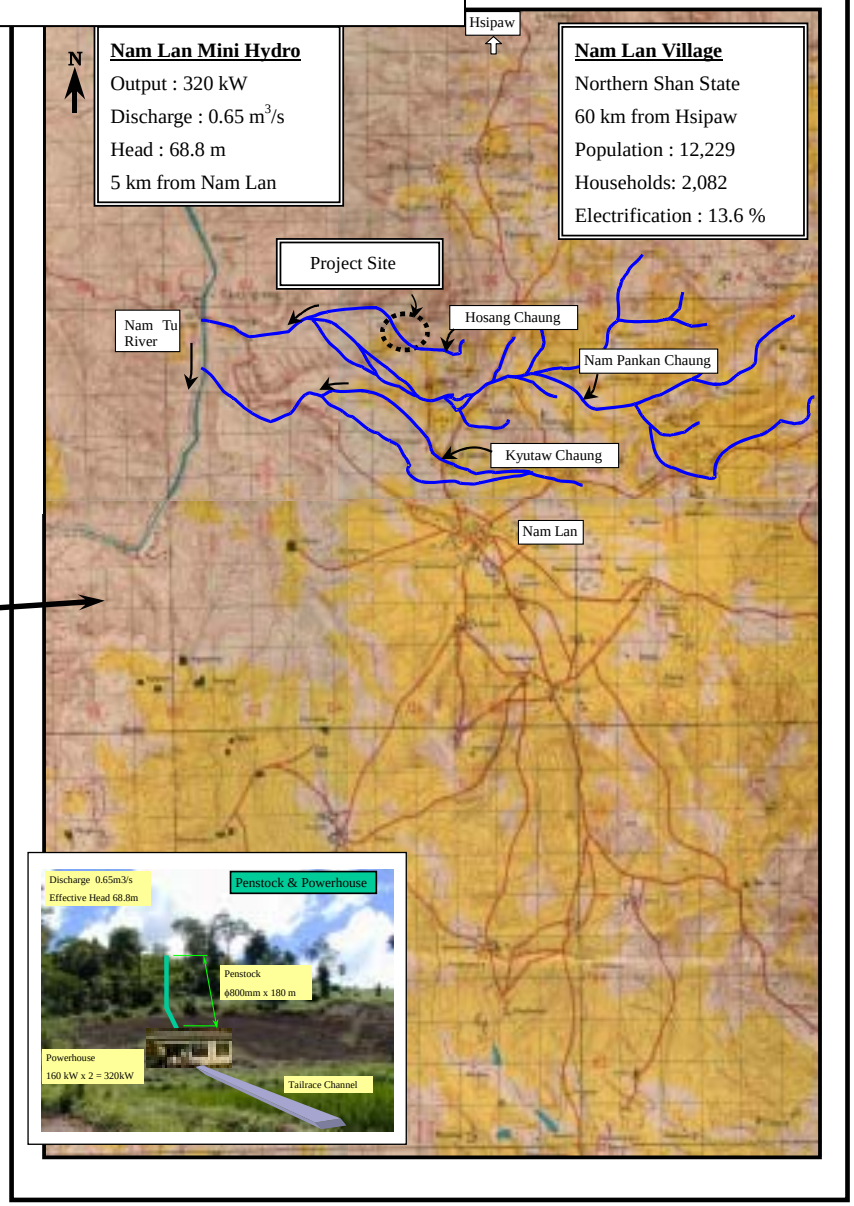
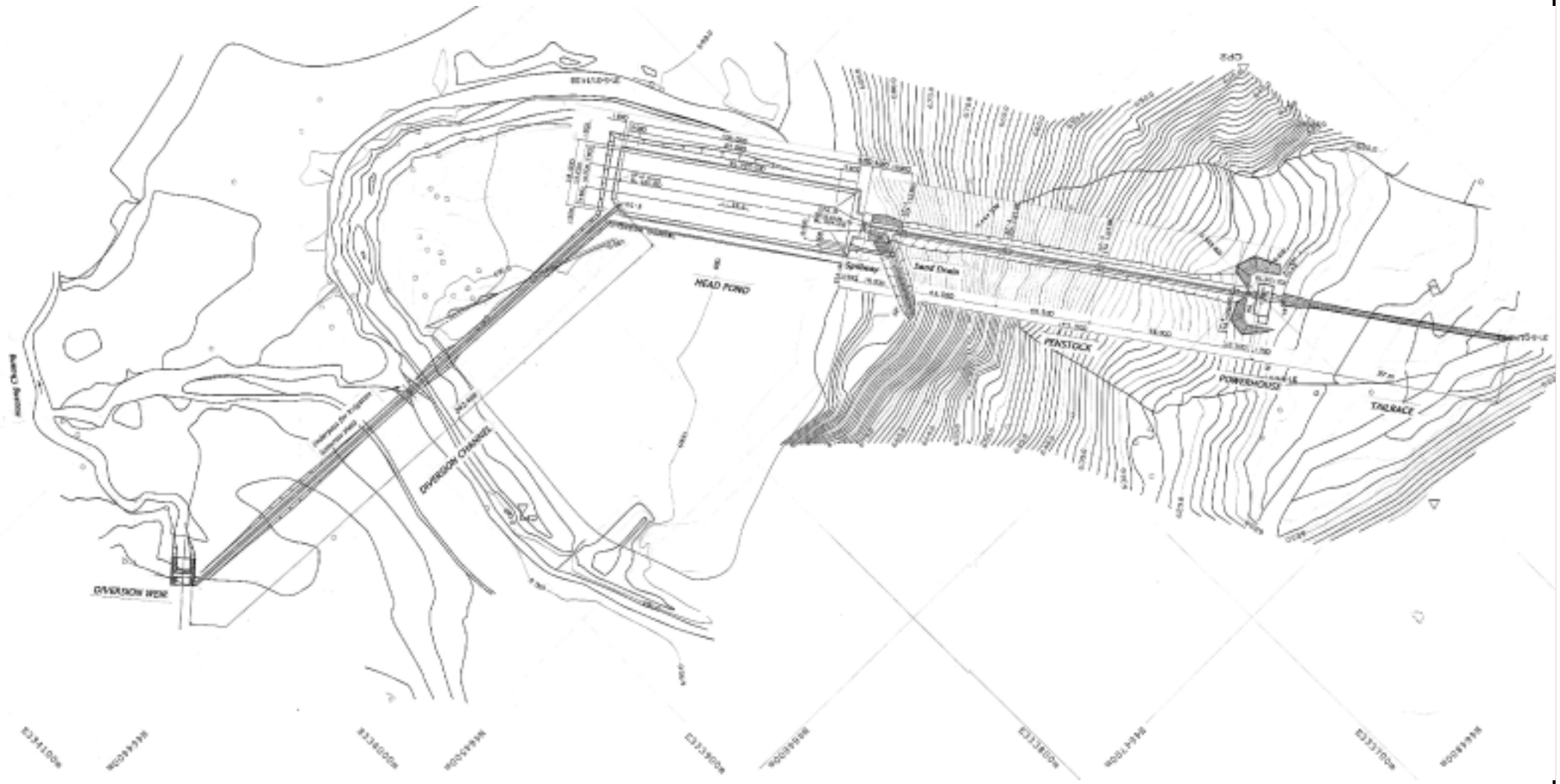
Appendix 4-1 Project Drawings (Nam Lan)



Japan International Cooperation Agency	Myanma Electric Power Enterprise	NAM LAN MINI HYDRO
The Study on the Introduction of Renewable Energies in the Rural Areas of Myanmar		LOCATION MAP
Nippon Koei Co., Ltd.		



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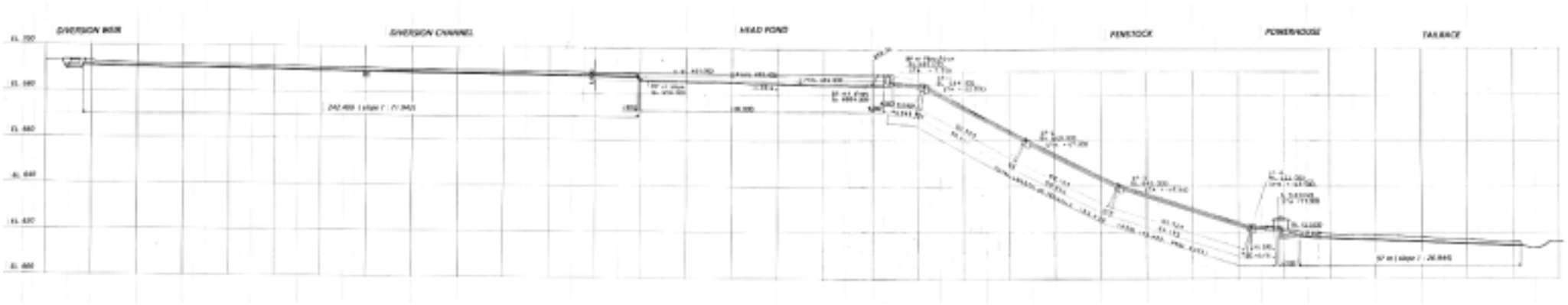
The Study on the Introduction of Renewable Energies in the Rural Areas of Myanmar		**GENERAL PLAN**
Nippon Koei Co., Ltd.		



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The Study on the Introduction of Renewable Energies in the Rural Areas of Myanmar		**GENERAL PROFILE**
Nippon Koei Co., Ltd.		

