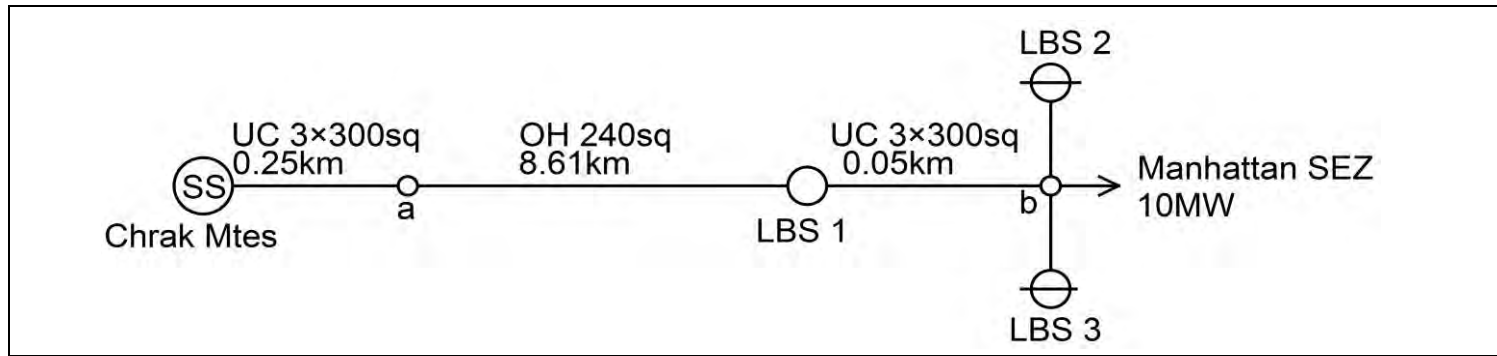


# **APPENDIX 8**

## **VOLTAGE DROP STUDY DETAILS OF EACH DISTRIBUTION LINE**

### Voltage drop calculation of B1



Sending voltage(V)	22,000
--------------------	--------

Load (kW)	10,000
Sending current(A)	262.4

Voltage drop (V)	-912
Voltage drop rate	-4.1%

	Chrak Mtes SS~a	a~LBS 1	LBS 1~b Manhattan SEZ	4th section	5th section	6th section	7th section	8th section	9th section	10th section
Transmission method	Three-phase	Three-phase	Three-phase							
Line type	4 PC-3x300sq	2 AAC-1x240sq	4 PC-3x300sq							
Distance (km)	0.25	8.61	0.05							
Load spread (Refer to load characteristic table)	1	1	1							
Section power factor cosθ	0.95	0.95	0.95							
Section load (kW)			10,000							
Section voltage drop (V)	17.7	891.1	3.5							
Section end voltage (V)	21,982	21,091	21,088							

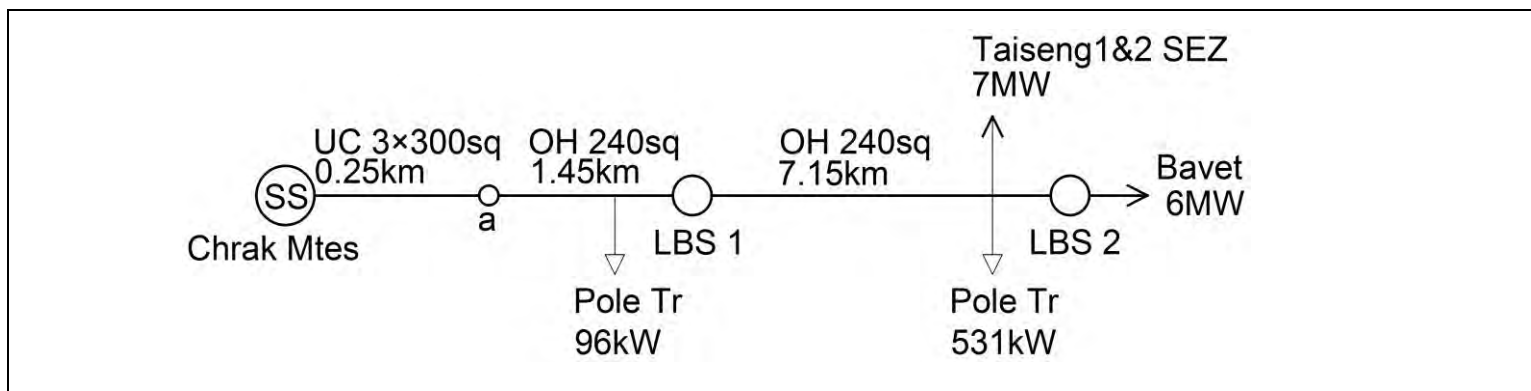
Impedance (Ω / km)

