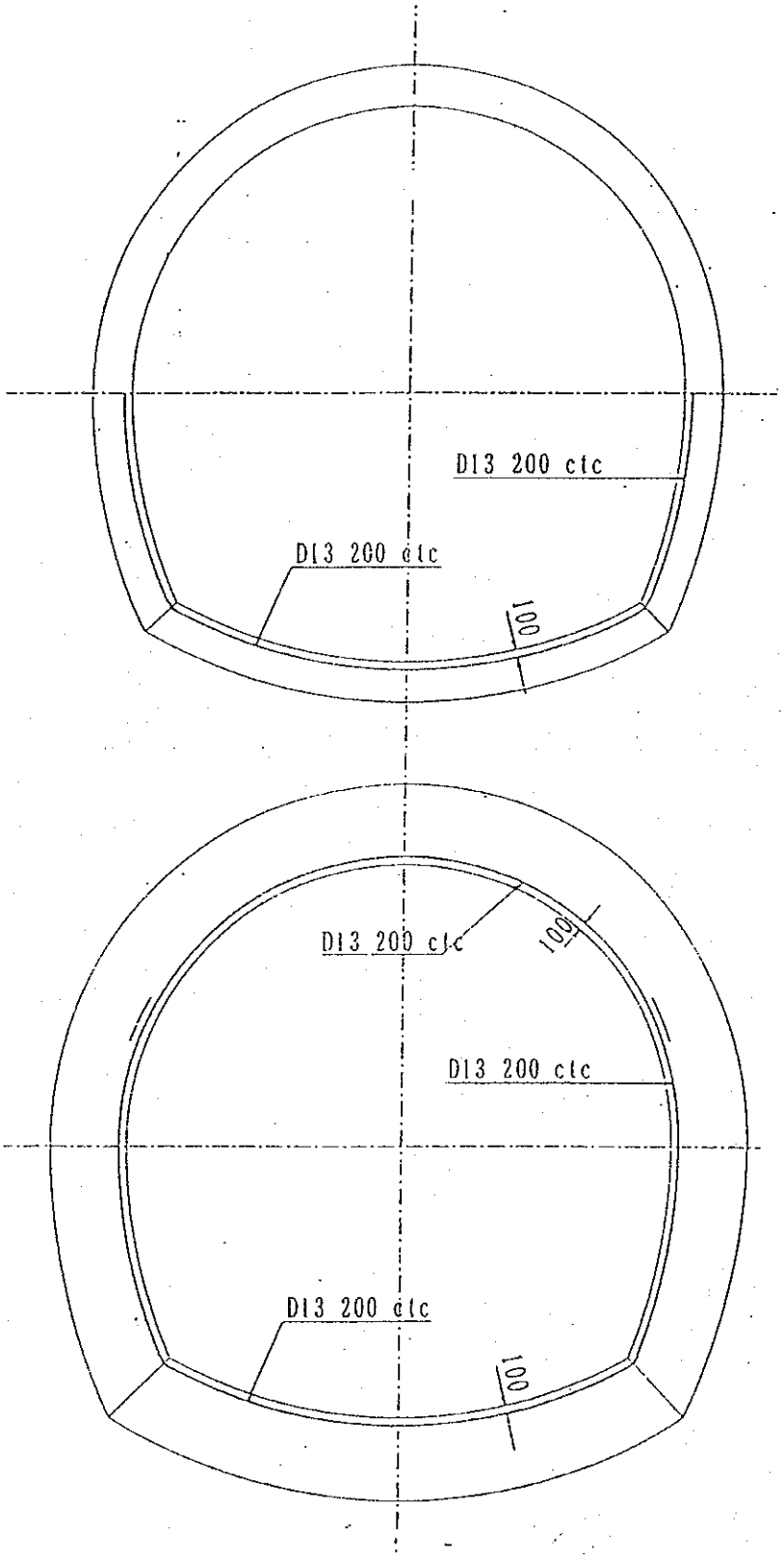
STEP－5

THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA	Fig. 7.5.11 (2/2) RESULTS OF FEM ANALYSIS FOR DIVERSION TUNNEL (CONTOUR LINE MAP OF MAXIMUM SHEAR STRAIN)
JAPAN INTERNATIONAL COOPERATION AGENCY	

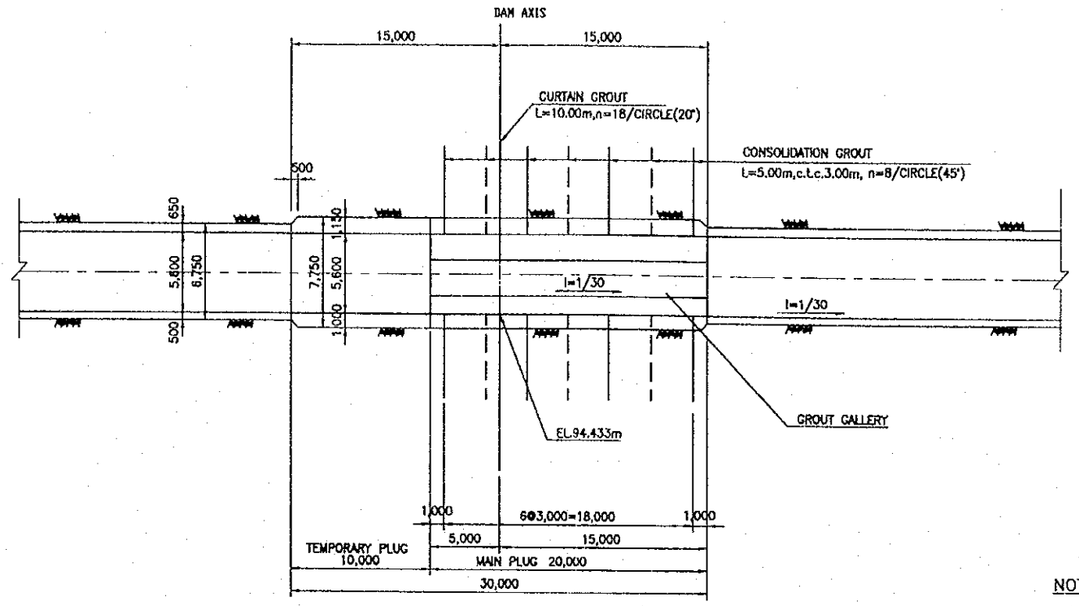


THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA	Fig. 7.5.12 ANALYSIS MODEL OF CONCRETE LINING
JAPAN INTERNATIONAL COOPERATION AGENCY	

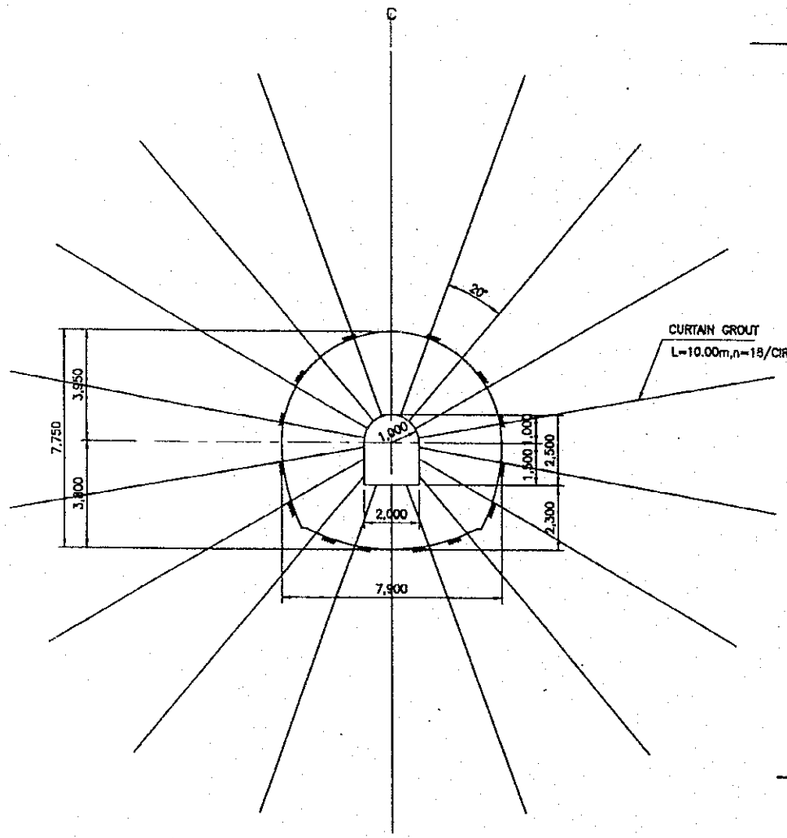
Design strength of the concrete: f'ck = 210 kgf/cm²



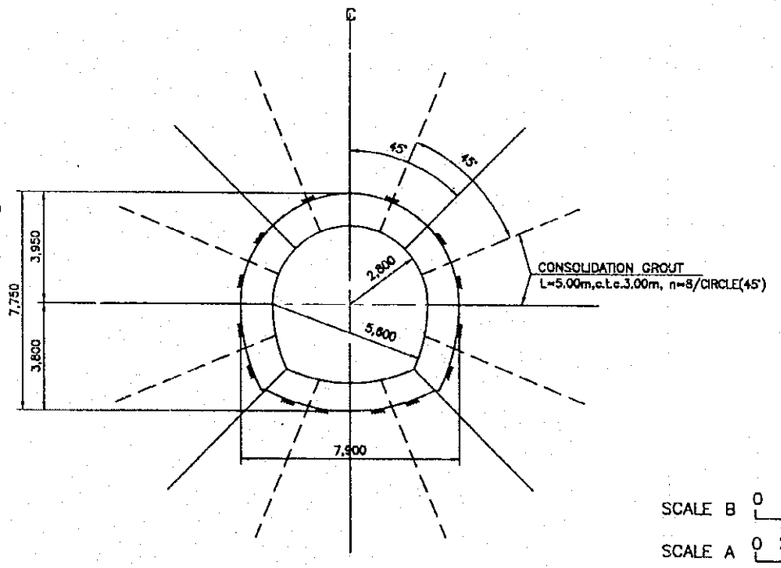
THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA	Fig. 7.5.13 REINFORCEMENT OF CONCRETE LINING
JAPAN INTERNATIONAL COOPERATION AGENCY	



PROFILE
SCALE A



TYPICAL ARRENGEMENT OF CURTAIN GROUT



TYPCAL ARRENGEMENT OF CONSOLIDATION GROUT

TYPICAL SECTION
SCALE B

SCALE B 0 2 4 6 8 10m

SCALE A 0 2 4 6 8 10 12 14 16 18 20m

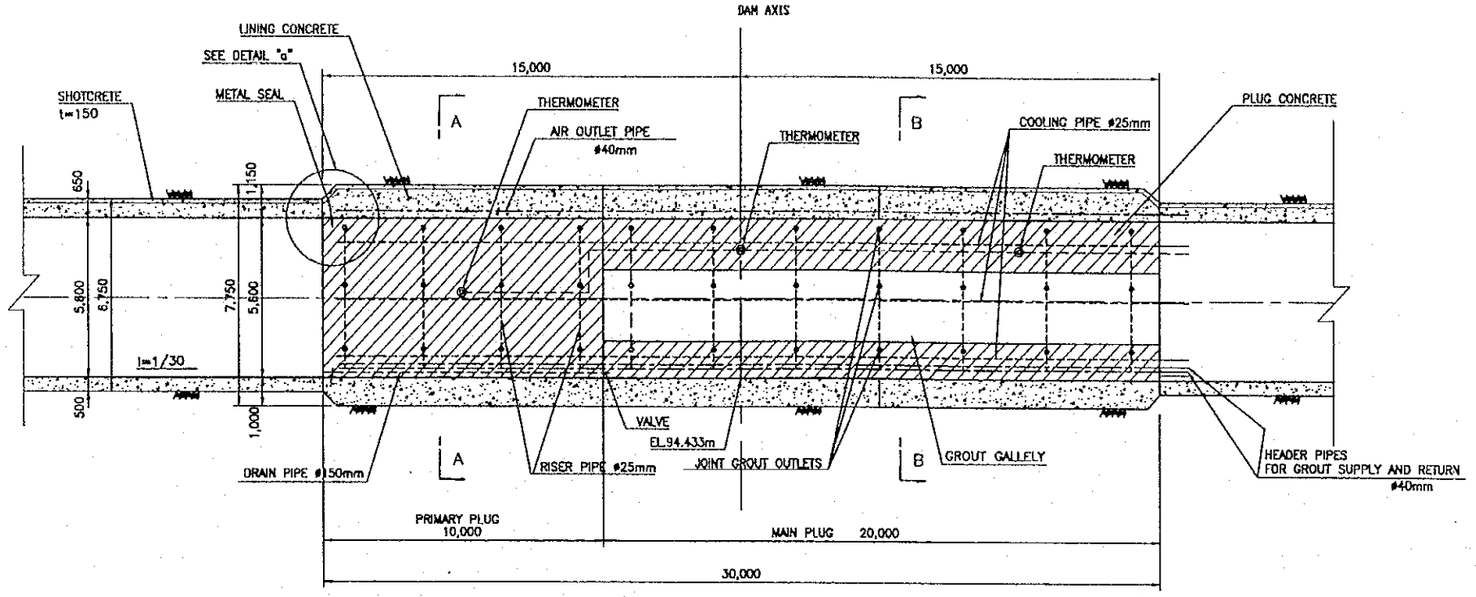
NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS, UNLESS OTHERWISE NOTED.

REFERENCE DRAWINGS

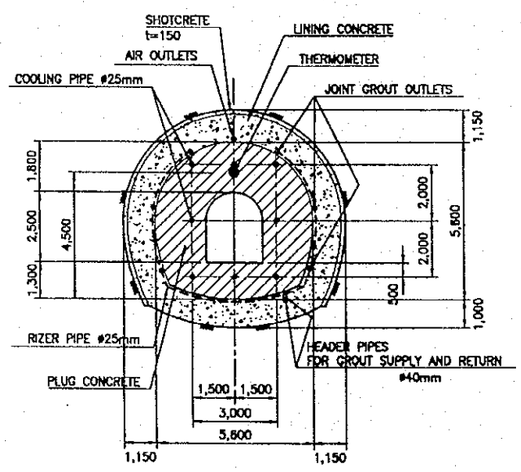
JD-P1-DF-PI-1	DIVERSION FACILITIES – LAYOUT PLAN
JD-P1-DF-Pg-1	PLUG WORKS IN DIVERSION TUNNEL – CONCRETE PLUG DETAILS

THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA	Fig. 7.5.14 (1/2) LAYOUT OF PLUG WORKS FOR DIVERSION TUNNEL
JAPAN INTERNATIONAL COOPERATION AGENCY	

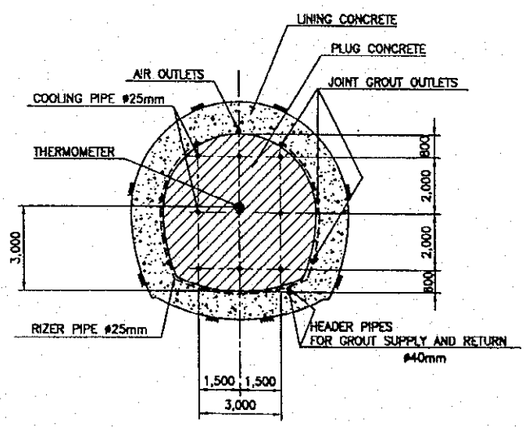


PROFILE

SCALE A



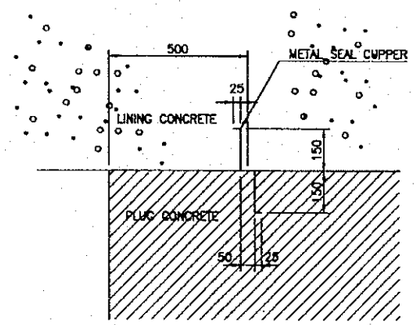
SECTION A-A



SECTION B-B

TYPICAL SECTION

SCALE A



DETAILE "a"

NOT TO SCALE

SCALE A 0 2 4 6 8 10m

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS, UNLESS OTHERWISE NOTED.
2. PLUG CONCRETE SHALL BE OF TYPE D AS PER SPECIFICATION.