COORDINATE SYSTEM OF NAM LAN MINI HYDRO PROJECT

INTAKE

	E(m)	N(m)	Distance(m)	Notes
IW-1	334,012.0000	464,361.5000	18.062	Left abutment
IW-2	334,000.0000	464,375.0000	10.200	Right abutment
IW-3	334,006.7765	464,367.3764		Center of weir axis

DIVERSION CHANNEL

	E(m)	N(m)	Distance(m)	Notes
DC-1	334,005.8855	464,371.3890	2.000	BP of Diversion Channel
DC-2	334,004.5568	464,372.8839	240.409	1st IP of Diversion Channel
DC-3	333,764.4602	464,385.1391		EL of Diversion Channel

HEAD POND

	E(m)	N(m)	Distance(m)	Notes
STA. -100	333,756.6528	464,377.5958	100.000	Upstream edge
STA. 0	333,700.0000	464,460.0000		

SPILLWAY & SAND DRAIN

	E(m)	N(m)	Distance(m)	Notes
SP-1	333,690.4977	464,455.2875	17.964	BP. of Spillway
SP-2	333,680.3204	464,470.0906		EP. of Spillway
SD-1	333,693.2068	464,465.6446	7.500	BP. of Sand Drain
SD-2	333,688.9578	464,471.8250	8.747	IP. of Sand Drain
SD-3	333,680.2379	464,471.1374		Center of Drain Pit

PENSTOCK

	E(m)	N(m)	Distance(m)	Notes
STA. 0	333,700.0000	464,460.0000	7.500	
BP of Penstock	333,695.7510	464,466.1803	15.000	STA. + 7.5
IP-1	333,687.2531	464,478.5409	44.500	STA. + 22.5
IP-2	333,662.0425	464,515.2108	40.500	STA. + 67.0
IP-3	333,639.0981	464,548.5845	58.000	STA. + 107.5
IP-4	333,606.2394	464,596.3789	7.000	STA. + 165.5
Y-Branch	333,602.2737	464,602.1472	5.000	STA. + 172.5
PH	333,599.4411	464,606.2674		STA. + 177.5

POWERHOUSE & TAILRACE

	E(m)	N(m)	Distance(m)	Notes
PH	333,599.4411	464,606.2674	9.000	STA. + 177.5
TR-1	333,594.3423	464,613.6838	93.500	BP of Tailrace(STA.+ 186.5)
TR-2	333,541.3719	464,690.7317		STA. + 280

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Geotechnical Engineering

LOG OF TEST PIT OR AUGER HOLE

FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature: SURGE TANK SITE Project: NAMLAN HYDROPOWER PROJECT Hole No. TP-1

Area Designation: ---------- Coordinates: ---------- Ground Elevation: ---------- Depth to Ground Water Level: NIL

Method of Excavation: Manual Approx.Dimension of Hole: 4' x6' x15' Dates of Excavation: 24/25-May-01 Hole Logged By: S.Lwin

CLASSIFICATION SYMBOL (LETTER)	CLASSIFICATION SYMBOL (GRAPHIC)	DEPTH (FEET)	SIZE AND TYPE OF SAMPLE TAKEN	CLASSIFICATION AND DESCRIPTION OF MATERIAL (SEE CHART UNIFIED SOIL CLASSIFICATION-GIVE GEOLOGIC AND IN-PLACE DESCRIPTION OF FOUNDATION INVESTIGATION)	PERCENTAGE OF COBBLES AND BOULDERS**
		5 10		0-2 ft. Top soil. black silty clay with scattered shell and rocks 2-3ft Tufa mixed with soil 2.25 loose yellowish yellowish grey tufa and from 2.5 to 3ft is black soil layer. 3-5ft Tufa yellowish grey poorly consolidated tufa with some hollows from which solid tufa pieces fall out or solution holes.Easy in excavation. 5-15ft tufa yellowish brown with iron staining,medium dense, with bedding like layers dipping towards the cliff side indicating the water flow direction.	

REMARKS

NOTES: Record water test and density test data, if applicable, under remarks

*Record after water has reached its natural level, prior date of reading adjacent to graphic symbol or in remarks

**Applicable only to borrow pits and/or foundations which are potential sources of construction materials

*** (lbs of soil sampled @30

(bulk specific gravity of soil @24 (Cubic feet bulk sampled)

Record bulk specific gravity in remarks,stating how obtained (measured or estimated)

GEODYNAMICS CO.,LTD.

Geotechnical Engineering

LOG OF TEST PIT OR AUGER HOLE

FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature: POWER STATION SITE Project: NAMLAN HYDROPOWER PROJECT Hole No. TP-3

Area Designation: ---------- Coordinates: ---------- Ground Elevation: ---------- Depth to Ground Water Level: 9.3ft.

Method of Excavation: Manual Approx.Dimension of Hole: 4'x6'x12' Dates of Excavation: 23/24-May-01 Hole Logged By: S.Lwin

CLASSIFICATION SYMBOL (LETTER)	CLASSIFICATION SYMBOL (GRAPHIC)	DEPTH (FEET)	SIZE AND TYPE OF SAMPLE TAKEN	CLASSIFICATION AND DESCRIPTION OF MATERIAL (SEE CHART UNIFIED SOIL CLASSIFICATION-GIVE GEOLOGIC AND IN-PLACE DESCRIPTION OF FOUNDATION INVESTIGATION)	PERCENTAGE OF COBBLES AND BOULDERS**
		5 10 15		0-1.5ft. Top soil. Black silty clay with vegetable roots. 1.3-3.5ft Shale. Completely weathered yellowish brown with patches of purple spots, stiff.Easy in excavation. 3.5-7.0ft Boulders in weathered shale;boulders are hard sandstone. 7.0-15ft Shale.Moderately weathered purple shale, thin bedded, interbedded with thin sandy shale layers.Hard in excavation. Foundation class C_{II}, ground water at 9.30.	

REMARKS

NOTES: Record water test and density test data, if applicable, under remarks

*Record after water has reached its natural level, prior date of reading adjacent to graphic symbol or in remarks

**Applicable only to borrow pits and/or foundations which are potential sources of construction materials

*** (lbs of soil sampled @30

(bulk specific gravity of soil @24 (Cubic feet bulk sampled)

Record bulk specific gravity in remarks,stating how obtained (measured or estimated)

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LOG OF TEST PIT OR AUGER HOLE

FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature: ANCHOR BLOCK Project: NAMLAN HYDROPOWER PROJECT Hole No. TP-2

Area Designation: ---------- Coordinates: ---------- Ground Elevation: ---------- Depth to Ground Water Level: NIL

Method of Excavation: Manual Approx.Dimension of Hole: 4'X 6'X15' Dates of Excavation: 24/25-May-01 Hole Logged By: S.Lwin

CLASSIFICATION SYMBOL (LETTER)	CLASSIFICATION SYMBOL (GRAPHIC)	DEPTH (FEET)	SIZE AND TYPE OF SAMPLE TAKEN	CLASSIFICATION AND DESCRIPTION OF MATERIAL (SEE CHART UNIFIED SOIL CLASSIFICATION-GIVE GEOLOGIC AND IN-PLACE DESCRIPTION OF FOUNDATION INVESTIGATION)	PERCENTAGE OF COBBLES AND BOULDERS**
CL SHALE		5 10 15		0-1.5ft. Top soil. Black silty clay with pieces of tufa and roots 1.5-2.5ft Tufa Whitish grey loose tufa 2.5-5.5ft Clay, Yellowish brown and purplish stiff clay; developed from completely weathered shale. 5.5-7.0ft Shale, highly weathered purplish shale, thinly bedded and highly jointed,can crushed between fingers.Easy in excavation. Foundation class C_{II} 7.5-15 Shale.Highly to moderately weathered purple shale. Hard in excavation. Broken into flat pieces,closely jointed. Foundation class C_{III}.	

REMARKS shale do not break down after soaking in water. Some are sandy

NOTES: Record water test and density test data, if applicable, under remarks

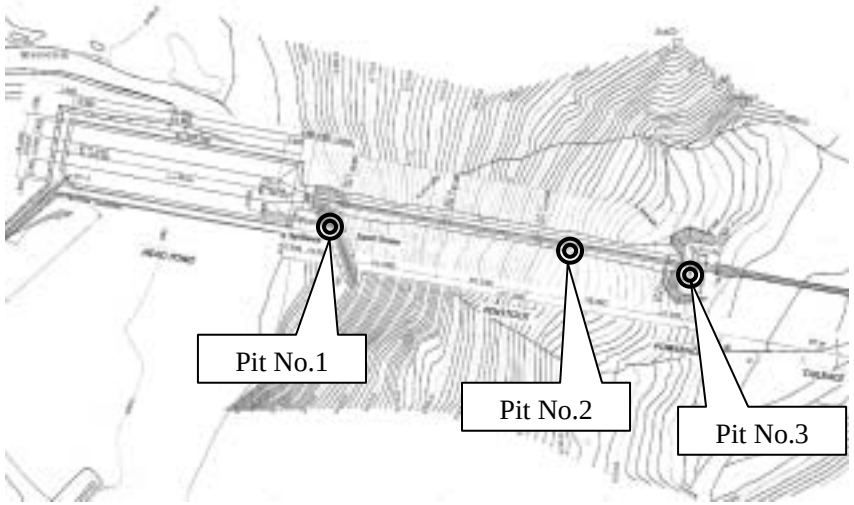
*Record after water has reached its natural level, prior date of reading adjacent to graphic symbol or in remarks