	R	X
1 AAC-1x150sq	0.2060	0.2507
2 AAC-1x240sq	0.1620	0.2364
3 PC-3x240sq	0.1620	0.1100
4 PC-3x300sq	0.1290	0.1070

Load characteristic table

Load characteristic number	F	Load spread	Load state
1	1	↓	End centralized load
2	0.5	↕	Equality spread load(+End centralized load)
3	0.667	↕	End maximum spread load(+End centralized load)
4	0.5	↕	Center maximum spread load(+End centralized load)
5	0.333	↕	Sending end maximum spread load(+End centralized load)

### Voltage drop calculation of B2



Sending voltage(V)	22,000
--------------------	--------

Load (kW)	13,627
Sending current(A)	357.6

Voltage drop (V)	-866
Voltage drop rate	-3.9%

	Chrak Mtes SS~a	a~LBS1	LBS1~ LBS2	4th section	5th section	6th section	7th section	8th section	9th section	10th section
Transmission method	Three-phase	Three-phase	Three-phase							
Line type	4 PC-3x300sq	2 AAC-1x240sq	2 AAC-1x240sq							
Distance (km)	0.25	1.45	7.15							
Load spread (Refer to load characteristic table)	1	2	3							
Section power factor cosθ	0.9	0.9	0.9							
Section load (kW)		96	13,531							
Section voltage drop (V)	25.2	111.7	729.5							
Section end voltage (V)	21,975	21,863	21,134							

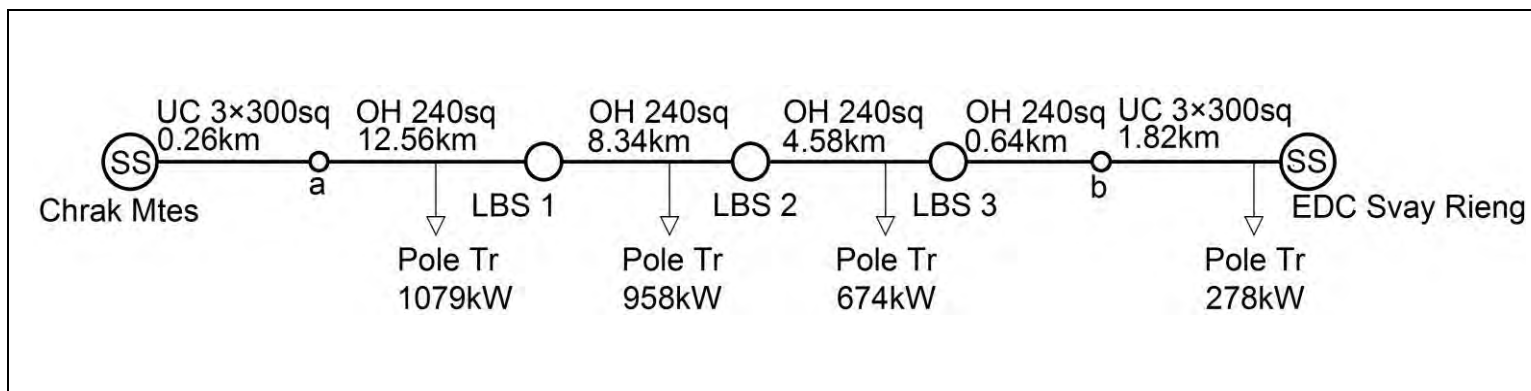
Impedance (Ω / km)

	R	X
1 AAC-1x150sq	0.2060	0.2507
2 AAC-1x240sq	0.1620	0.2364
3 PC-3x240sq	0.1620	0.1100
4 PC-3x300sq	0.1290	0.1070