REFERENCE DRAWINGS

JD-P1-DF-P1-1	DIVERSION FACILITIES – LAYOUT PLAN
JD-P1-DF-Pg-2	PLUG WORKS IN DIVERSION TUNNEL – GROUT PLAN

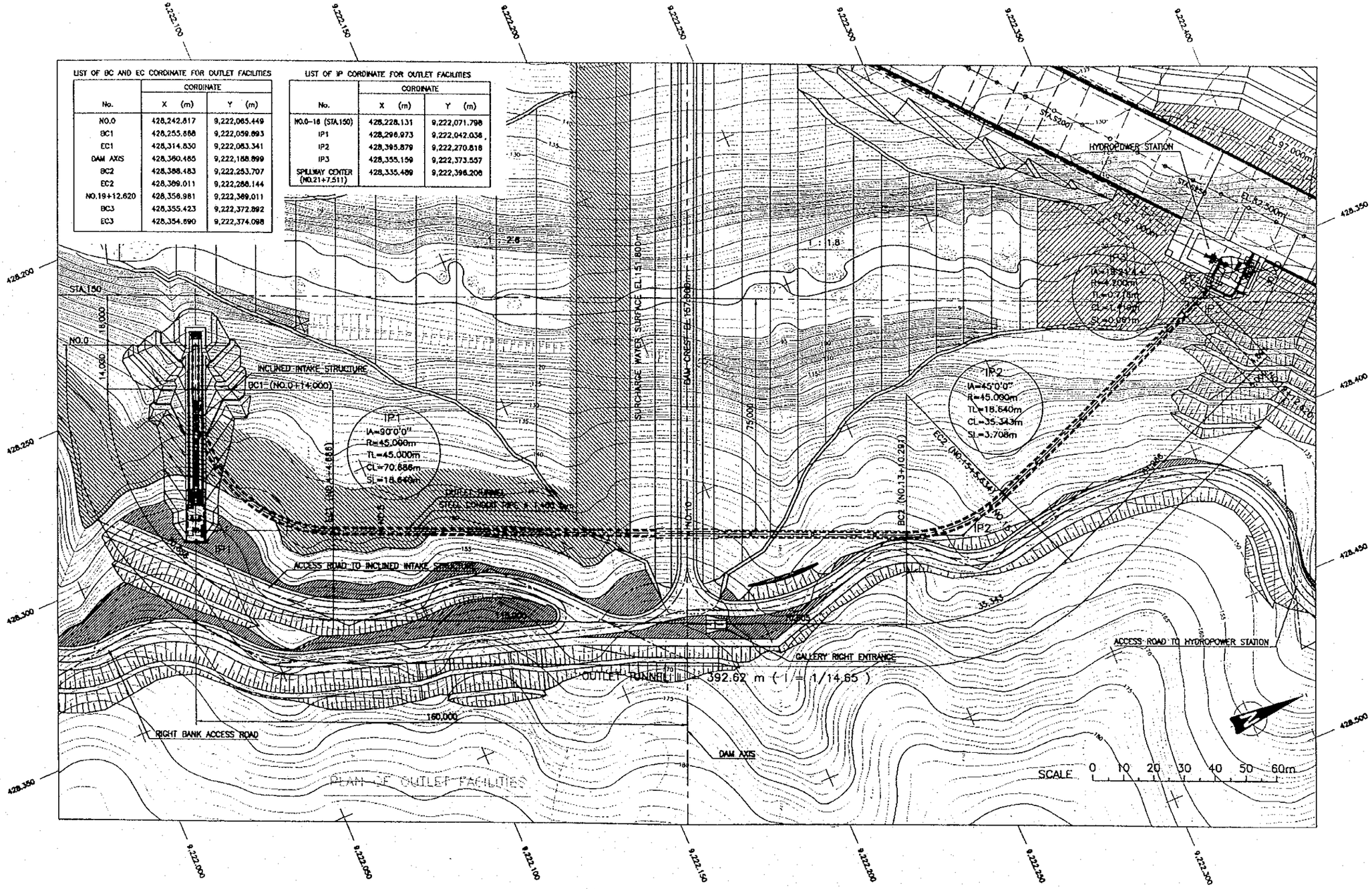
THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA	Fig. 7.5.14 (2/2) LAYOUT OF PLUG WORKS FOR DIVERSION TUNNEL
JAPAN INTERNATIONAL COOPERATION AGENCY	

LIST OF BC AND EC CORDINATE FOR OUTLET FACILITIES

No.	CORDINATE X (m)	CORDINATE Y (m)
NO.0	428,242.617	9,222,065.449
BC1	428,255.868	9,222,059.893
EC1	428,314.830	9,222,083.341
DAM AXIS	428,360.485	9,222,188.899
BC2	428,388.483	9,222,253.707
EC2	428,369.011	9,222,286.144
NO.19+12.620	428,356.981	9,222,369.011
BC3	428,355.423	9,222,372.892
EC3	428,354.690	9,222,374.088

LIST OF IP CORDINATE FOR OUTLET FACILITIES

No.	CORDINATE X (m)	CORDINATE Y (m)
NO.0–18 (STA.150)	428,228.131	9,222,071.798
IP1	428,296.973	9,222,042.038
IP2	428,395.879	9,222,270.818
IP3	428,355.159	9,222,373.557
SPILLWAY CENTER (NO.21+7.511)	428,335.489	9,222,396.206



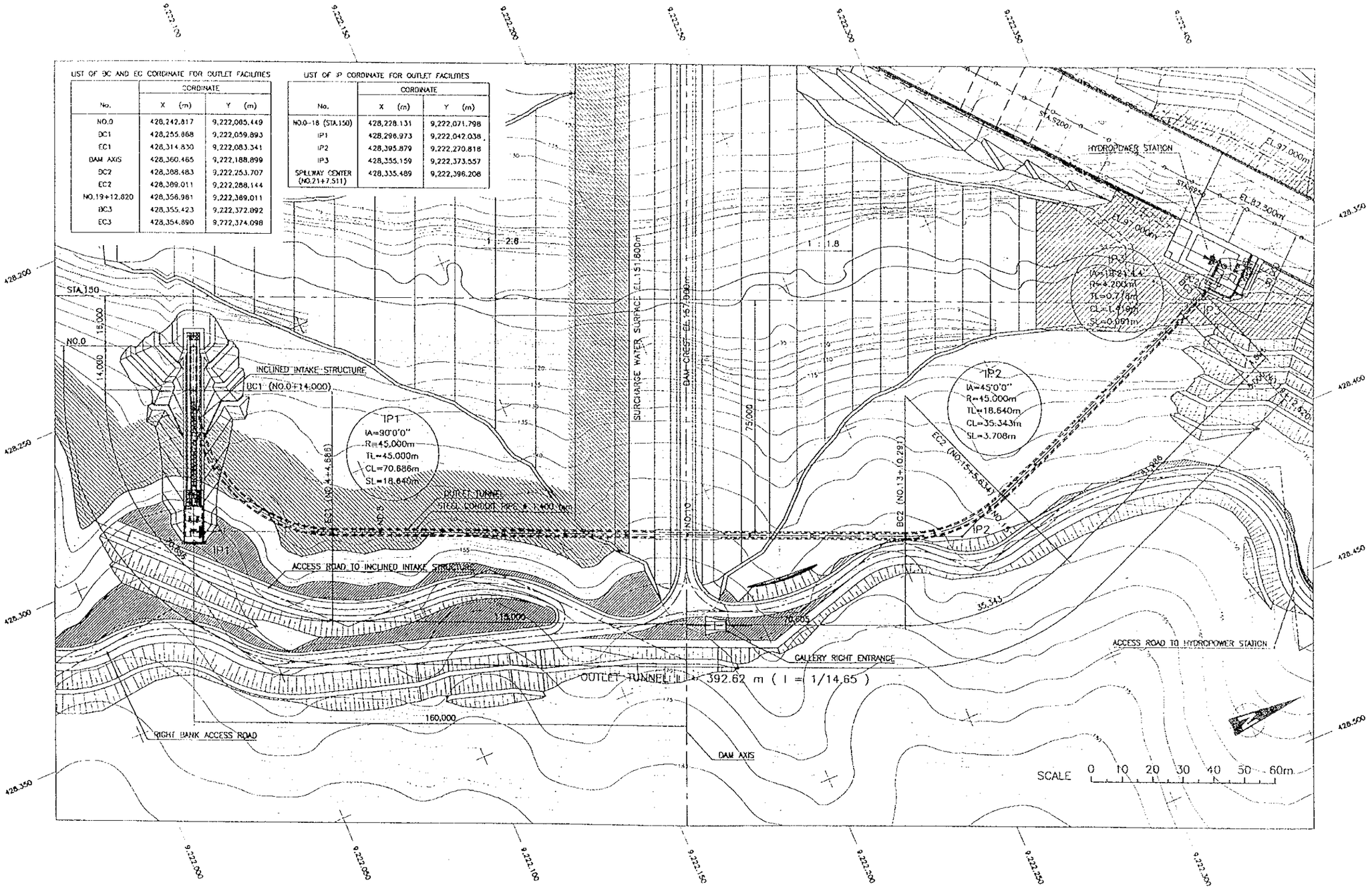
NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS, UNLESS OTHERWISE NOTED.

REFERENCE DRAWINGS

JD–P1–OF–Tu–1	TUNNEL – PROFILE AND TYPICAL CROSS SECTIONS
JD–P1–OF–Is–1	INCLINED INTAKE STRUCTURE – LAYOUT PLAN AND PROFILE

THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA	Fig. 7.6.1 PLAN OF OUTLET FACILITIES
JAPAN INTERNATIONAL COOPERATION AGENCY	



NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS, UNLESS OTHERWISE NOTED.

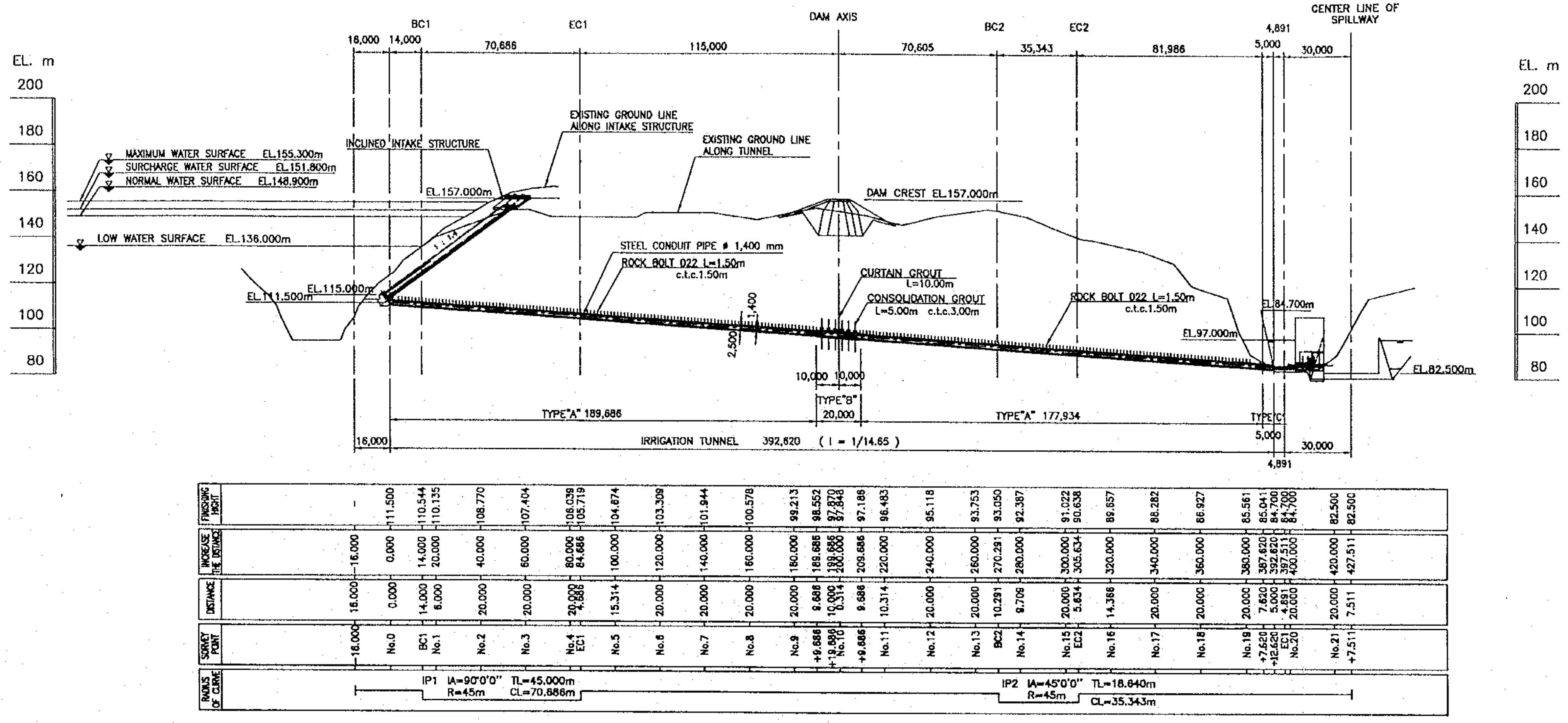
REFERENCE DRAWINGS

JD-P1-OF-Tu-1	TUNNEL -- PROFILE AND TYPICAL CROSS SECTIONS
JD-P1-OF-Is-1	INCLINED INTAKE STRUCTURE -- LAYOUT PLAN AND PROFILE

THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA

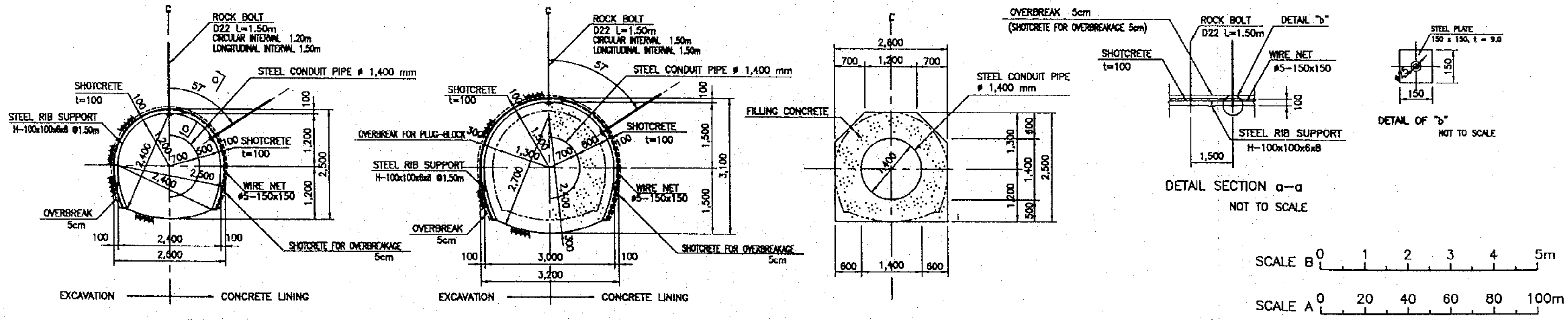
JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 7.6.1
PLAN OF OUTLET FACILITIES



PROFILE

SCALE A



TYPICAL SECTION

SCALE B

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS, UNLESS OTHERWISE NOTED.
2. FILLING CONCRETE OF OUTLET TUNNEL SHALL BE OF TYPE D AS PER SPECIFICATION.