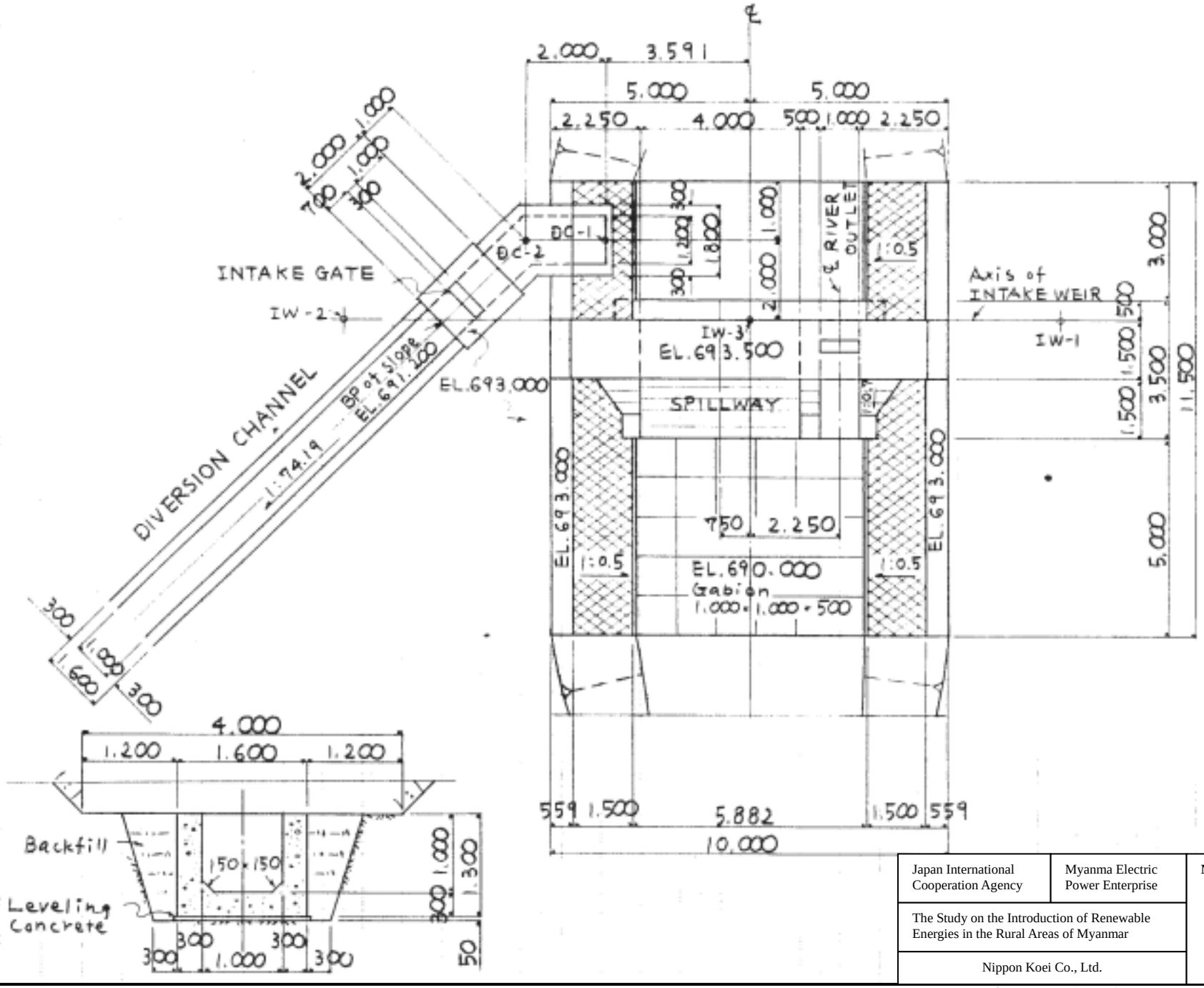
**Applicable only to borrow pits and/or foundations which are potential sources of construction materials

*** (lbs of soil sampled @30

(bulk specific gravity of soil @24 (Cubic feet bulk sampled)

Record bulk specific gravity in remarks,stating how obtained (measured or estimated)





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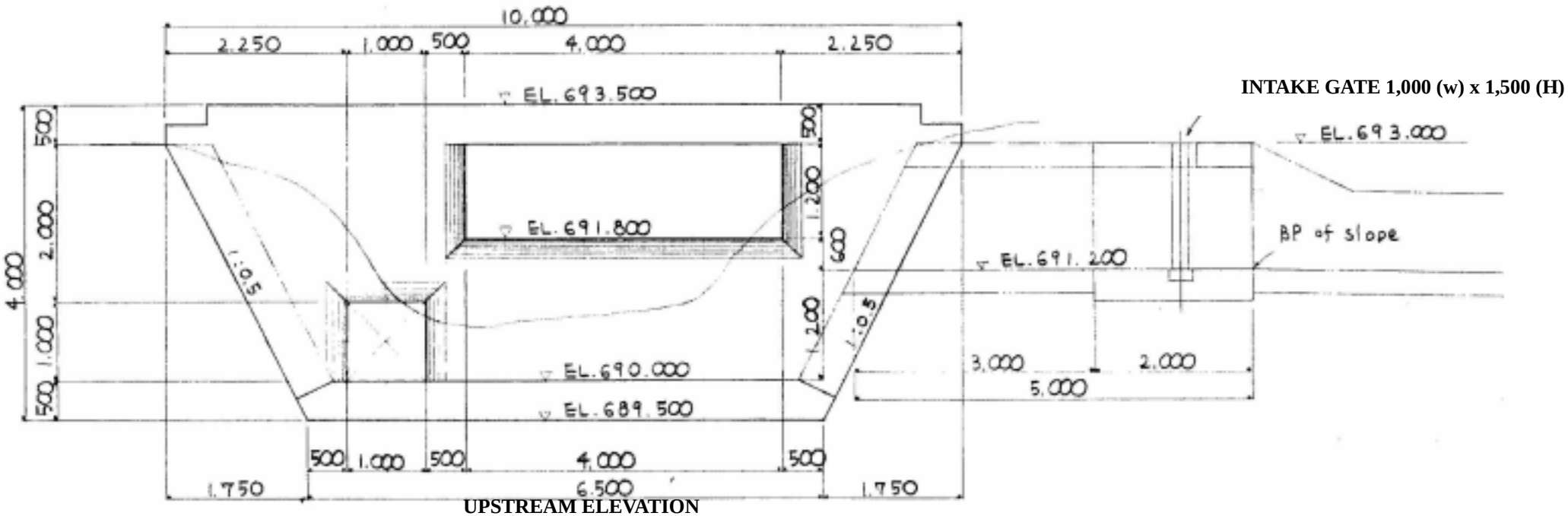
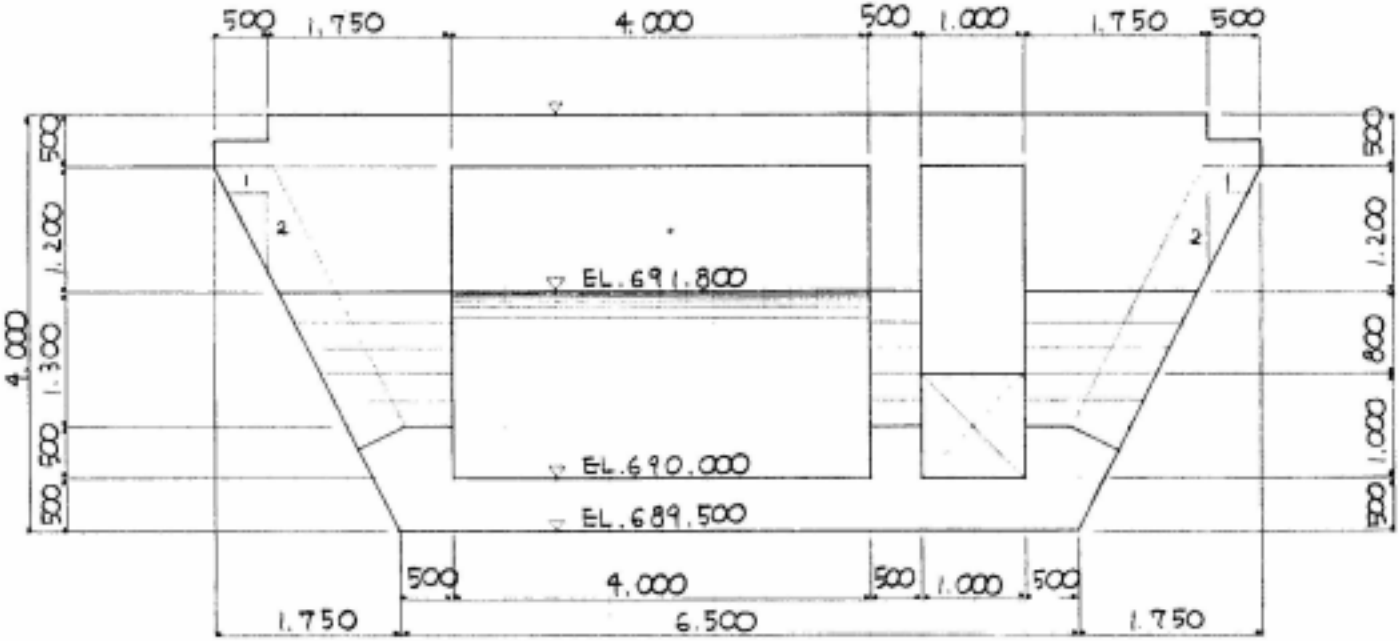
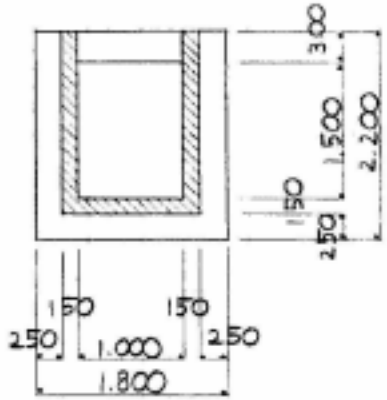
The Study on the Introduction of Renewable Energies in the Rural Areas of Myanmar		DIVERSION WEIR PLAN
Nippon Koei Co., Ltd.		