Load characteristic table

Load characteristic number	F	Load spread	Load state
1	1	↓	End centralized load
2	0.5	┌─┴─┐	Equality spread load(+End centralized load)
3	0.667	┌─┬─┐	End maximum spread load(+End centralized load)
4	0.5	┌─┴─┐	Center maximum spread load(+End centralized load)
5	0.333	┌─┬─┐	Sending end maximum spread load(+End centralized load)

### Voltage drop calculation of B3



Sending voltage(V)	22,000
--------------------	--------

Load (kW)	2,989
Sending current(A)	78.4

Voltage drop (V)	-307
Voltage drop rate	-1.4%

	Chrak Mtes SS~a	a~LBS1	LBS1~ LBS2	LBS2~ LBS3	LBS3~b	b~EDC Svay Rieng	7th section	8th section	9th section	10th section
Transmission method	Three-phase	Three-phase	Three-phase	Three-phase	Three-phase	Three-phase				
Line type	4 PC-3x300sq	2 AAC-1x240sq	2 AAC-1x240sq	2 AAC-1x240sq	2 AAC-1x240sq	4 PC-3x300sq				
Distance (km)	0.26	12.56	8.34	4.58	0.64	1.82				
Load spread (Refer to load characteristic table)	1	2	2	2	2	2				
Section power factor cosθ	0.95	0.95	0.95	0.95	1	1				
Section load (kW)		1,079	958	674		278				
Section voltage drop (V)	5.5	194.3	82.4	22.6	0.7	1.5				
Section end voltage (V)	21,994	21,800	21,718	21,695	21,695	21,693				

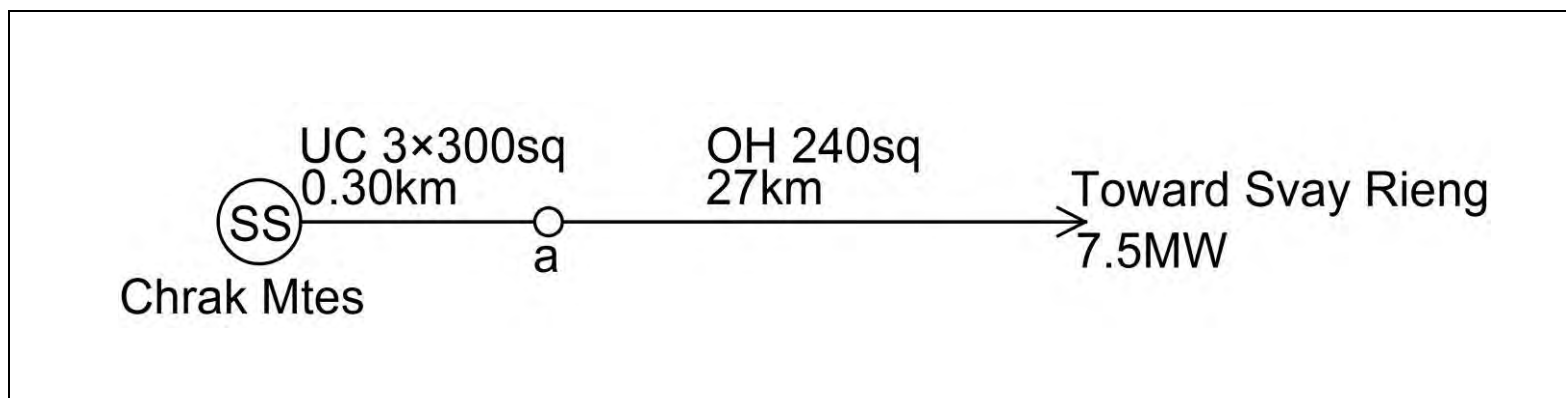
Impedance (Ω / km)

	R	X
1 AAC-1x150sq	0.2060	0.2507
2 AAC-1x240sq	0.1620	0.2364
3 PC-3x240sq	0.1620	0.1100
4 PC-3x300sq	0.1290	0.1070

Load characteristic table

Load characteristic number	F	Load spread	Load state
1	1	↓	End centralized load
2	0.5	┌─┴─┐	Equality spread load(+End centralized load)
3	0.667	┌─┬─┐	End maximum spread load(+End centralized load)
4	0.5	┌─┴─┐	Center maximum spread load(+End centralized load)
5	0.333	┌─┬─┐	Sending end maximum spread load(+End centralized load)