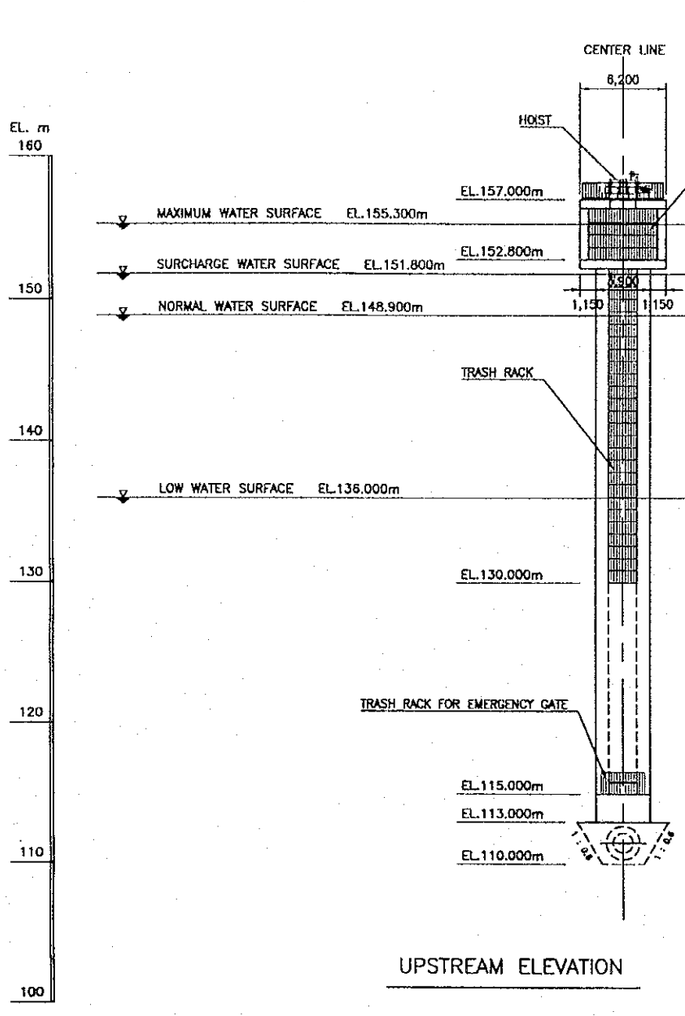
REFERENCE DRAWINGS

JD-P1-OF-PI-1 OUTLET FACILITIES – LAYOUT PLAN
JD-P1-OF-Tu-2 TUNNEL – STEEL RIB SUPPORT AND GROUT PLAN

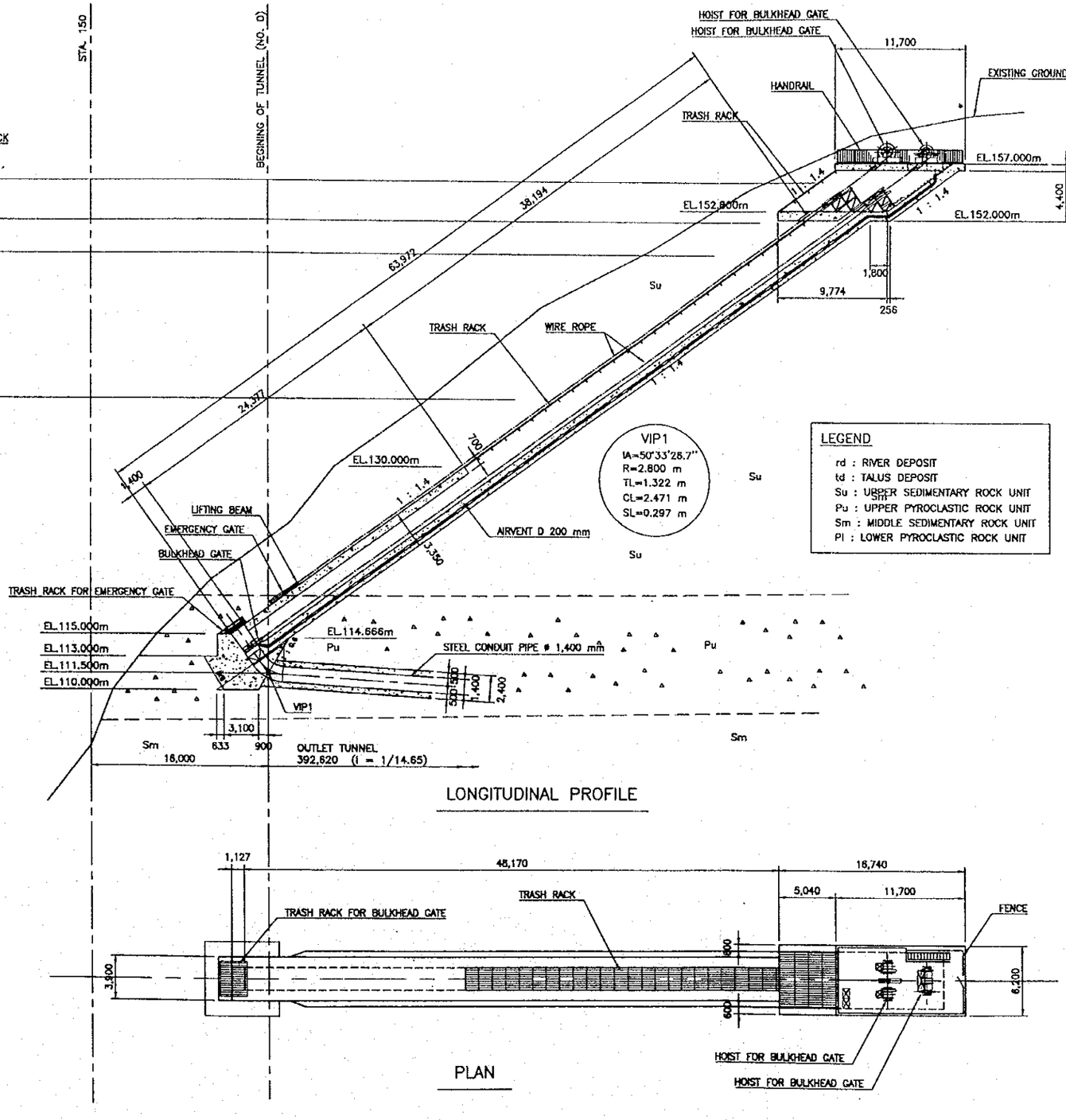
THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 7.6.2 PROFILE OF OUTLET FACILITIES



UPSTREAM ELEVATION



LONGITUDINAL PROFILE

PLAN

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS, UNLESS OTHERWISE NOTED.
2. CONCRETE OF INTAKE STRUCTURE SHALL BE OF TYPE B AS PER SPECIFICATION.
3. GEOLOGICAL INFORMATION IS ONLY FOR REFERENCE.

REFERENCE DRAWINGS

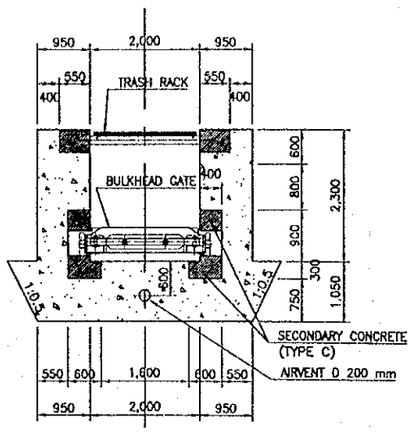
JD-P1-OF-Pl-1	OUTLET FACILITIES - LAYOUT PLAN
JD-P1-DF-Is-1	INCLINED INTAKE STRUCTURE - CONCRETE OUTLINE (1/2)
JD-P1-DF-Is-2	INCLINED INTAKE STRUCTURE - CONCRETE OUTLINE (2/2)

SCALE 0 5 10 15 20 m

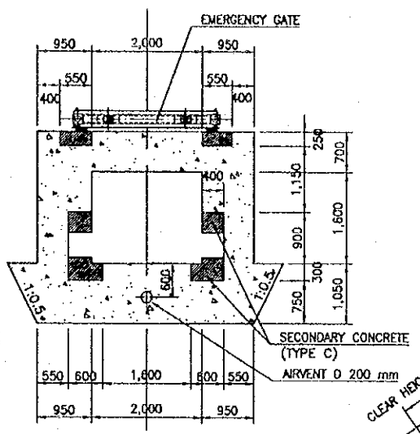
THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 7.6.3
LAYOUT OF INCLINED INTAKE STRUCTURE



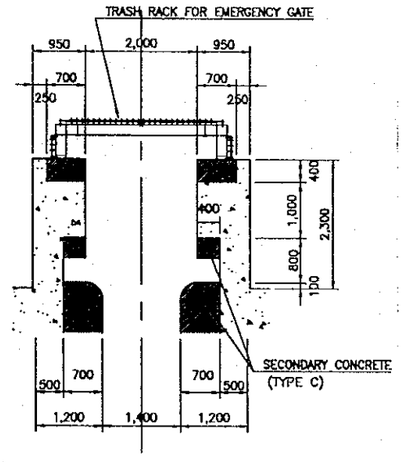
A – A SECTION



B – B SECTION

LONGITUDINAL PROFILE AND PLAN

C – C SECTION



D – D SECTION

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS, UNLESS OTHERWISE NOTED.
2. CONCRETE OF INTAKE STRUCTURE SHALL BE OF TYPE B AS PER SPECIFICATION.
3. SECONDARY CONCRETE FOR BLOCKOUT SHALL BE OF TYPE B AS PER SPECIFICATION.

REFERENCE DRAWINGS

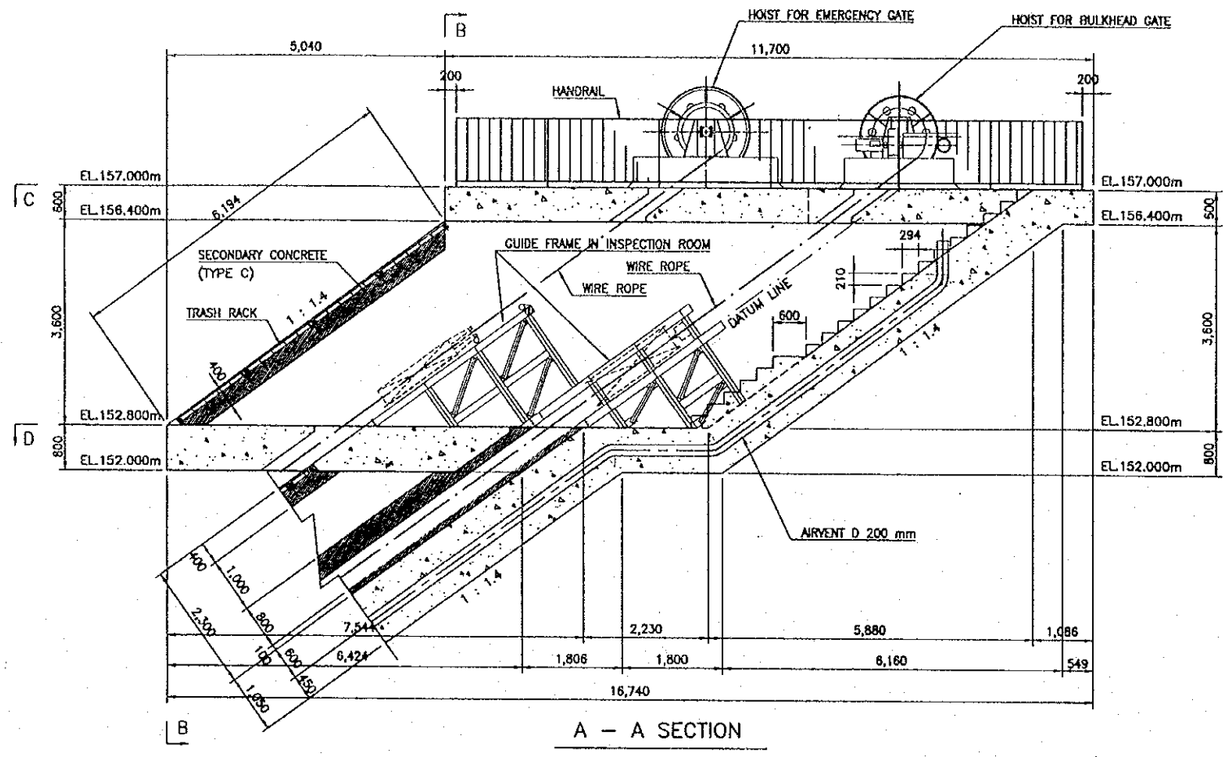
JD-P1-OF-PI-1	OUTLET FACILITIES – LAYOUT PLAN
JD-P1-DF-Is-2	INCLINED INTAKE STRUCTURE – CONCRETE OUTLINE (2/2)

SCALE 0 1 2 3 4 5m

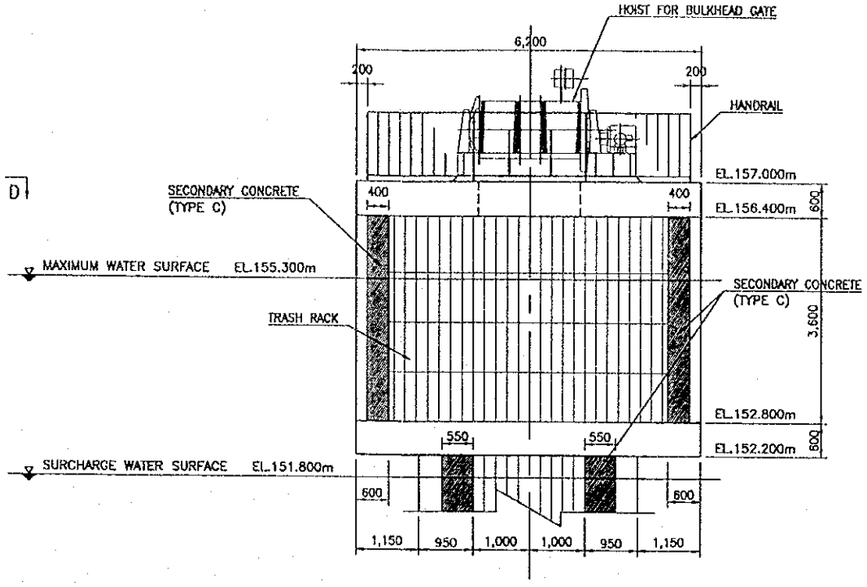
THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA

JAPAN INTERNATIONAL COOPERATION AGENCY

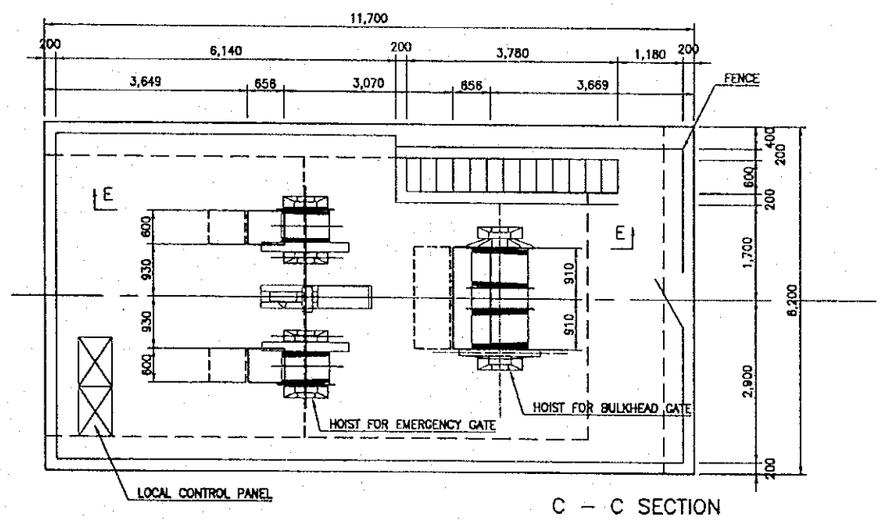
Fig. 7.6.4 (1/2)
DETAILS OF INCLINED INTAKE STRUCTURE



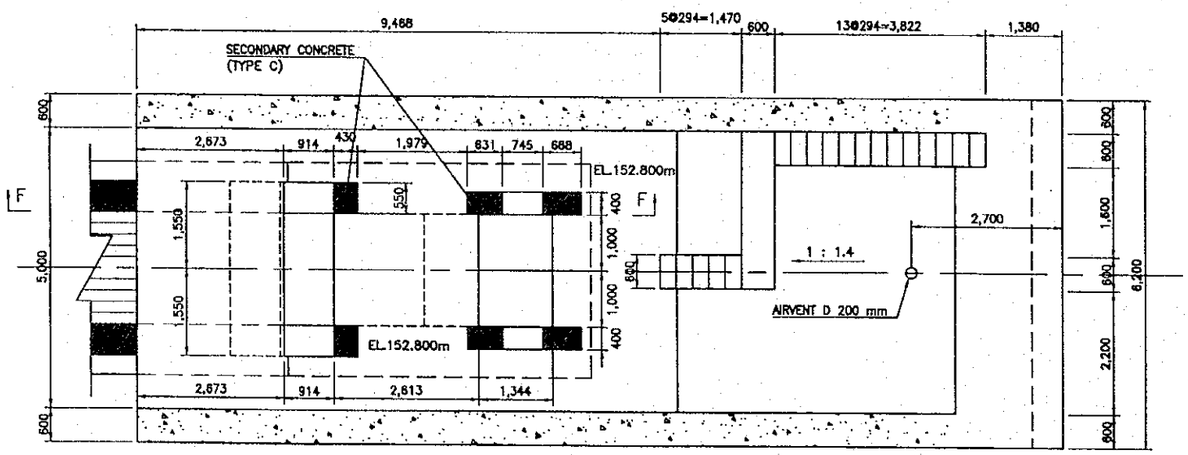
A – A SECTION



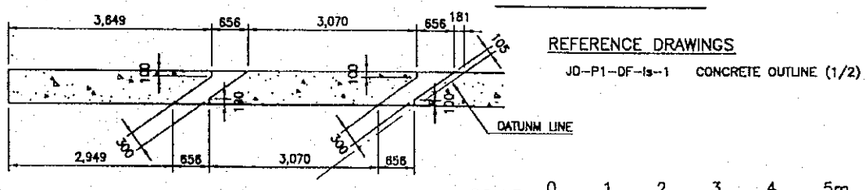
B – B SECTION



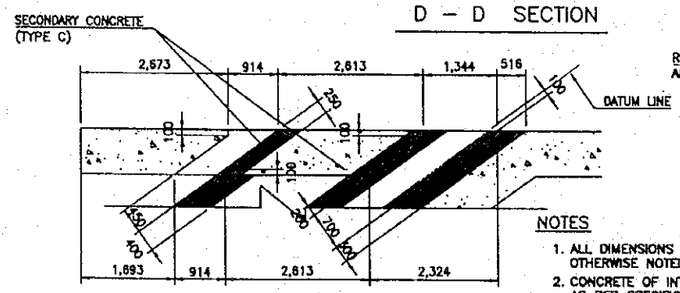
C – C SECTION



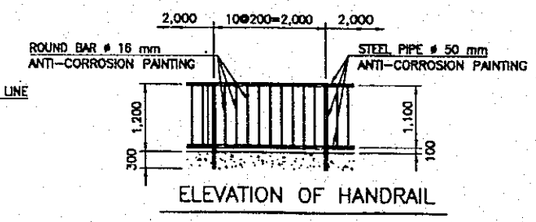
D – D SECTION



E – E SECTION



F – F SECTION



ELEVATION OF HANDRAIL

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS, UNLESS OTHERWISE NOTED.
2. CONCRETE OF INTAKE STRUCTURE SHALL BE OF TYPE B AS PER SPECIFICATION.
3. SECONDARY CONCRETE FOR BLOCKOUT SHALL BE OF TYPE C AS PER SPECIFICATION.