UPSTREAM ELEVATION



DOWNSTREAM ELEVATION



INTAKE GATE SLOT

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The Study on the Introduction of Renewable Energies in the Rural Areas of Myanmar		DIVERSION WEIR ELEVATIONS
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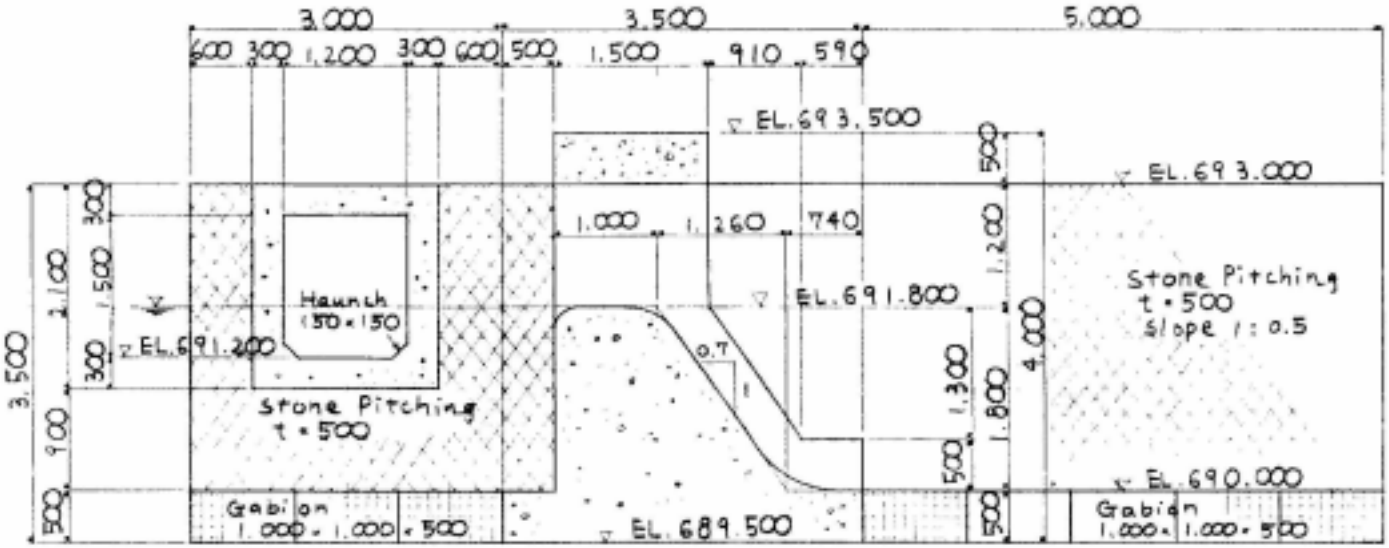
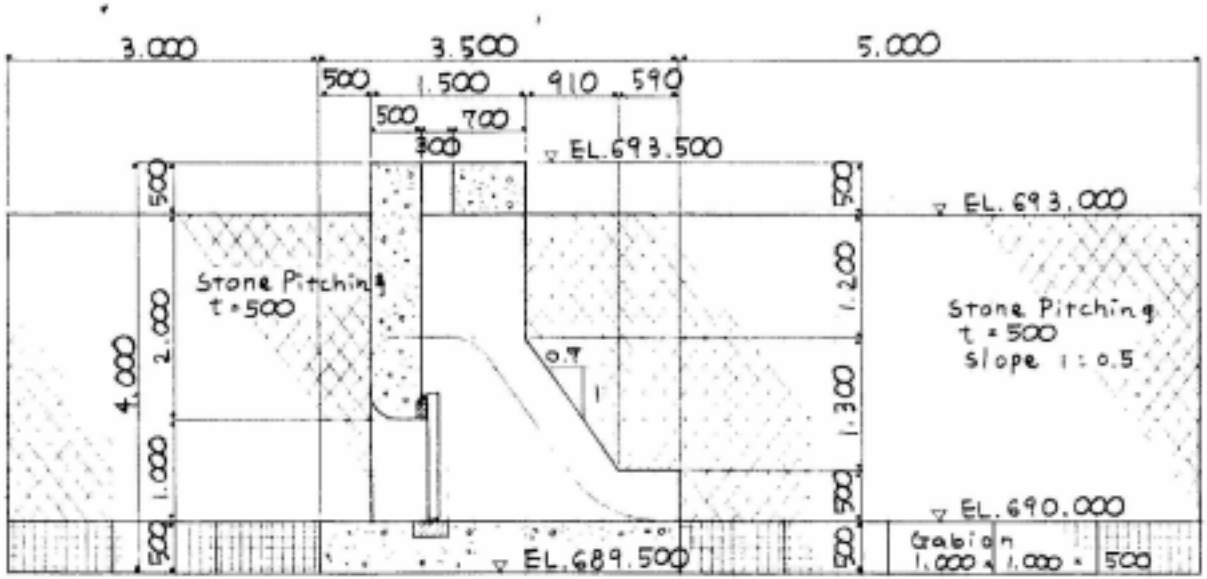


PROFILE OF WEIR



PROFILE OF RIVER OUTLET

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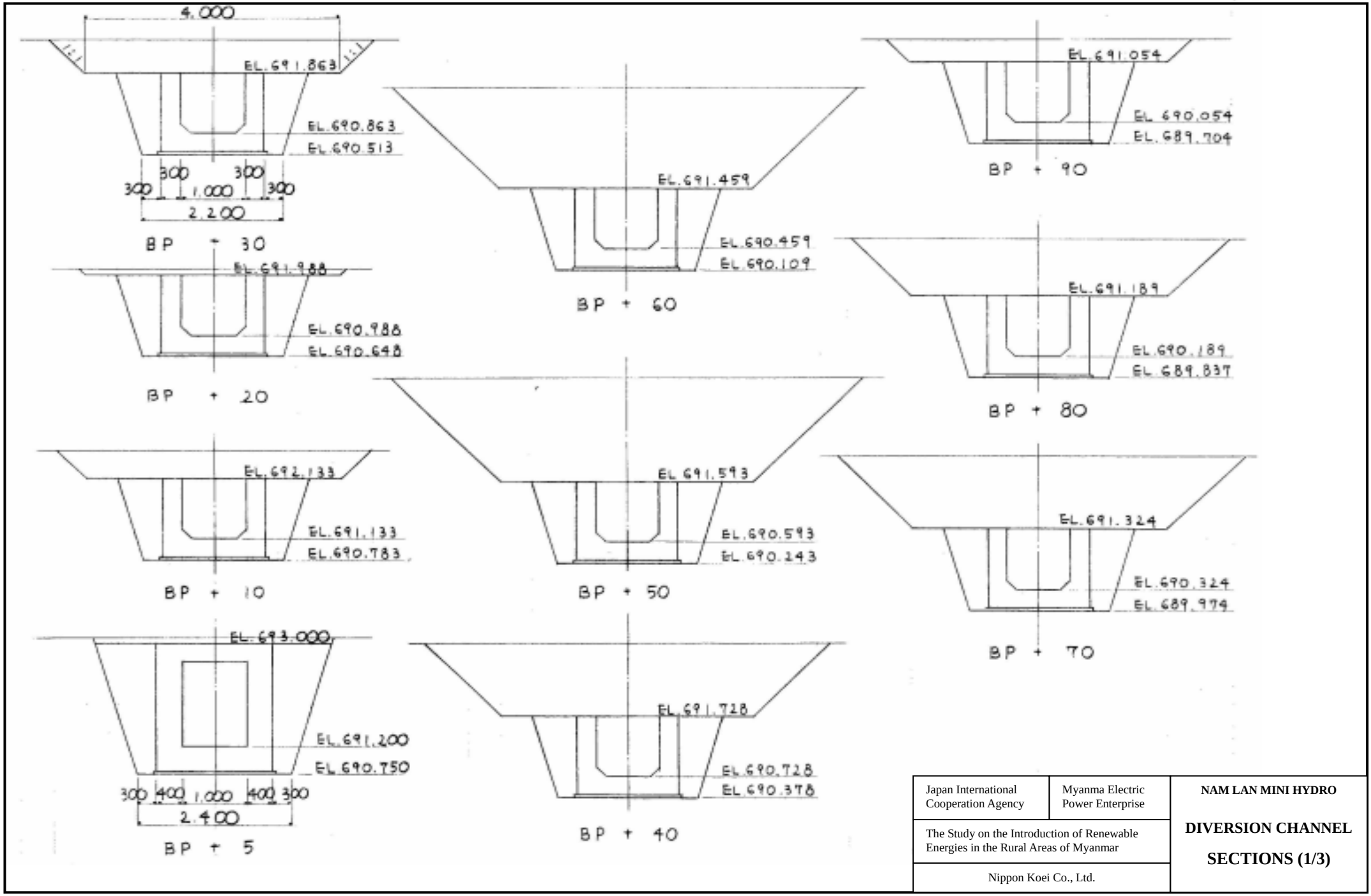

Japan International Cooperation Agency	Myanma Electric Power Enterprise	**NAM LAN MINI HYDRO**
The Study on the Introduction of Renewable Energies in the Rural Areas of Myanmar		**DIVERSION CHANNEL SECTIONS (1/3)**
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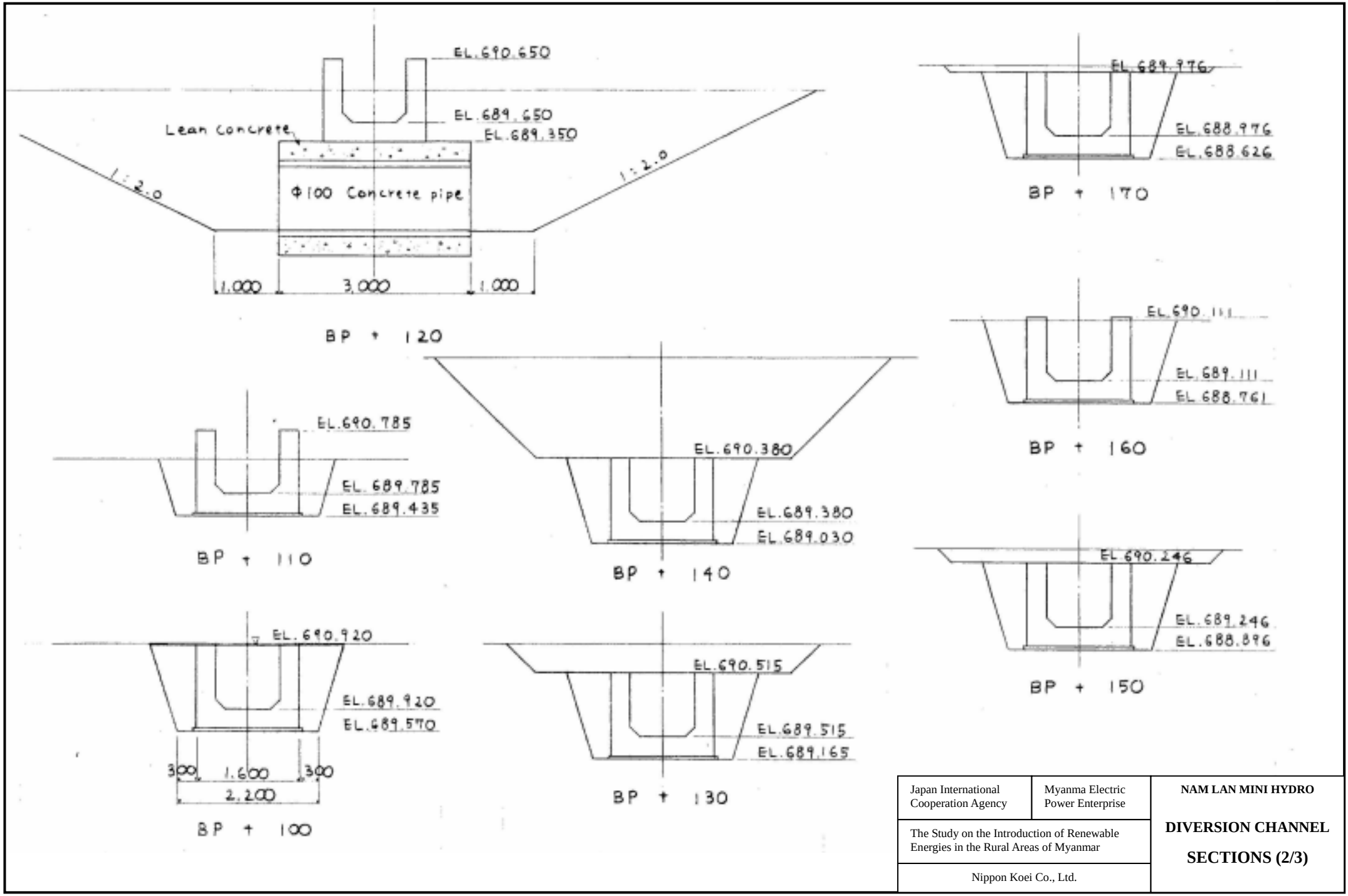
EL.690.650
EL.689.650
EL.689.350
Lean Concrete
Φ100 Concrete pipe
1:2.0
1:2.0
1,000
3,000
1,000
BP + 120
EL.689.976
EL.688.976
EL.688.626
BP + 170
EL.690.111
EL.689.111
EL.688.761
BP + 160
EL.690.785
EL.689.785
EL.689.435
BP + 110
EL.690.380
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EL.689.030
BP + 140
EL.690.246
EL.689.246
EL.688.896
BP + 150
EL.690.920
EL.689.920
EL.689.570
300
1,600
300
2,200
BP + 100
EL.690.515
EL.689.515
EL.689.165
BP + 130
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DIVERSION CHANNEL
SECTIONS (2/3)
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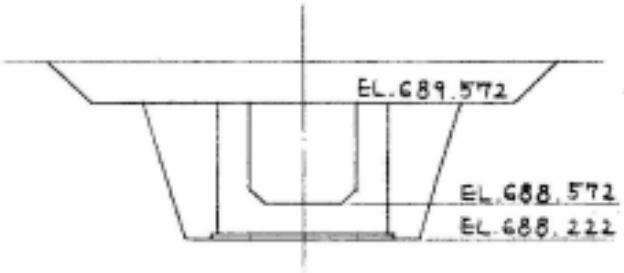
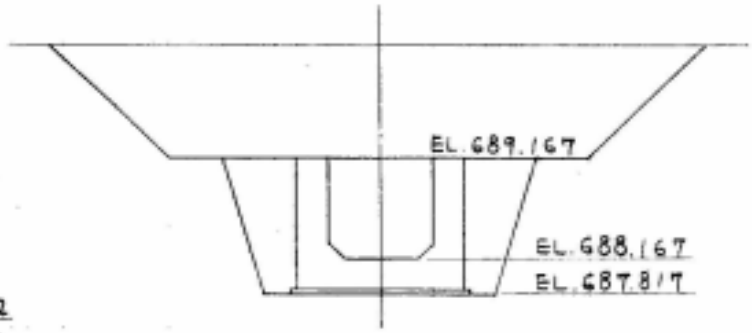
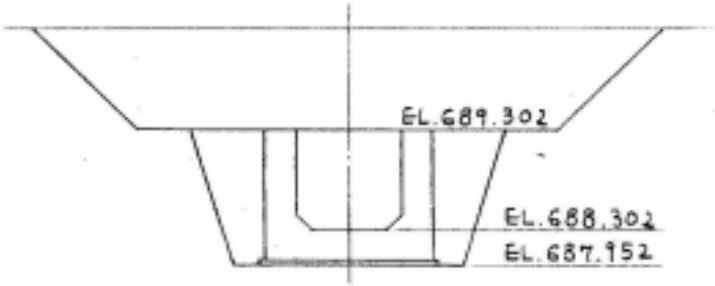


BP + 200

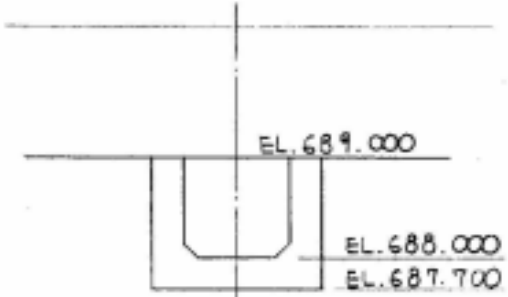


BP + 230

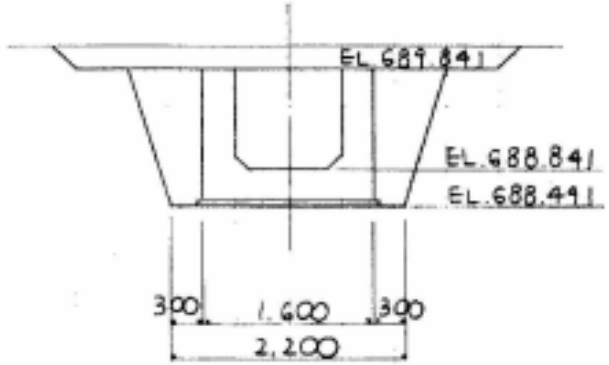
BP + 190



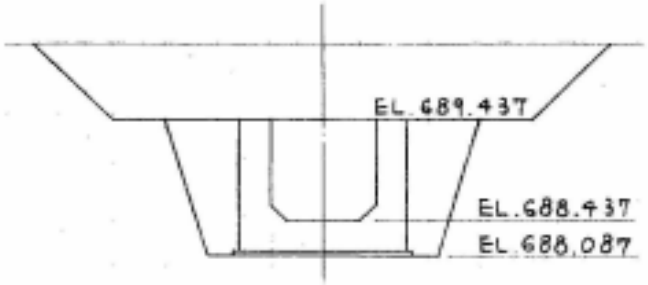
BP + 220



BP + 242.409 (EP)