REFERENCE DRAWINGS

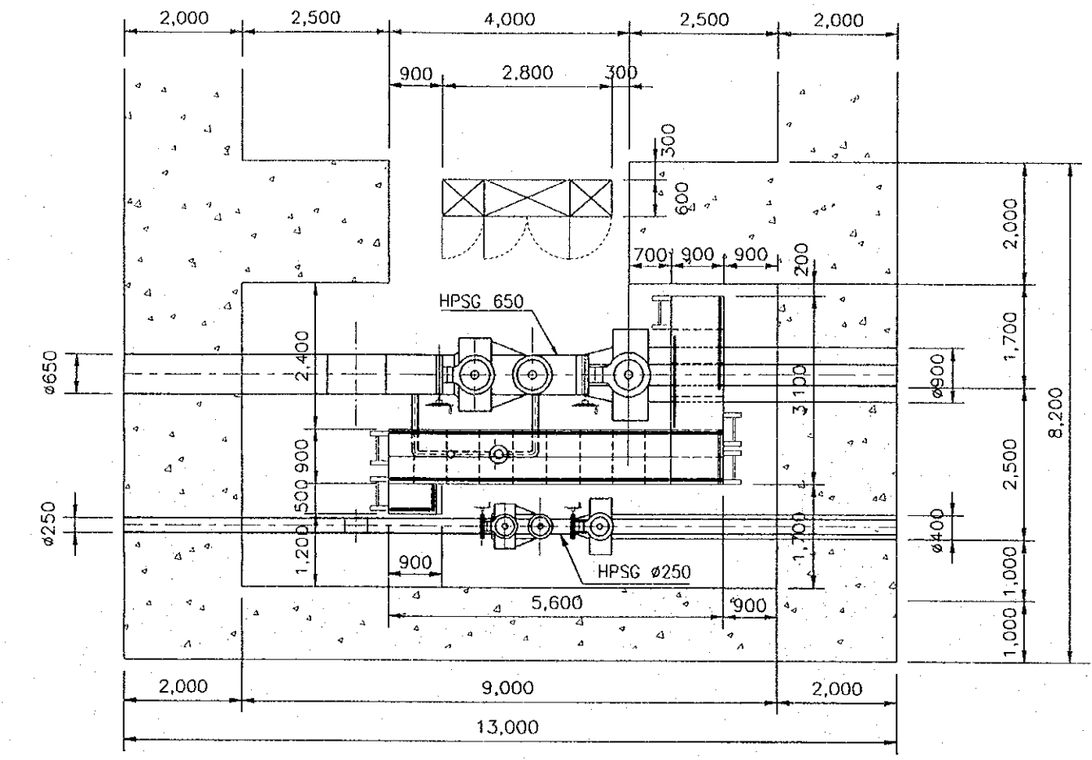
JD-P1-DF-ls-1 CONCRETE OUTLINE (1/2)

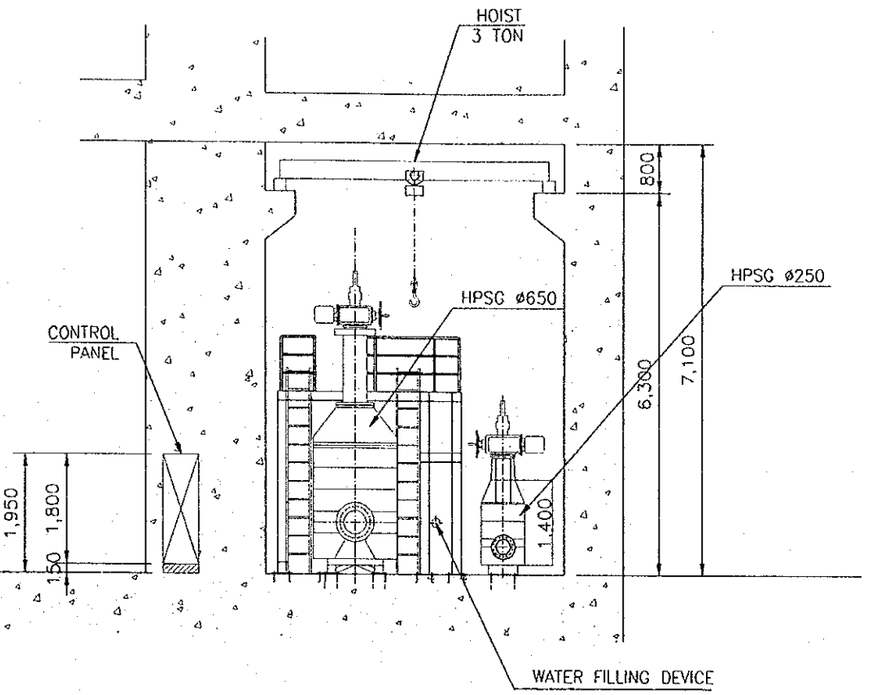
SCALE 0 1 2 3 4 5m

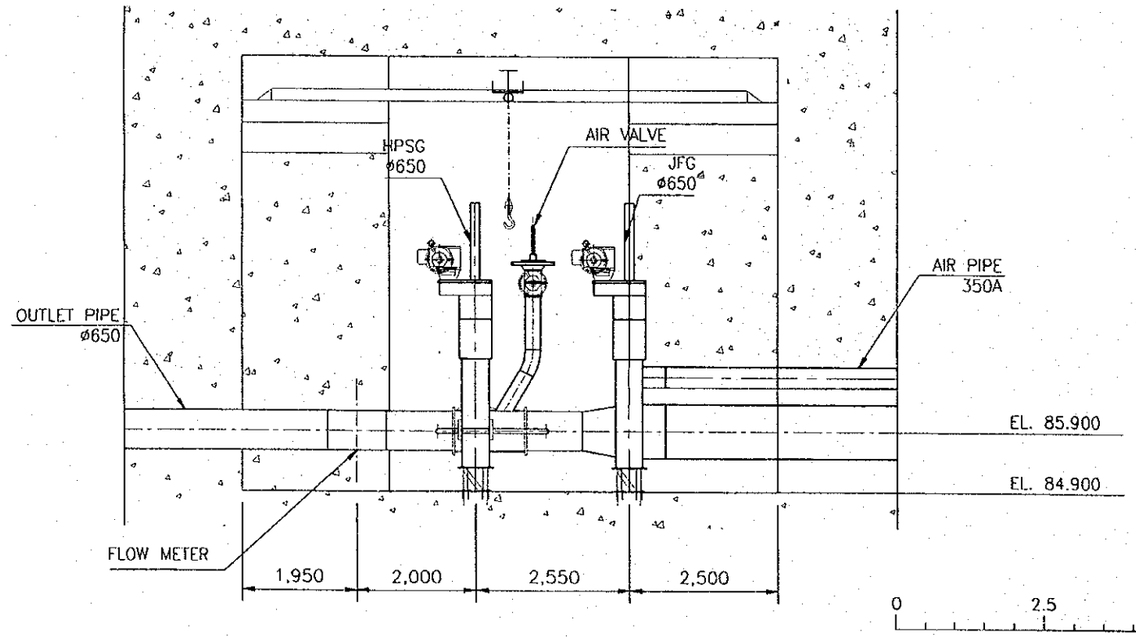
THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA

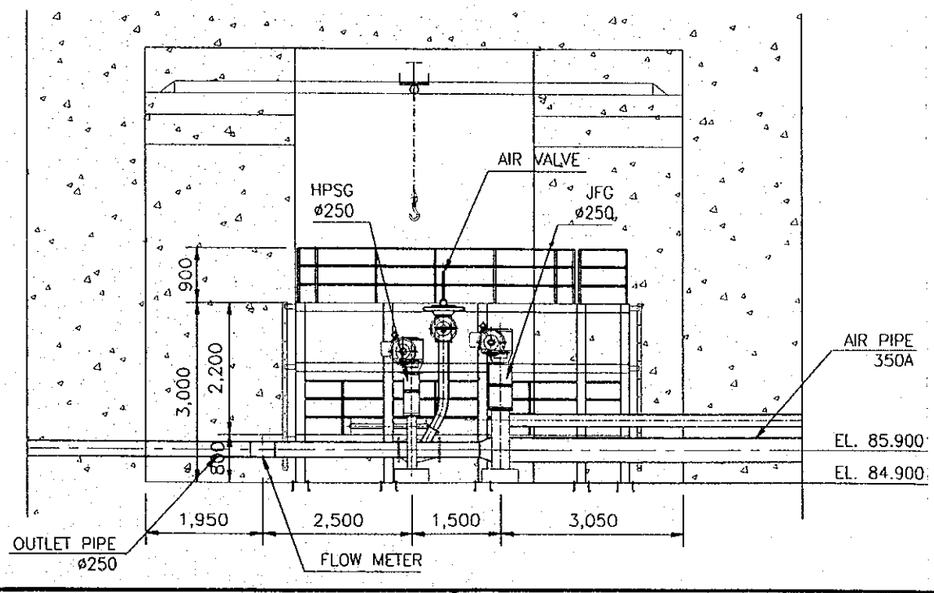
JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 7.6.4 (2/2)
DETAILS OF INCLINED INTAKE STRUCTURE







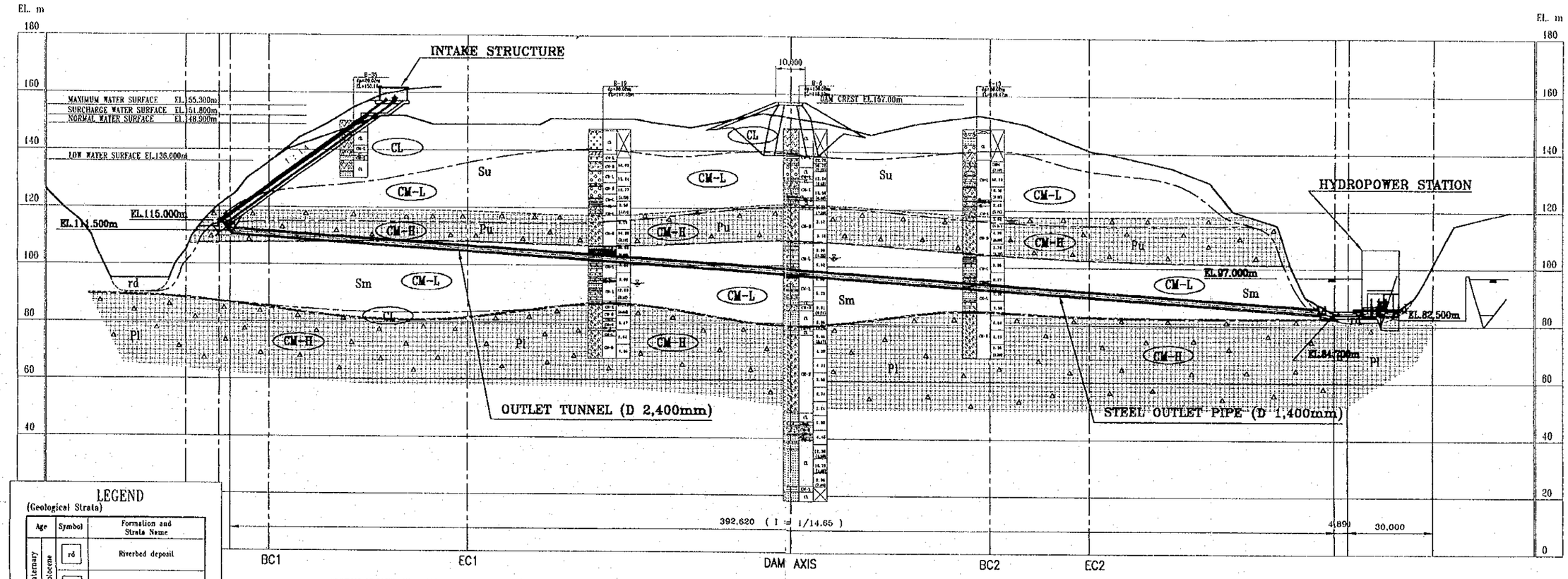


0 2.5 5 m
SCALE 1:100

THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 7.6.5
LAYOUT OF CONTROL AND GUARD GATES



LEGEND

(Geological Strata)

Age		Symbol	Formation and Strata Name
Quaternary	Holocene	rd	Riverbed deposit
		td	Talus deposit
Tertiary-Quaternary	Pliocene-Pleistocene	Su	Upper Sedimentary Rock Unit
		Pu	Upper Pyroclastic Rock Unit
		Sm	Middle Sedimentary Rock Unit
		Pl	Lower Pyroclastic Rock Unit
		Sl	Lower Sedimentary Rock Unit

(Note)

Boundary of Geological Unit

Boundary of Rock Class

(SYMBOLS OF ROCKS AND COLORS OF ROCK CLASS AT CORE)

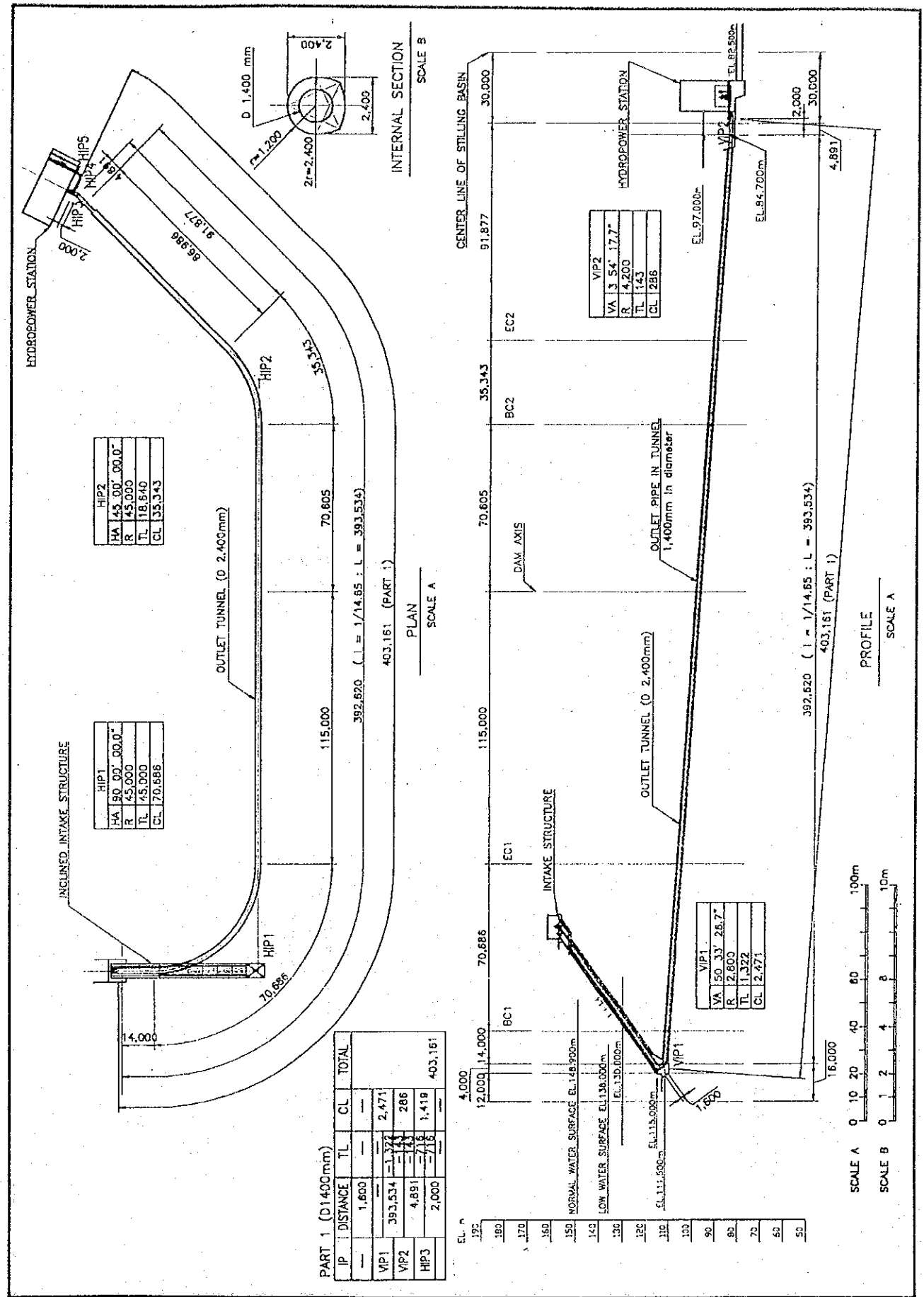
	B	Embankment	D	D Class
	To	Top Soil	CL	CL-L Class
	rd	Riverbed Deposit	CM-L	CM-L Class
	td	Talus Deposit	CM-H	CM-M Class
	Cg	Conglomerate		
	Sc	Conglomeratic Sandstone		
	Ss	Sandstone		
	Si	Siltstone		
	St	Tuffaceous Sandstone		
	Ts	Sandy Tuff		
	Tf	Tuff		
	Cv	Volcanic Conglomerate		
	Bb	Volcanic Breccia		
	La	Andesite Lava		

SCALE 0 10 20 40 60 80 100m

THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA

JAPAN INTERNATIONAL COOPERATION AGENCY

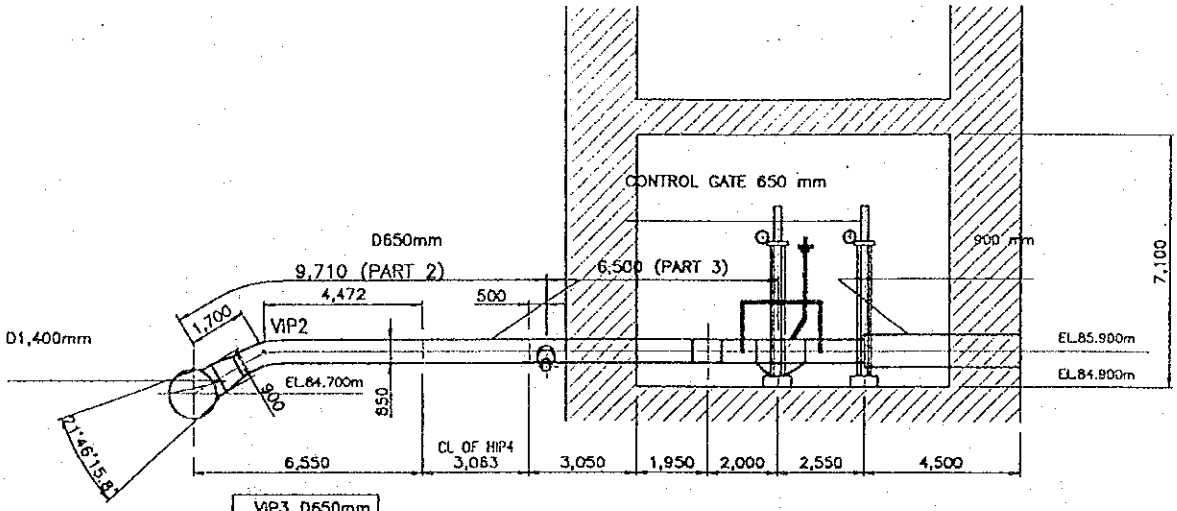
Fig. 7.6.6
GEOLOGICAL PROFILE ALONG CENTERLINE OF OUTLET FACILITIES



THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 7.6.7 (1/3)
DIMENSION OF HEAD LOSS CALCULATION

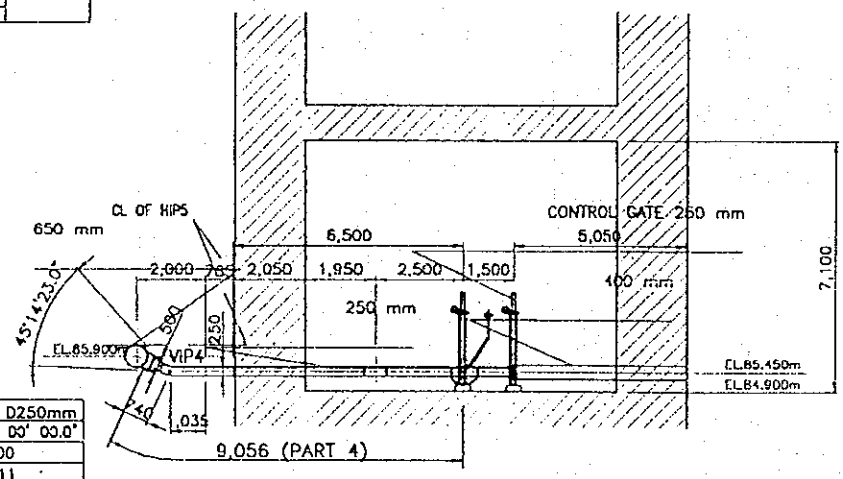


VIP3 D650mm	
VA	30 00' 00.0"
R	1,950
TL	523
CL	1,021

B–B SECTION

PART 2 (D650mm)

IP	DISTANCE	TL	CL	TOTAL
		—	—	
VIP3	1,700	−523	1,021	9,710
	4,472	−523		
HIP4		—	3,063	
	500	—		
		—	—	



VIP4 D250mm	
VA	25 00' 00.0"
R	500
TL	111
CL	218

C–C SECTION

PART 4 (D250mm)

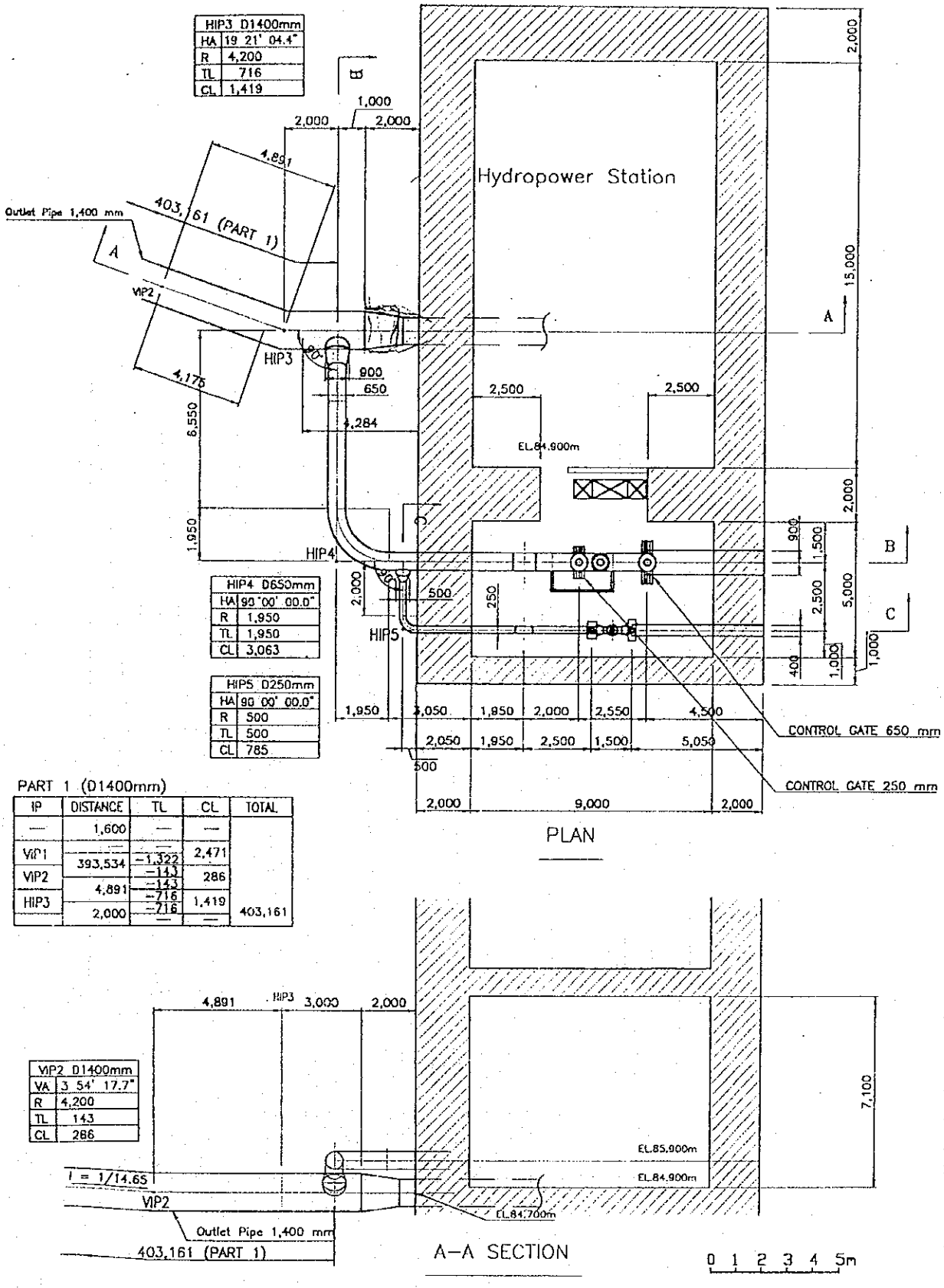
IP	DISTANCE	TL	CL	TOTAL
		—	—	
VIP4	740	−111	218	9,056
	1,035	−111		
HIP5		—	785	
	6,500	—		
		—	—	

0 1 2 3 4 5m

THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA

JAPAN INTERNATIONAL COOPERATION AGENCY

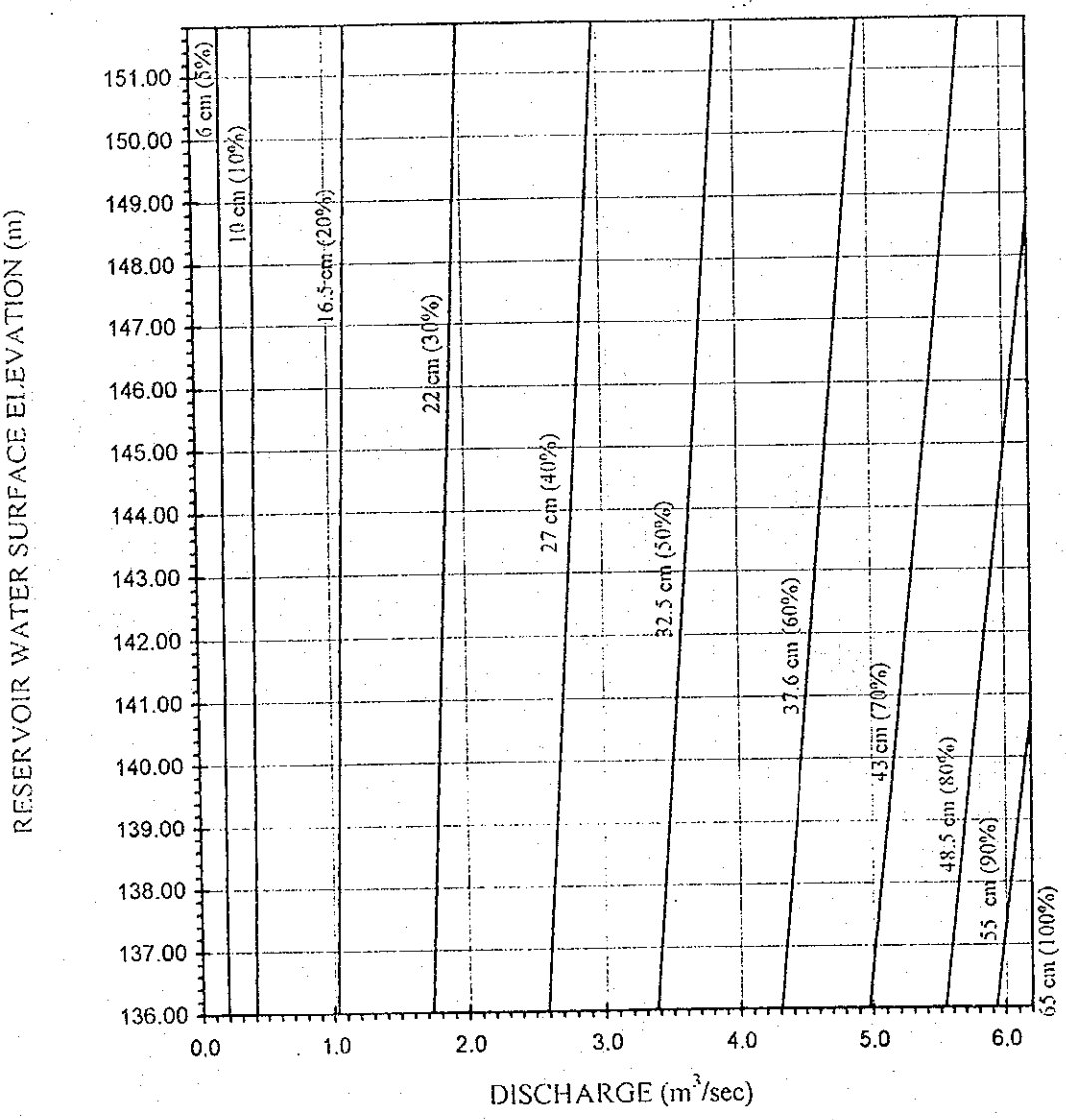
Fig. 7.6.7 (2/3)
DIMENSION OF HEAD LOSS CALCULATION



PART 1 (D1400mm)

IP	DISTANCE	TL	CL	TOTAL
—	1,600	—	—	
VIP1	393,534	-1,322	2,471	
VIP2		-143	286	
	4,891	-143		
HIP3		-716	1,419	
	2,000	-716		403,161
		—	—	

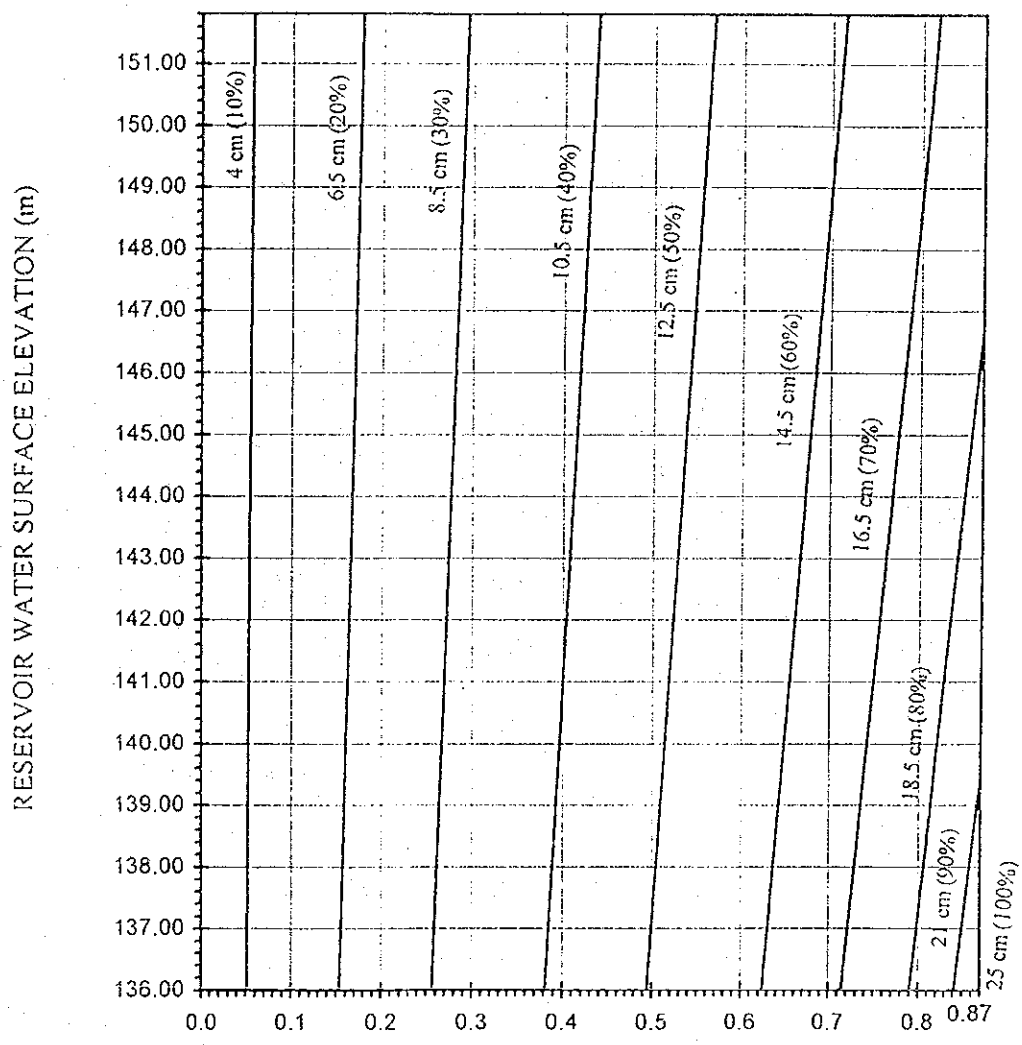
THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA	Fig. 7.6.7 (3/3) DIMENSION OF HEAD LOSS CALCULATION
JAPAN INTERNATIONAL COOPERATION AGENCY	



CONTROL GATE (650 mm in Diameter)

Note : Percentage is gate opening rate to fully open area (0.332 m^2)

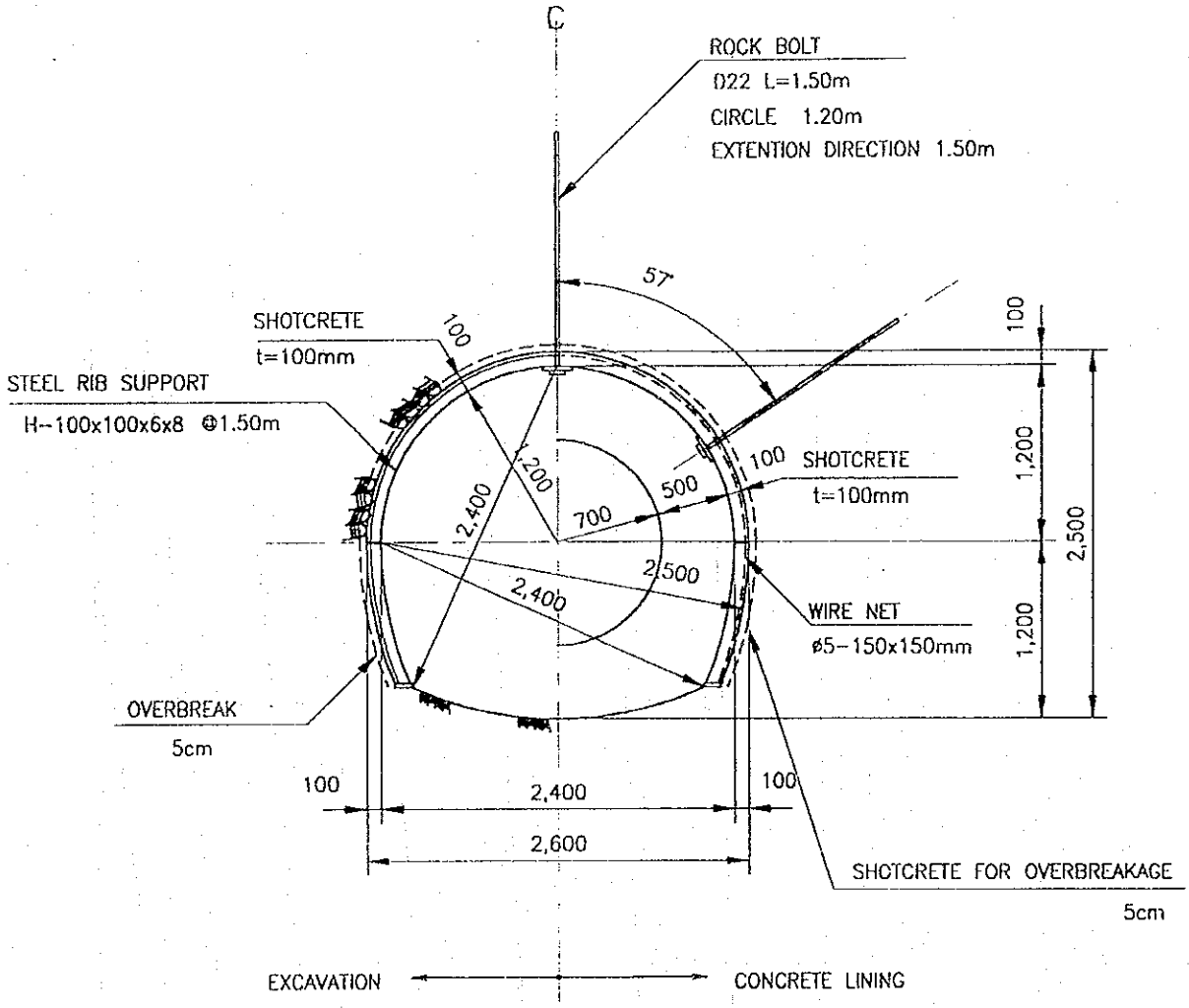
THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA	Fig. 7.6.8 (1/2) DISCHARGE-RATING CURVE OF CONTROL GATE
JAPAN INTERNATIONAL COOPERATION AGENCY	