BP + 180



BP + 210

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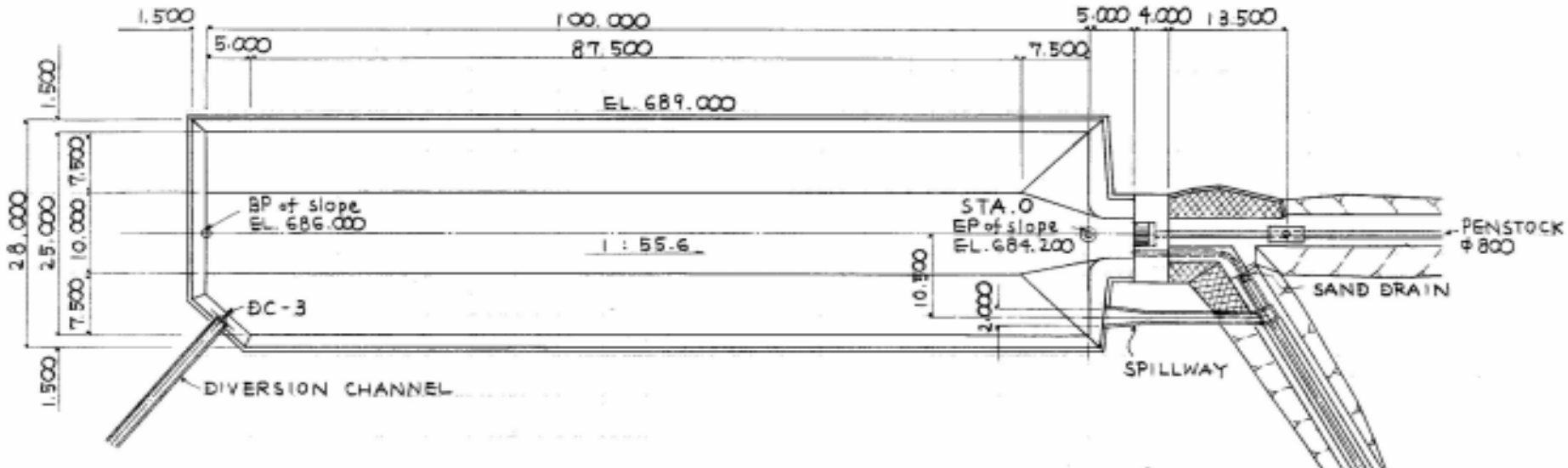
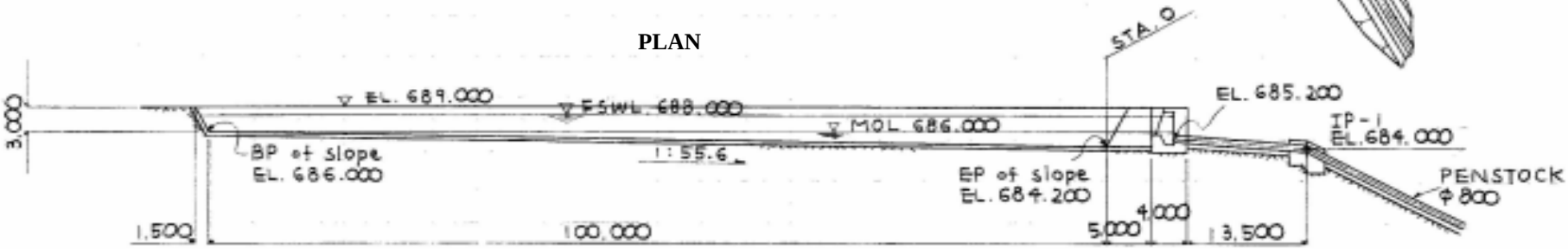
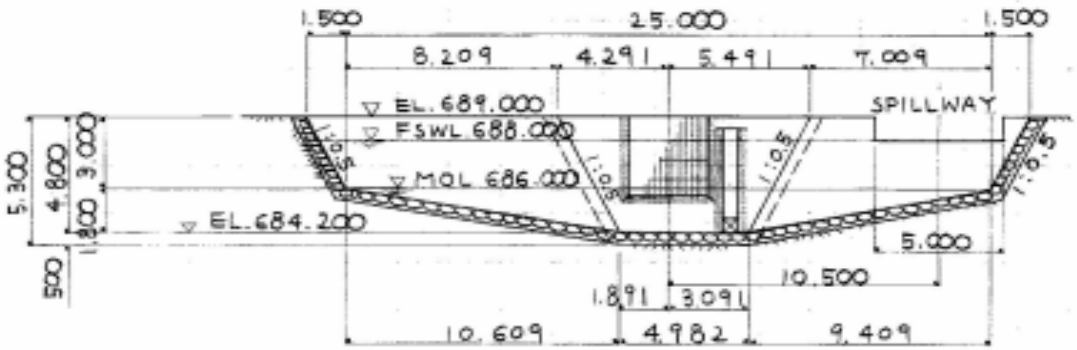


PLAN

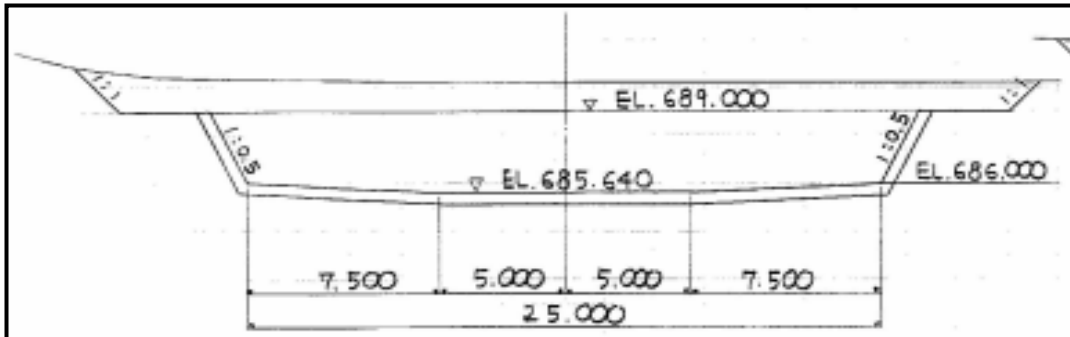




PROFILE

SECTION AT STA. 0

Japan International Cooperation Agency	Myanma Electric Power Enterprise	**NAM LAN MINI HYDRO** **HEAD POND** **PLAN, PROFILE AND SECTION**
The Study on the Introduction of Renewable Energies in the Rural Areas of Myanmar		
Nippon Koei Co., Ltd.		



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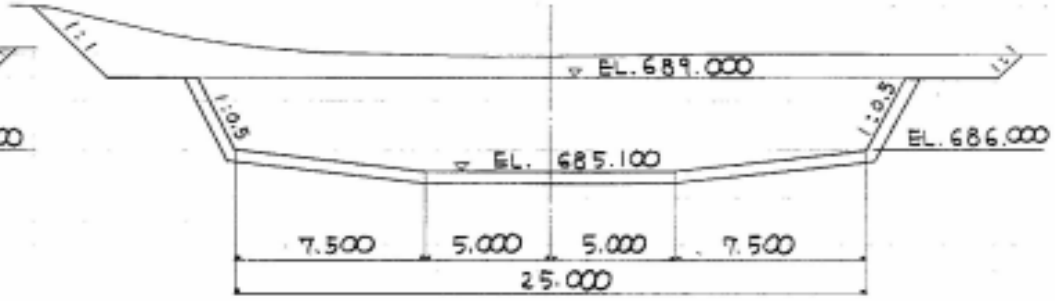

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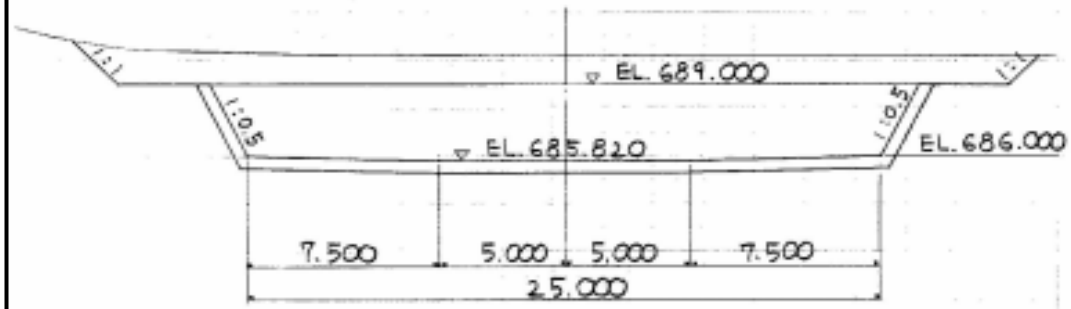

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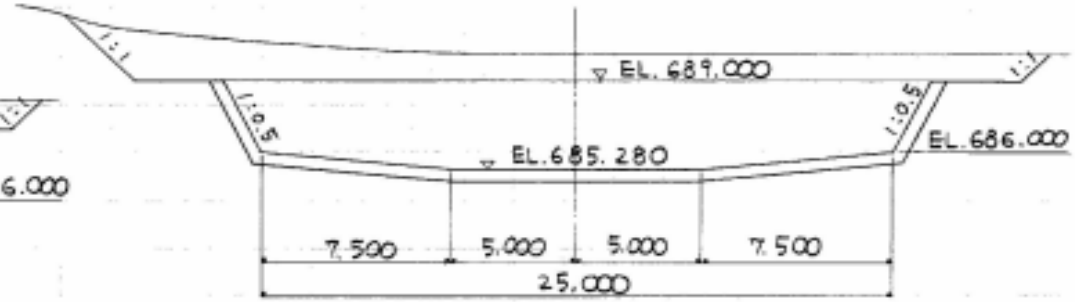

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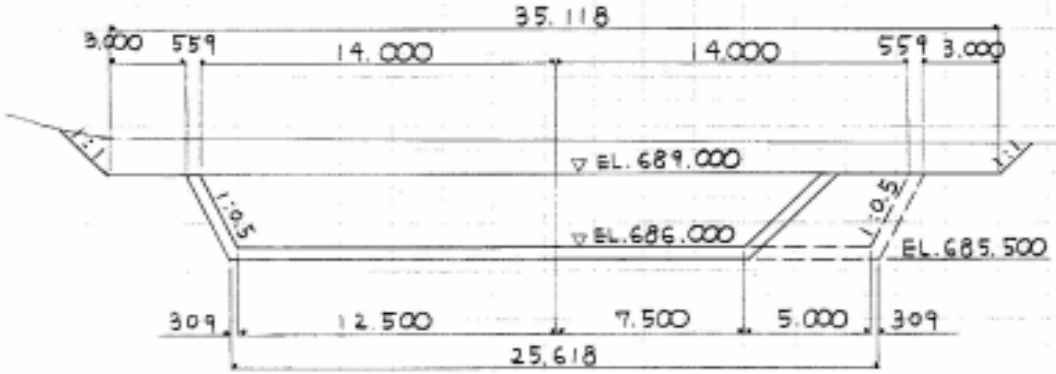

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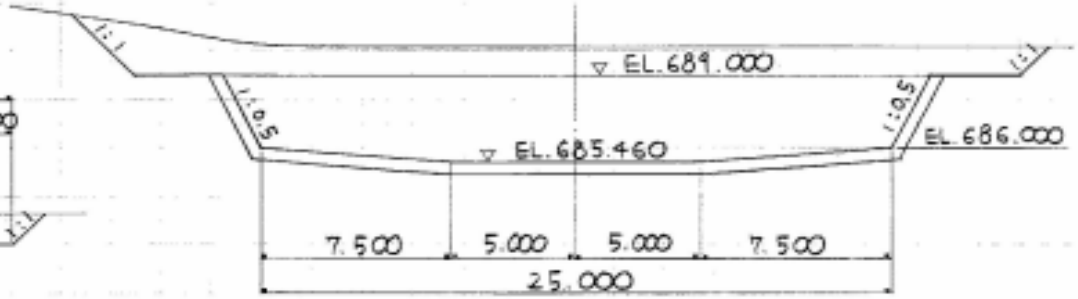