CONTROL GATE (250 mm in Diameter)

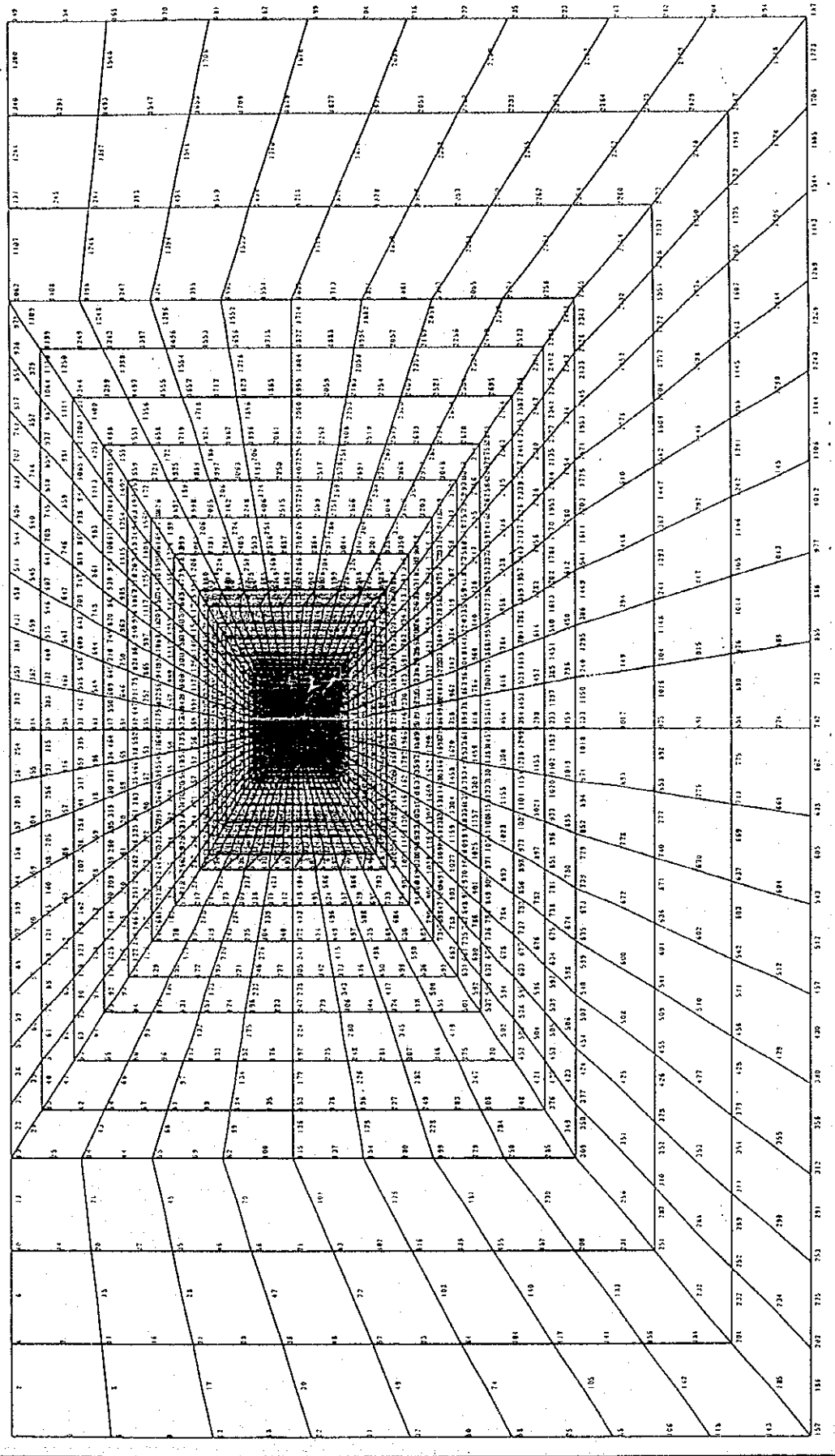
Note : (%) is gate opening rate to fully open area (0.049 m^2)

THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA	Fig. 7.6.8 (2/2) DISCHARGE-RATING CURVE OF CONTROL GATE
JAPAN INTERNATIONAL COOPERATION AGENCY	



TYPICAL CROSS SECTION

THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA	Fig. 7.6.9 TYPICAL CROSS SECTION OF OUTLET TUNNEL
JAPAN INTERNATIONAL COOPERATION AGENCY	

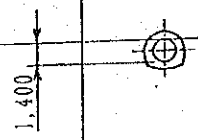


THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA

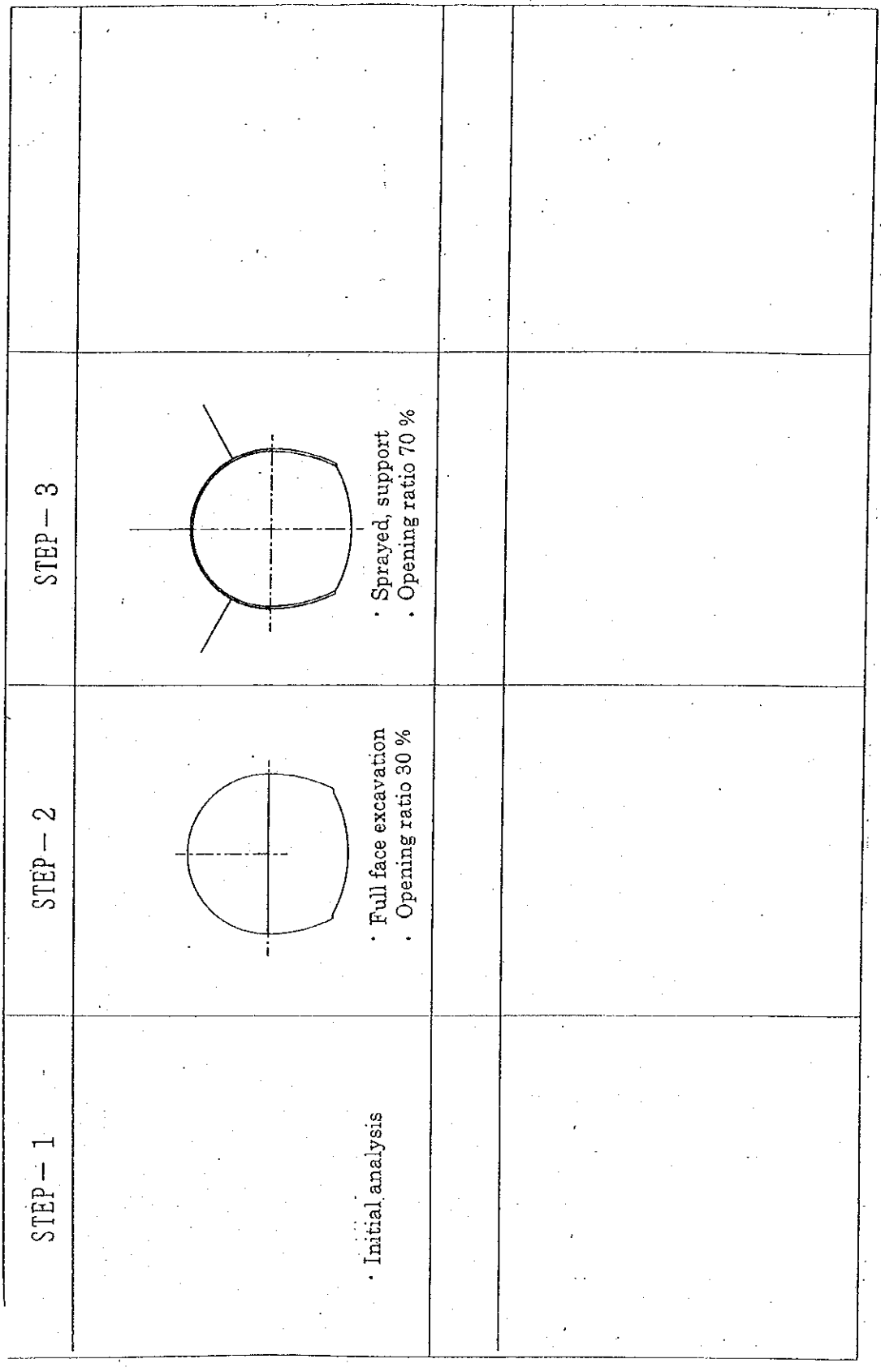
JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 7.6.10
FEM ANALYSIS MODEL OF OUTLET TUNNEL

Depth (m)	Thick (m)	Soil name	Density γ (tf/m³)	F. angle φ (°)	Cohesion c (tf/m²)	D. coeffi. E (tf/m²)	P's ratio ν
		CM-L	2.0	40°	250	100000	0.40
60.0	60.0						
140.0	80.0						



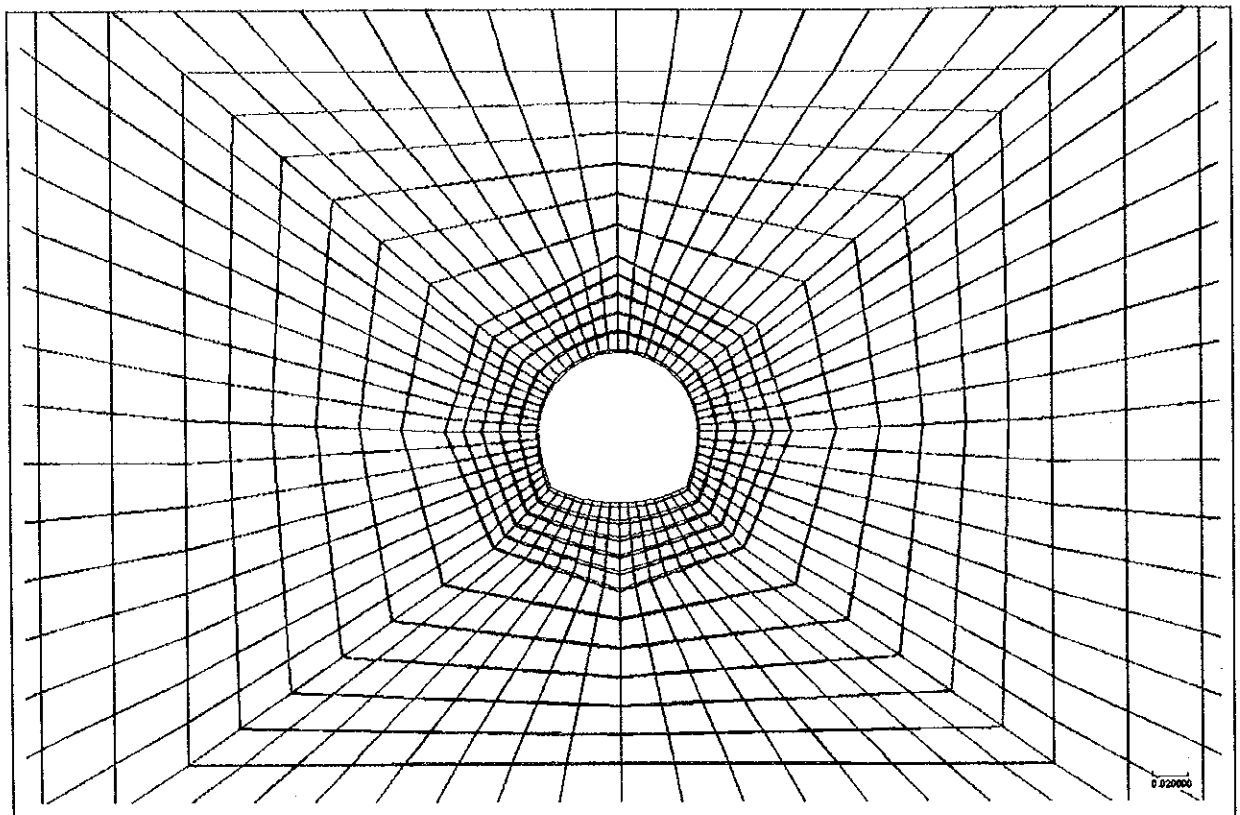
THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA	Fig. 7.6.11 PROPERTIES OF ROCK MASS AROUND OUTLET TUNNEL
JAPAN INTERNATIONAL COOPERATION AGENCY	



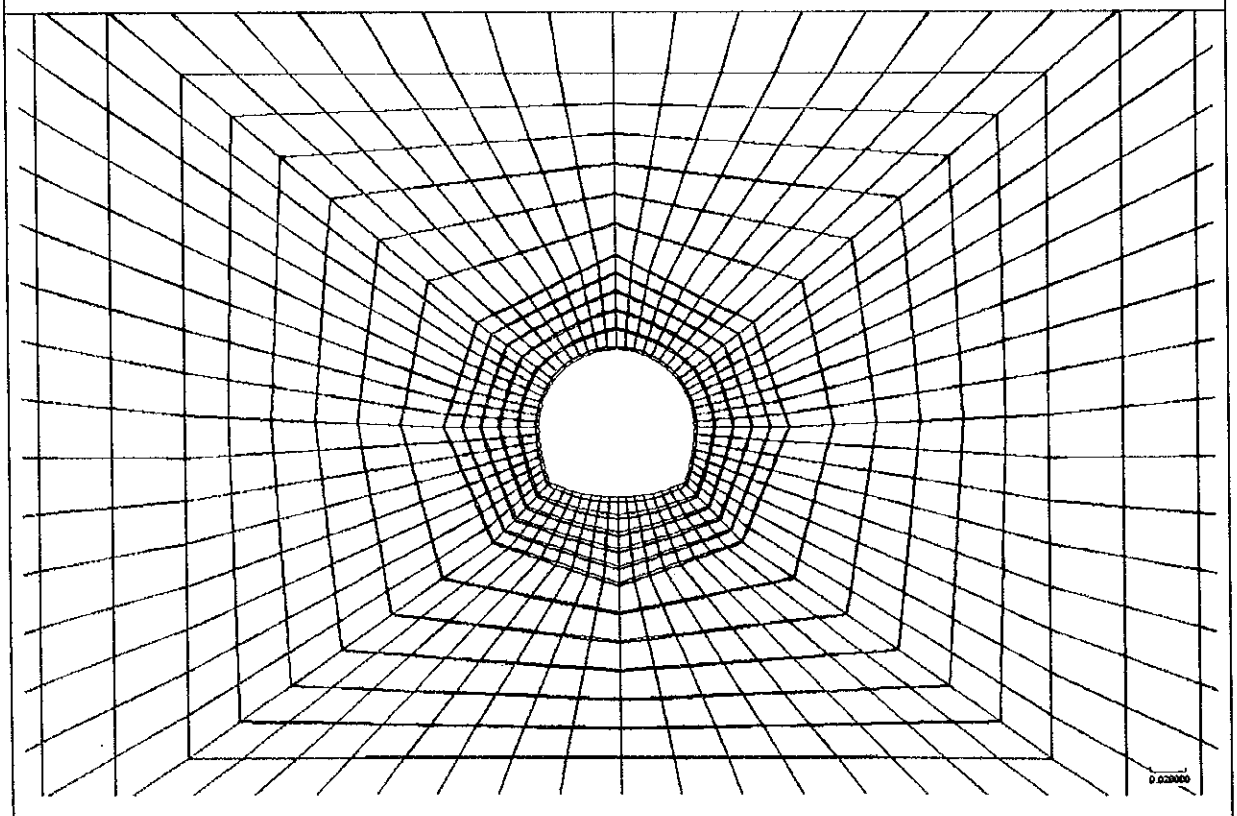
THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 7.6.12
ANALYSIS STEP FOR OUTLET TUNNEL



STEP－2

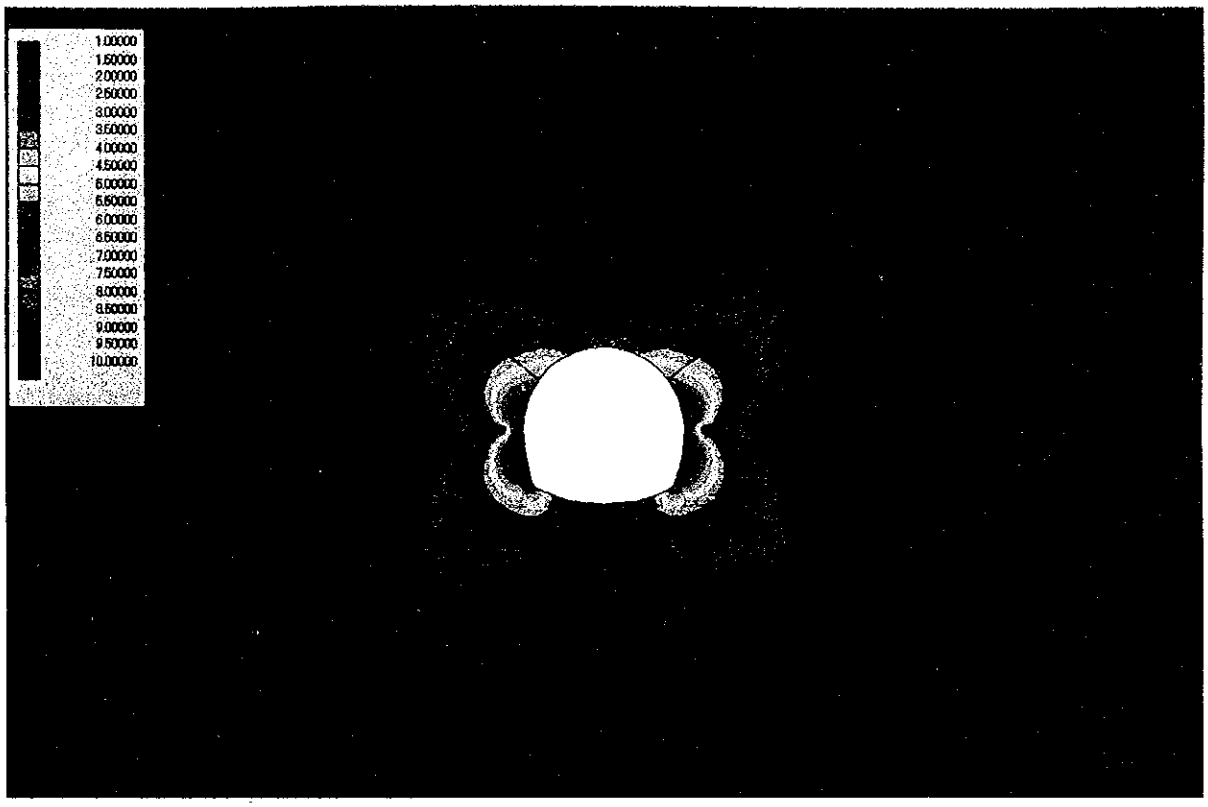


STEP－3

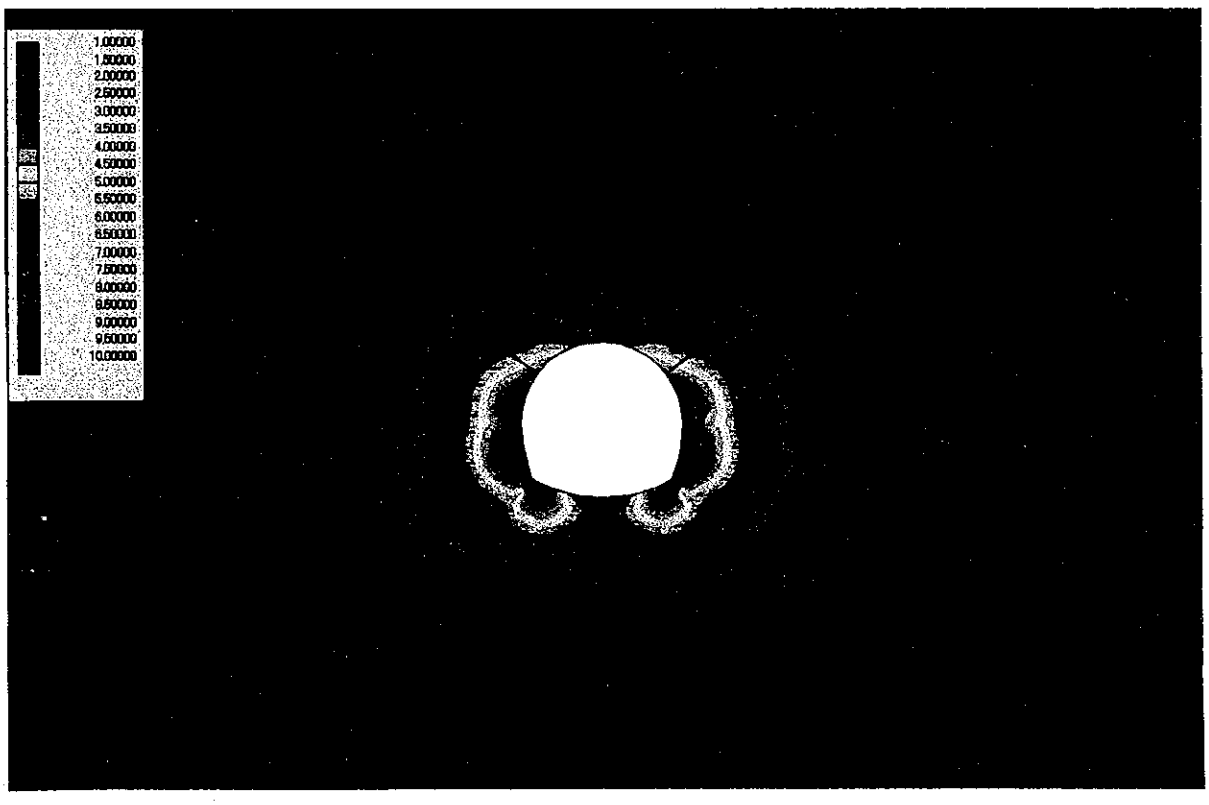
THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 7.6.13
RESULTS OF FEM ANALYSIS FOR OUTLET TUNNEL (DEFORMATION MAP)

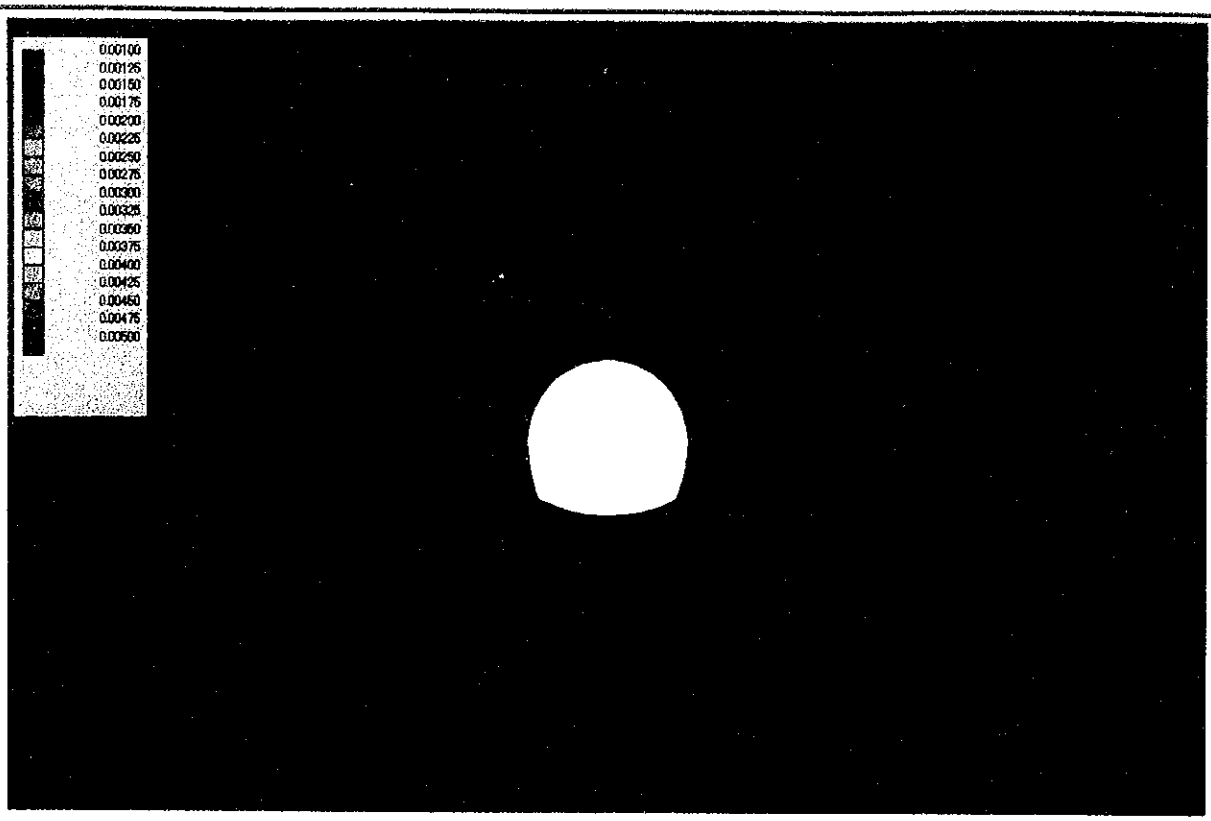


STEP－2

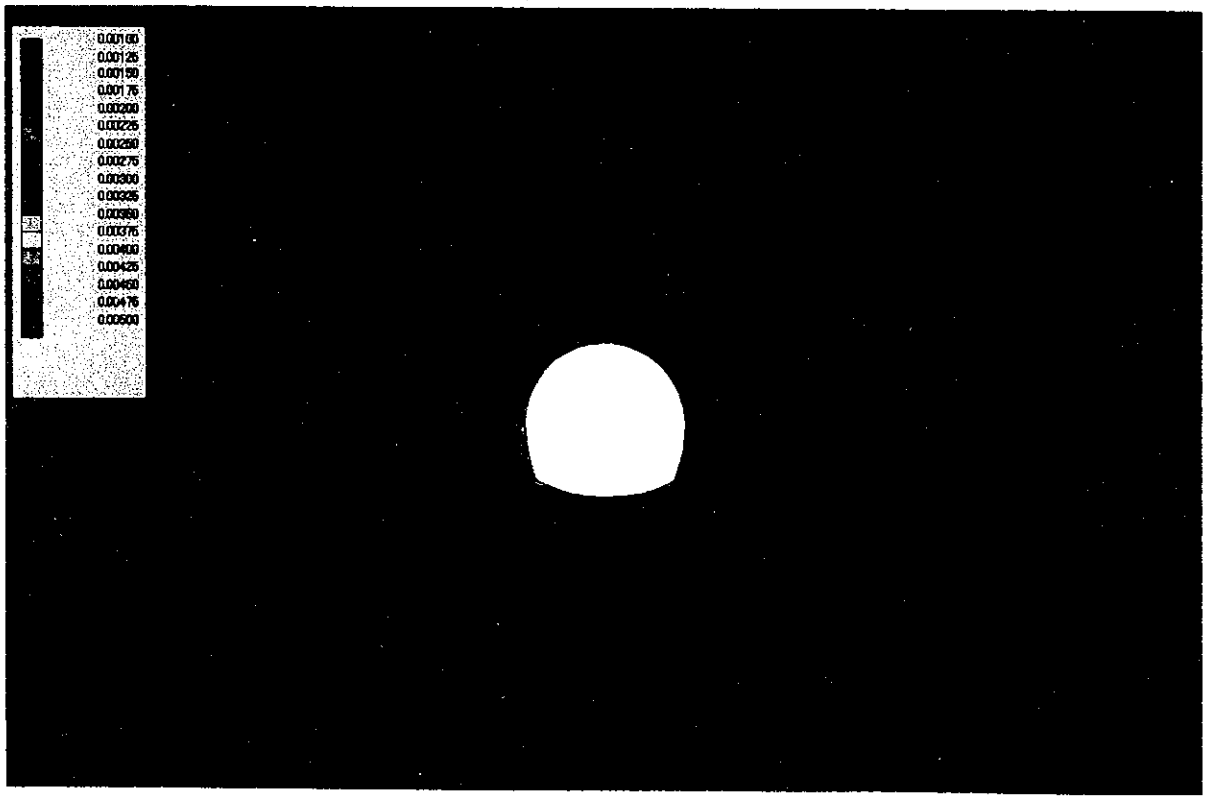


STEP－3

THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA	Fig. 7.6.14 RESULTS OF FEM ANALYSIS FOR OUTLET TUNNEL (CONTOUR LINE MAP OF FRACTURE SAFETY FACTOR)
JAPAN INTERNATIONAL COOPERATION AGENCY	

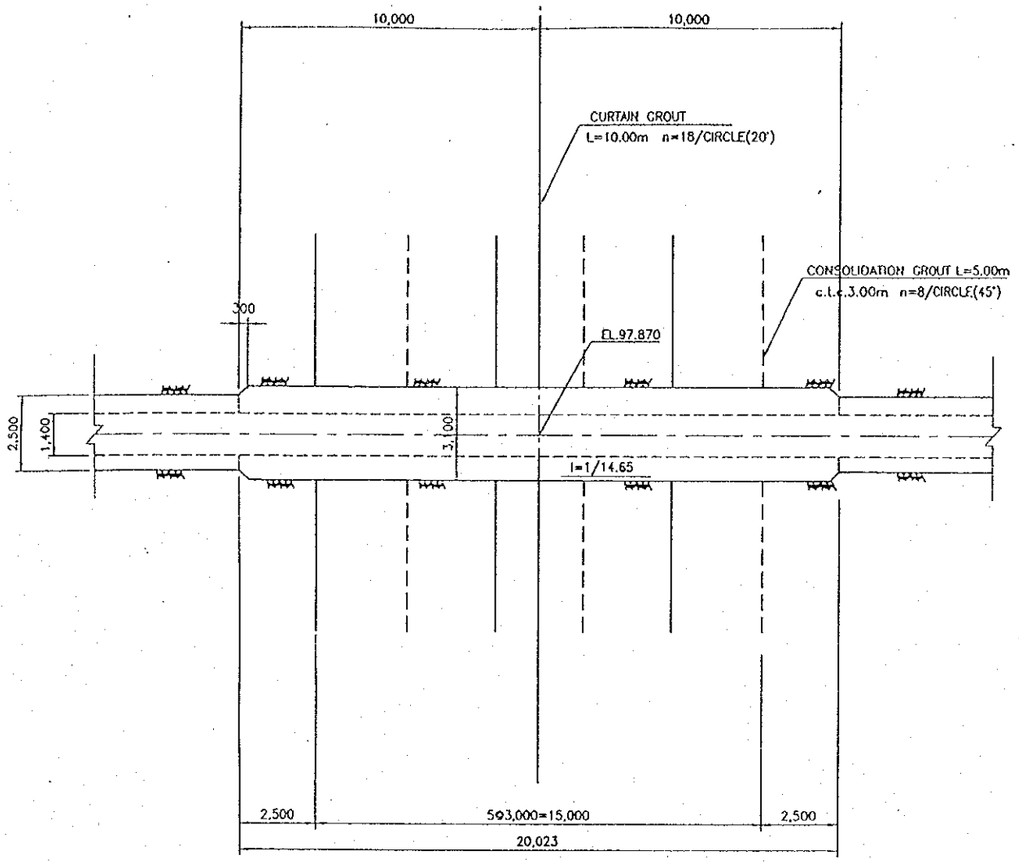


STEP－2



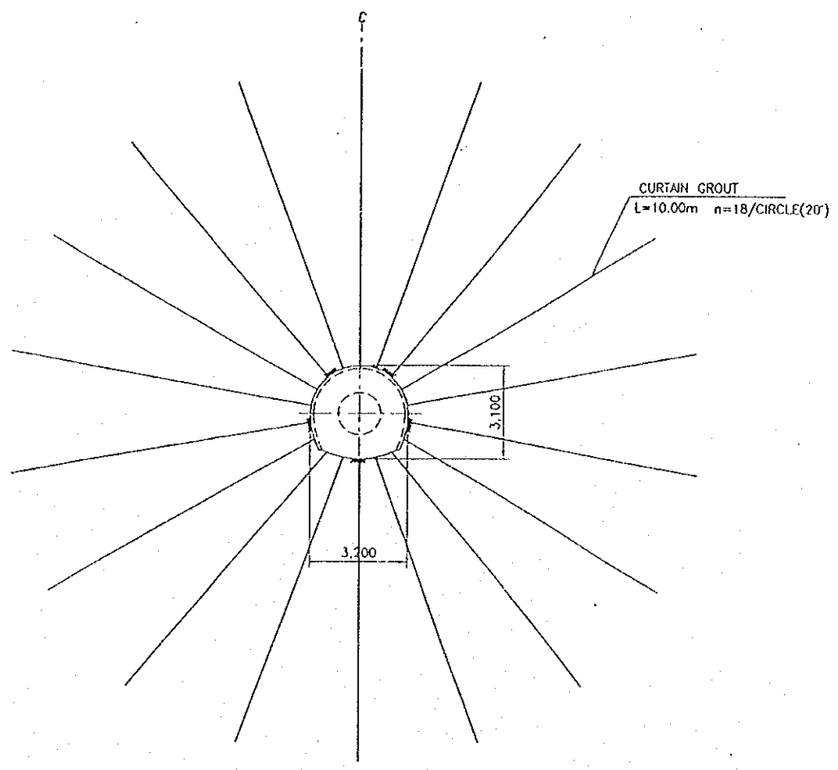
STEP－3

THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA	Fig. 7.6.15 RESULTS OF FEM ANALYSIS FOR OUTLET TUNNEL (CONTOUR LINE MAP OF MAXIMUM SHEAR STRAIN)
JAPAN INTERNATIONAL COOPERATION AGENCY	