STA. - 70

Japan International Cooperation Agency	Myanma Electric Power Enterprise	**NAM LAN MINI HYDRO**
The Study on the Introduction of Renewable Energies in the Rural Areas of Myanmar		**HEAD POND SECTIONS (1/2)**
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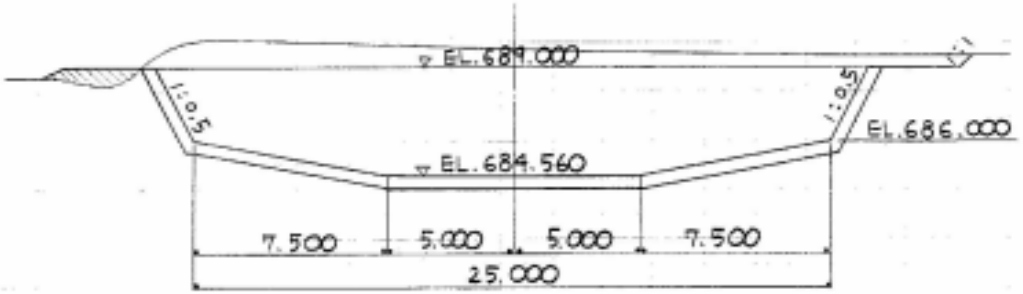

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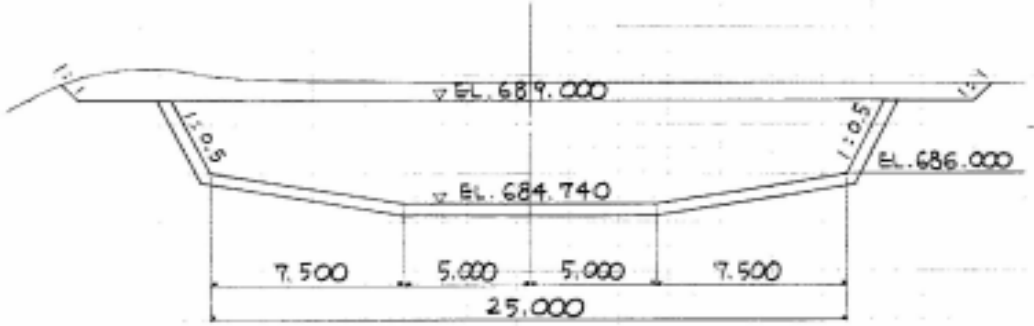

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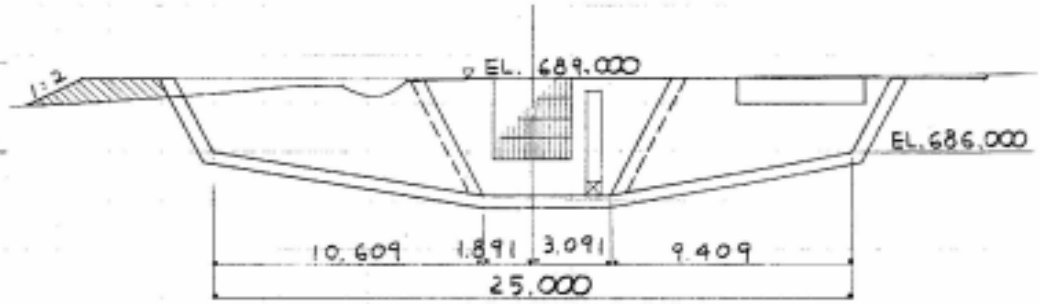

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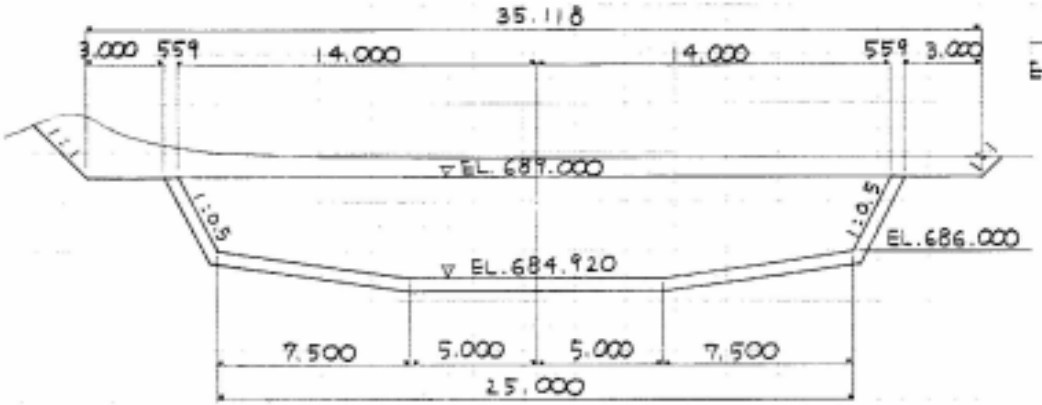

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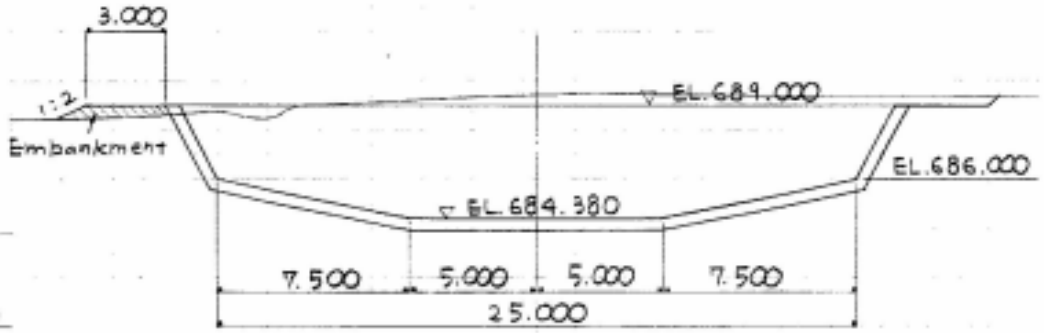
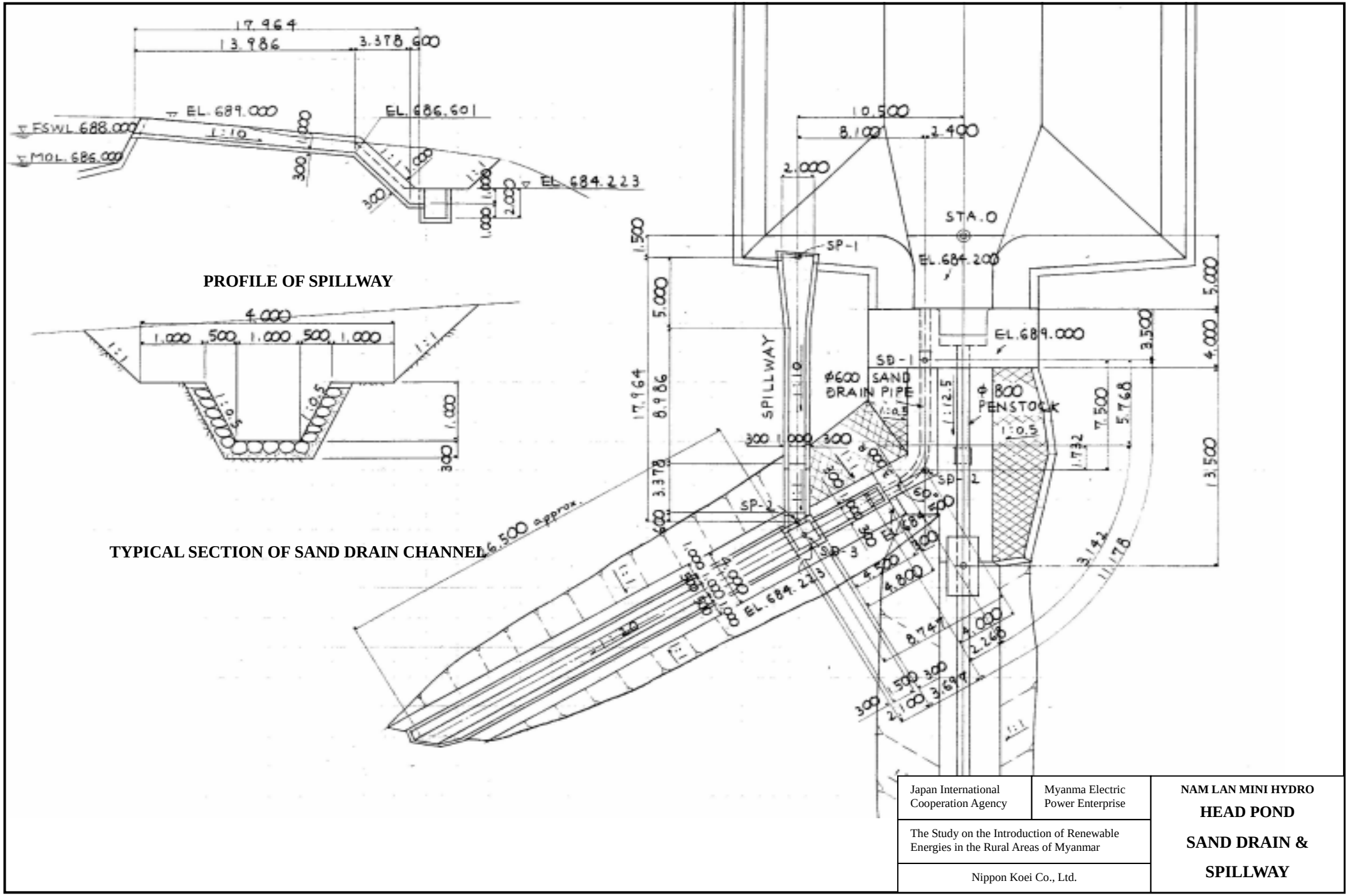
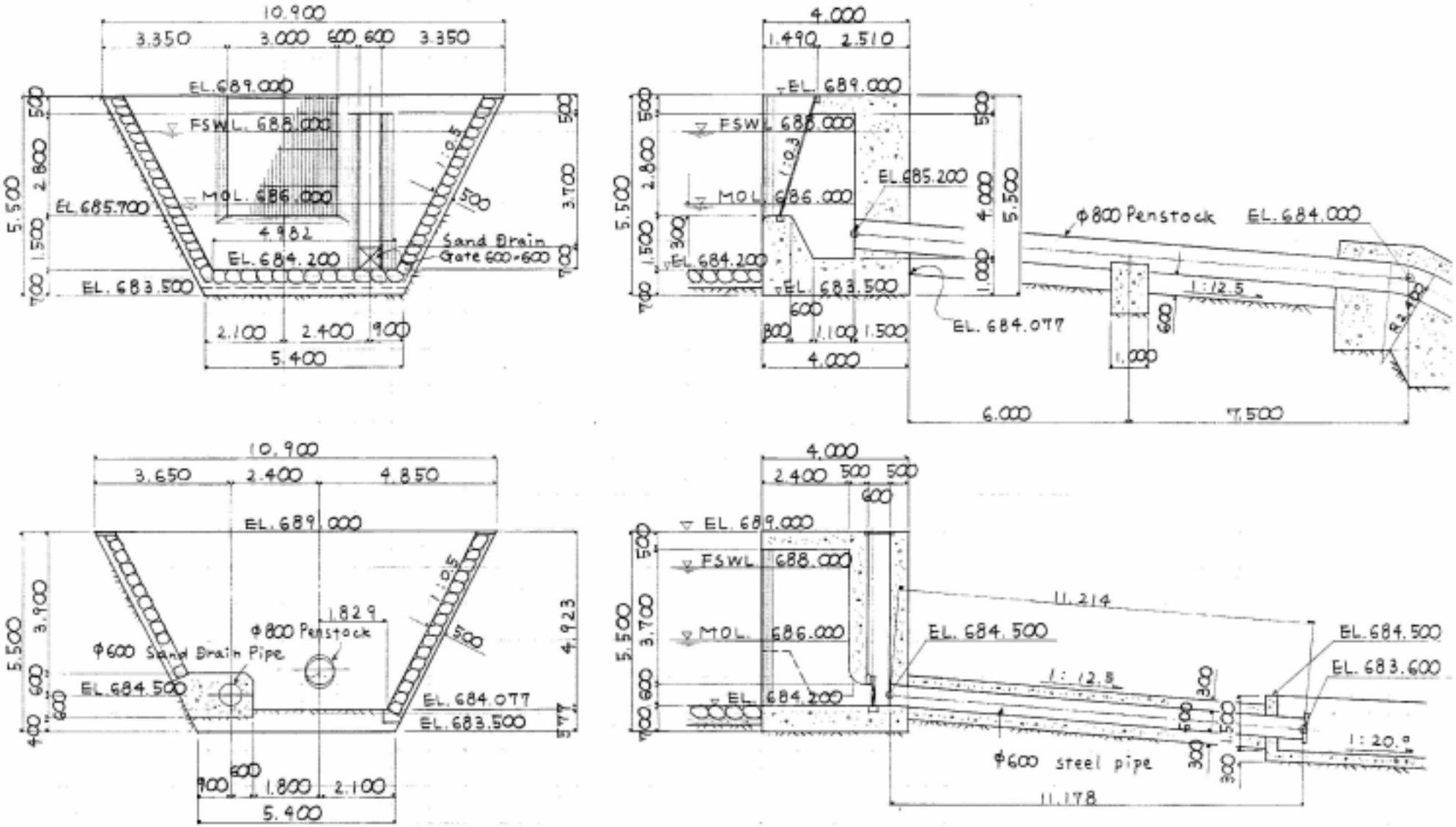