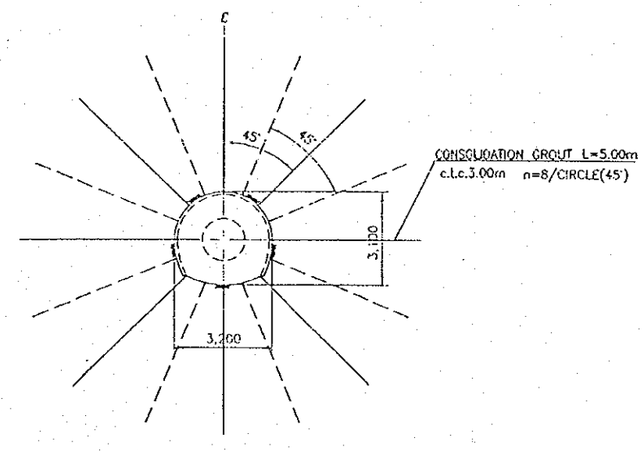


PROFILE

SCALE 8



TYPICAL ARRENGEMENT OF CURTAIN GROUT



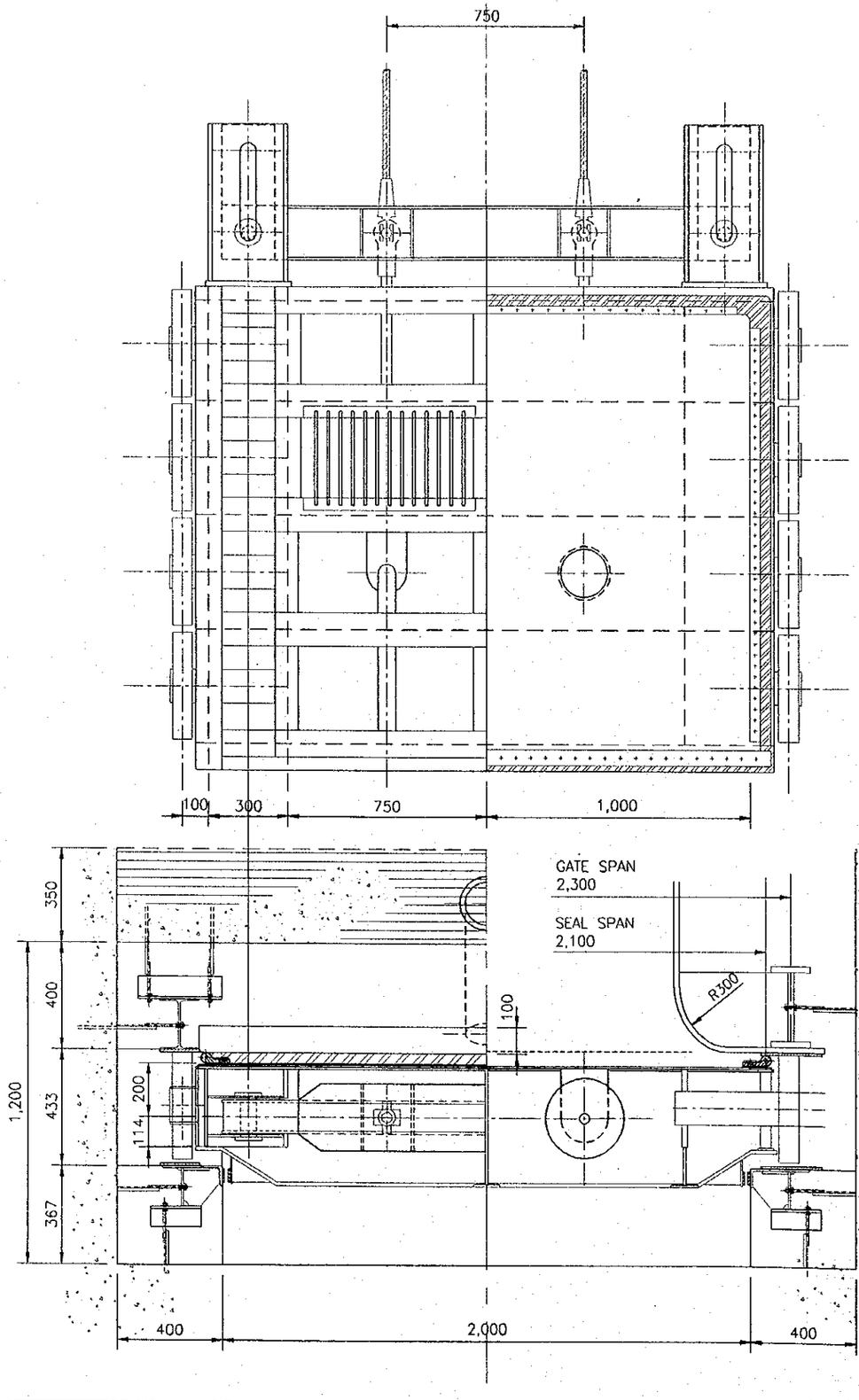
TYPICAL ARRENGEMENT OF CONSOLIDAITION GROUT

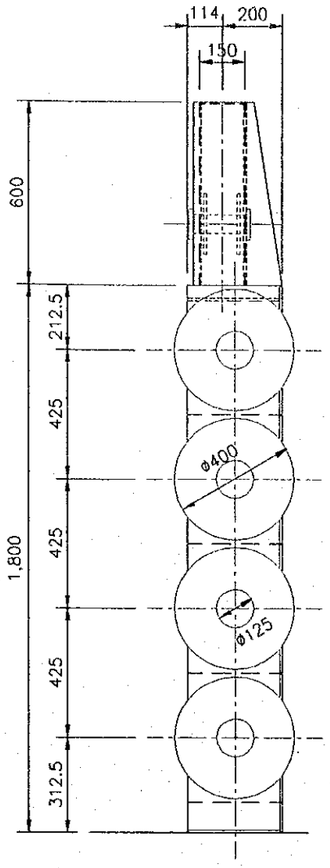
TYPICAL SECTION

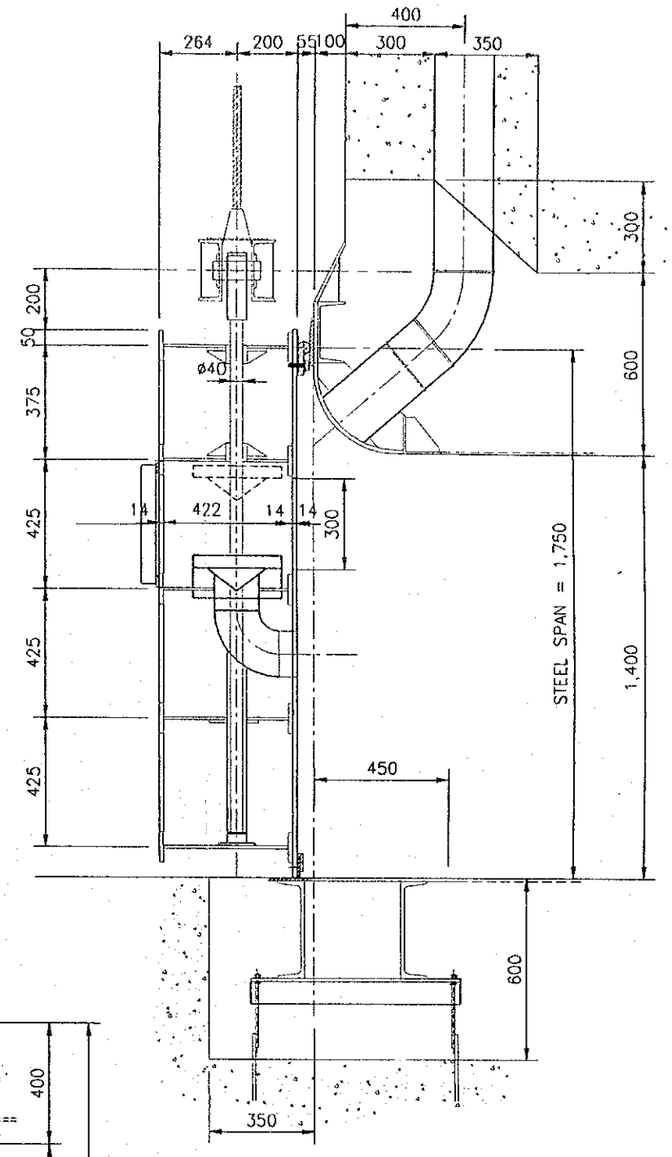
SCALE A

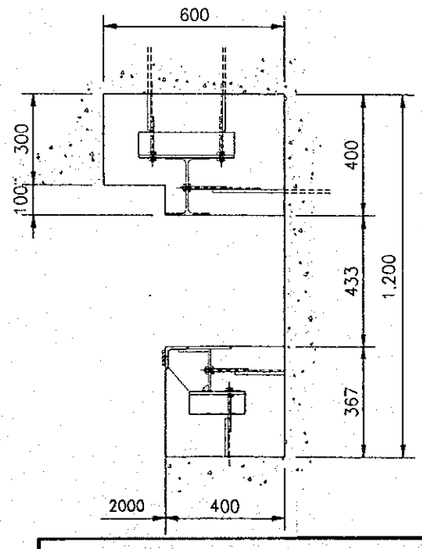
SCALE A 0 2 4 6 8 10m

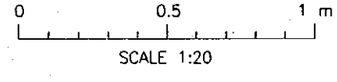
THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA	Fig. 7.6.16 LAYOUT OF PLUG WORKS FOR OUTLET TUNNEL
JAPAN INTERNATIONAL COOPERATION AGENCY	



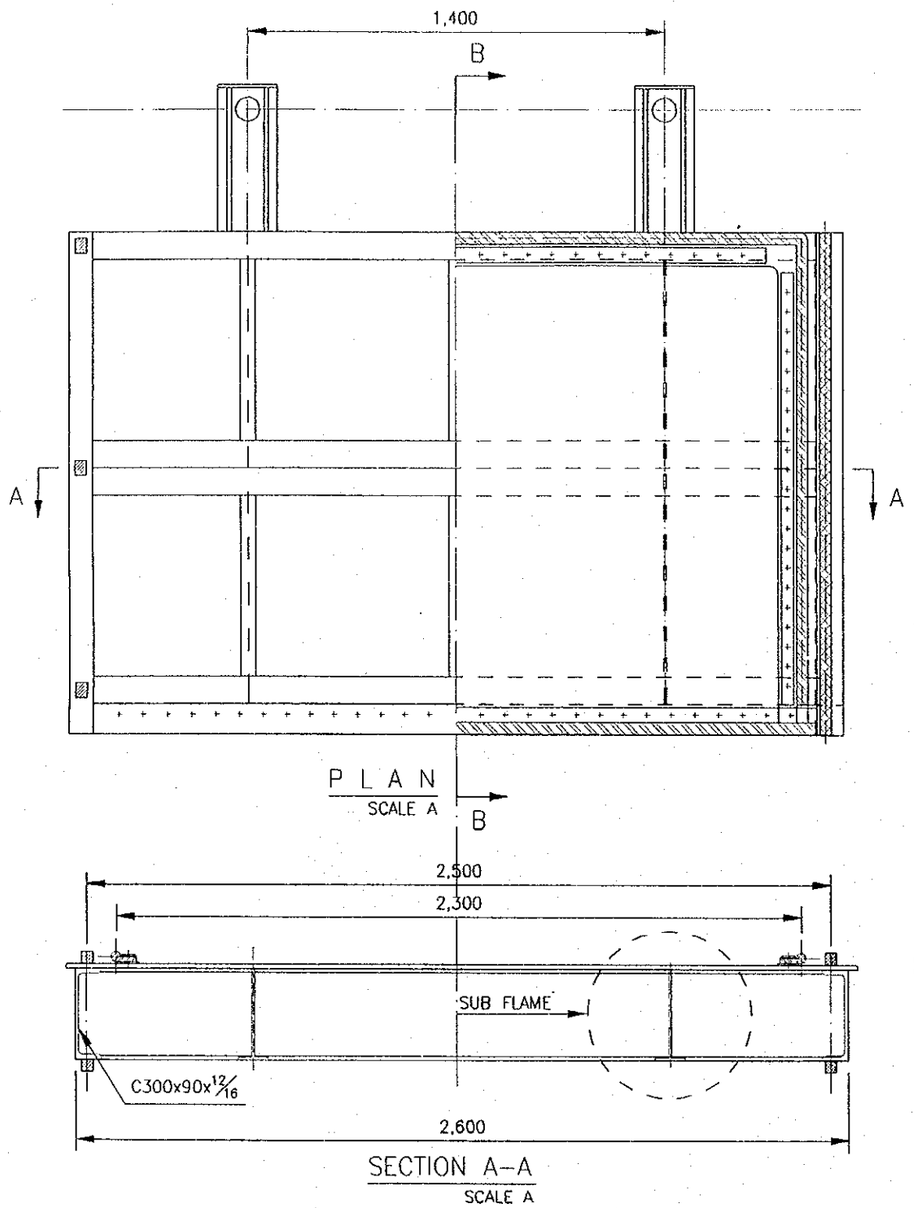






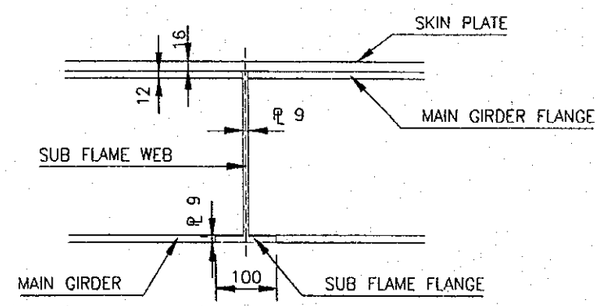


THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA	Fig. 7.6.17 LAYOUT OF BULKHEAD GATE
JAPAN INTERNATIONAL COOPERATION AGENCY	

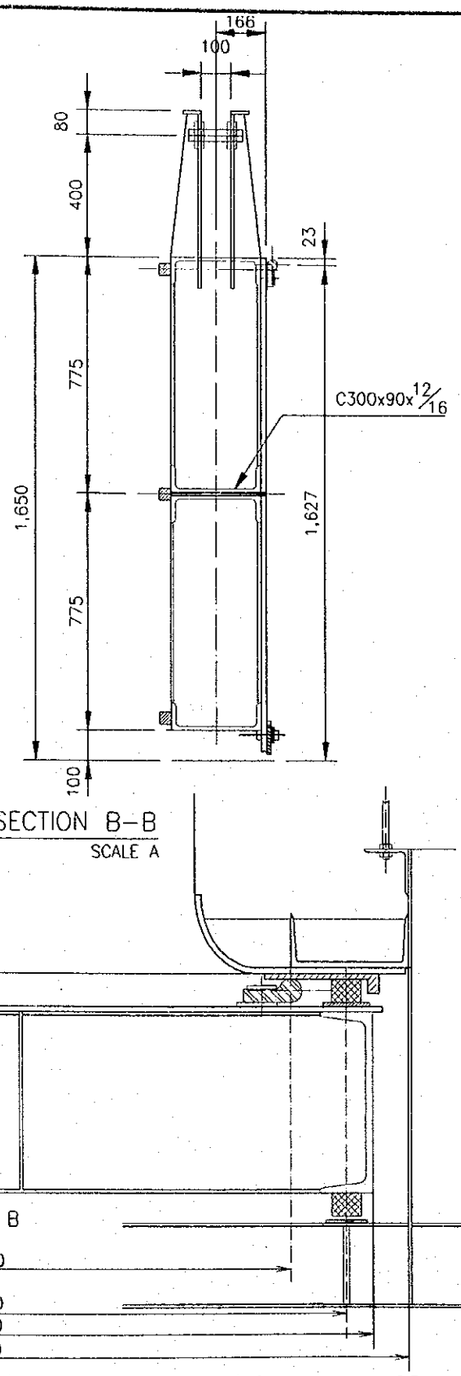


PLAN
SCALE A

SECTION A–A
SCALE A

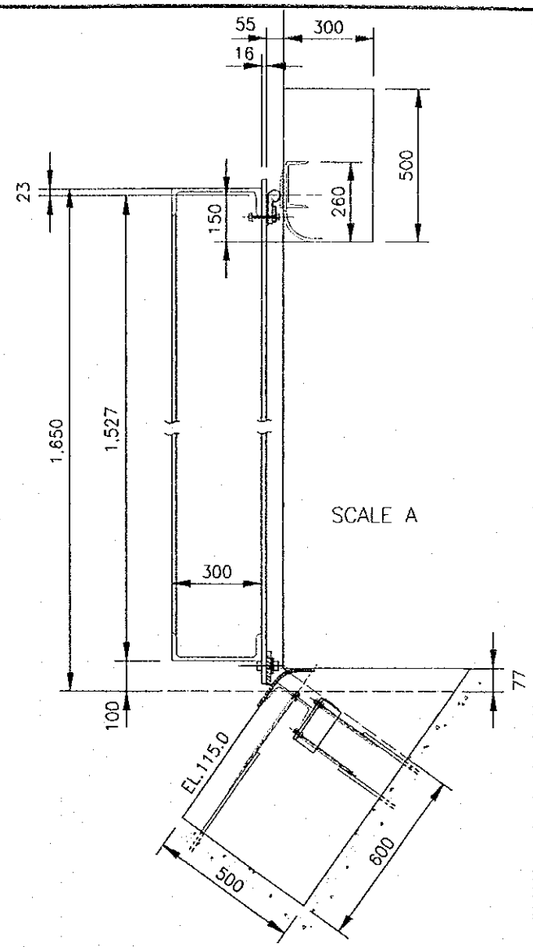


DETAIL OF SUB FLAME
SCALE B

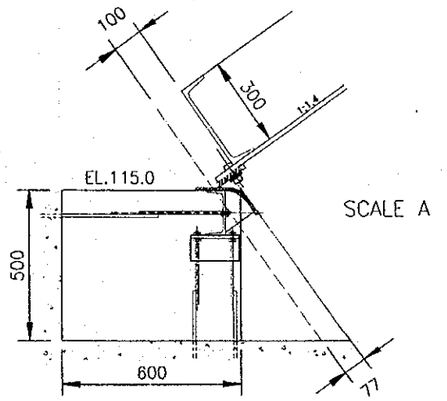


SECTION B–B
SCALE A

SCALE B



SCALE A



SCALE A

SCALE A 0 0.5 1 m
SCALE 1:20

SCALE B 0 1 2 m
SCALE 1:10

THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA	Fig. 7.6.18 LAYOUT OF EMERGENCY GATE
JAPAN INTERNATIONAL COOPERATION AGENCY	