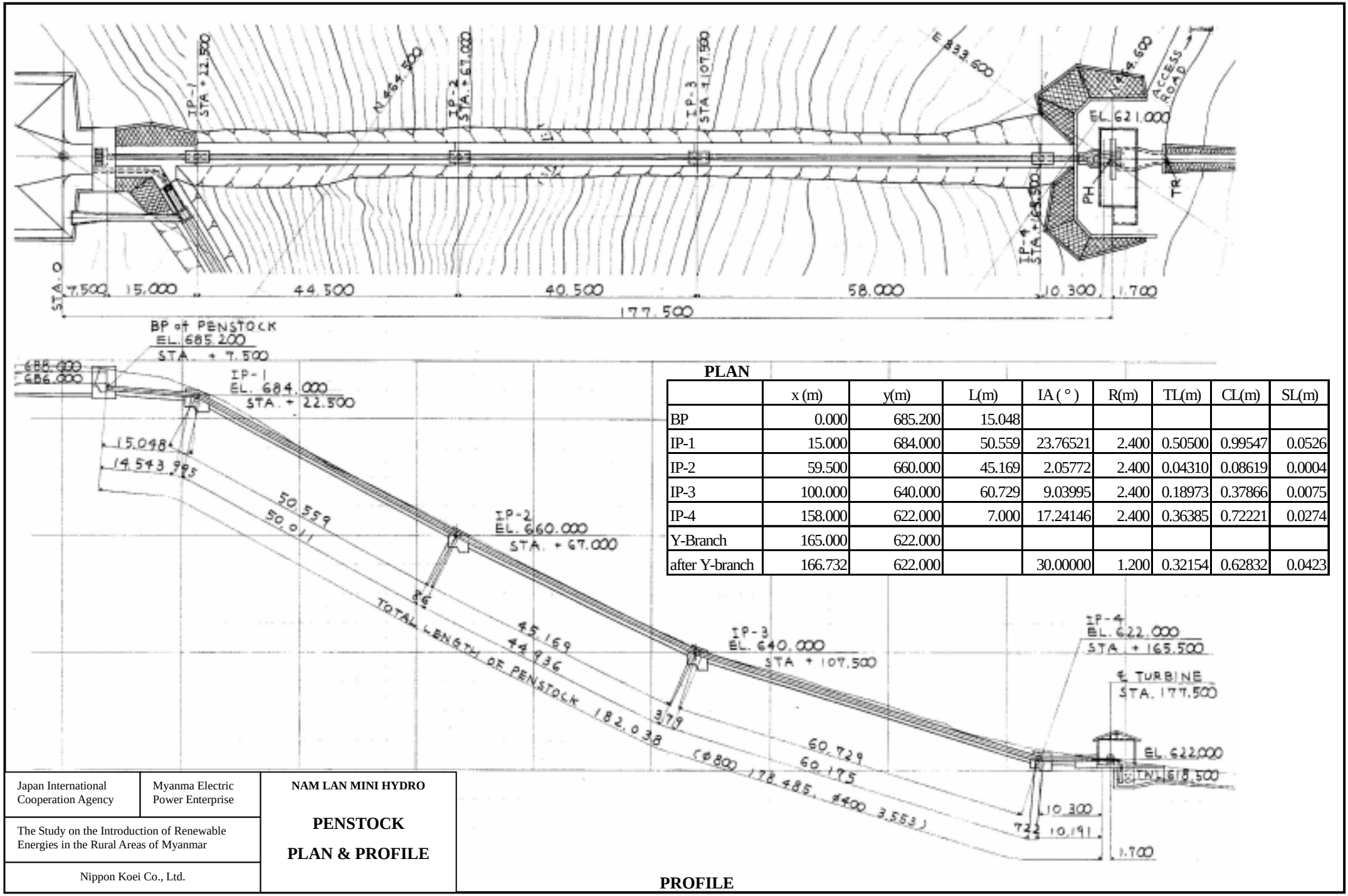
STA. -10

Japan International Cooperation Agency	Myanma Electric Power Enterprise	**NAM LAN MINI HYDRO**
The Study on the Introduction of Renewable Energies in the Rural Areas of Myanmar		**HEAD POND SECTIONS (2/2)**
Nippon Koei Co., Ltd.		


PROFILE OF SPILLWAY
TYPICAL SECTION OF SAND DRAIN CHANNEL
EL. 689.000
EL. 686.601
FSWL 688.000
MOL. 686.000
EL. 684.223
STA.O
SP-1
SP-2
SP-3
SD-1
SD-2
SPILLWAY
φ600 SAND DRAIN PIPE
φ800 PENSTOCK
EL. 684.200
EL. 689.000
6,500 approx.
Japan International Cooperation Agency
Myanma Electric Power Enterprise
The Study on the Introduction of Renewable Energies in the Rural Areas of Myanmar
Nippon Koei Co., Ltd.
NAM LAN MINI HYDRO
HEAD POND
SAND DRAIN &
SPILLWAY



Japan International Cooperation Agency	Myanma Electric Power Enterprise	NAM LAN MINI HYDRO **HEAD POND** **INLET DETAILS**
The Study on the Introduction of Renewable Energies in the Rural Areas of Myanmar		
Nippon Koei Co., Ltd.		



PLAN

	x (m)	y(m)	L(m)	IA (°)	R(m)	TL(m)	CL(m)	SL(m)
BP	0.000	685.200	15.048					
IP-1	15.000	684.000	50.559	23.76521	2.400	0.50500	0.99547	0.0526
IP-2	59.500	660.000	45.169	2.05772	2.400	0.04310	0.08619	0.0004
IP-3	100.000	640.000	60.729	9.03995	2.400	0.18973	0.37866	0.0075
IP-4	158.000	622.000	7.000	17.24146	2.400	0.36385	0.72221	0.0274
Y-Branch	165.000	622.000						
after Y-branch	166.732	622.000		30.00000	1.200	0.32154	0.62832	0.0423

PROFILE

Japan International Cooperation Agency	Myanma Electric Power Enterprise	**NAM LAN MINI HYDRO**
The Study on the Introduction of Renewable Energies in the Rural Areas of Myanmar		**PENSTOCK PLAN & PROFILE**
Nippon Koei Co., Ltd.		