### Voltage drop calculation of B4



Sending voltage(V)	22,000
--------------------	--------

Load (kW)	7,500
Sending current(A)	196.8

Voltage drop (V)	-1,550
Voltage drop rate	-7.0%

	1st section	2nd section	3rd section	4th section	5th section	6th section	7th section	8th section	9th section	10th section
Transmission method	Three-phase	Three-phase								
Line type	4 PC-3x300sq	5 AAC-1x185sq								
Distance (km)	0.3	27.0								
Load spread (Refer to load characteristic table)	1	3								
Section power factor cosθ	0.95	0.95								
Section load (kW)		7,500								
Section voltage drop (V)	16.0	1,534.1								
Section end voltage (V)	21,984	20,450								

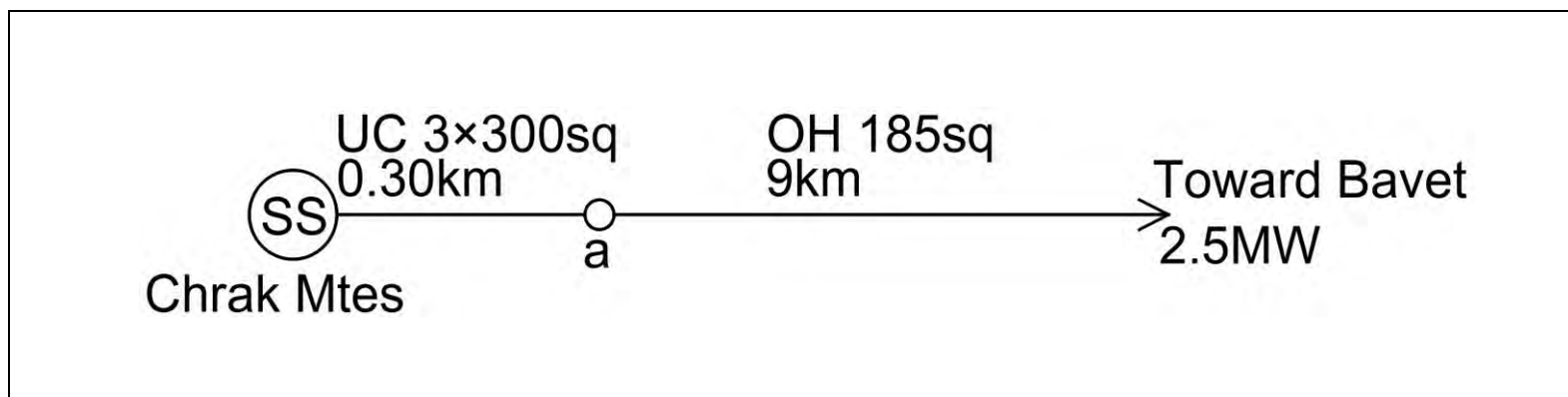
Impedance (Ω /km)

	R	X
1 AAC-1x150sq	0.2060	0.2507
2 AAC-1x240sq	0.1620	0.2364
3 PC-3x240sq	0.1620	0.1100
4 PC-3x300sq	0.1290	0.1070
5 AAC-1x185sq	0.1840	0.2409

Load characteristic table

Load characteristic number	F	Load spread	Load state
1	1	↓	End centralized load
2	0.5	⇩	Equality spread load(+End centralized load)
3	0.667	⇩	End maximum spread load(+End centralized load)
4	0.5	⇩	Center maximum spread load(+End centralized load)
5	0.333	⇩	Sending end maximum spread load(+End centralized load)

### Voltage drop calculation of B5



Sending voltage(V)	22,000
--------------------	--------

Load (kW)	2,500
Sending current(A)	65.6

Voltage drop (V)	-176
Voltage drop rate	-0.8%

	1st section	2nd section	3rd section	4th section	5th section	6th section	7th section	8th section	9th section	10th section
Transmission method	Three-phase	Three-phase								
Line type	4 PC-3x300sq	5 AAC-1x185sq								
Distance (km)	0.3	9.0								
Load spread (Refer to load characteristic table)	1	3								
Section power factor cosθ	0.95	0.95								
Section load (kW)		2,500								
Section voltage drop (V)	5.3	170.5								
Section end voltage (V)	21,995	21,824								

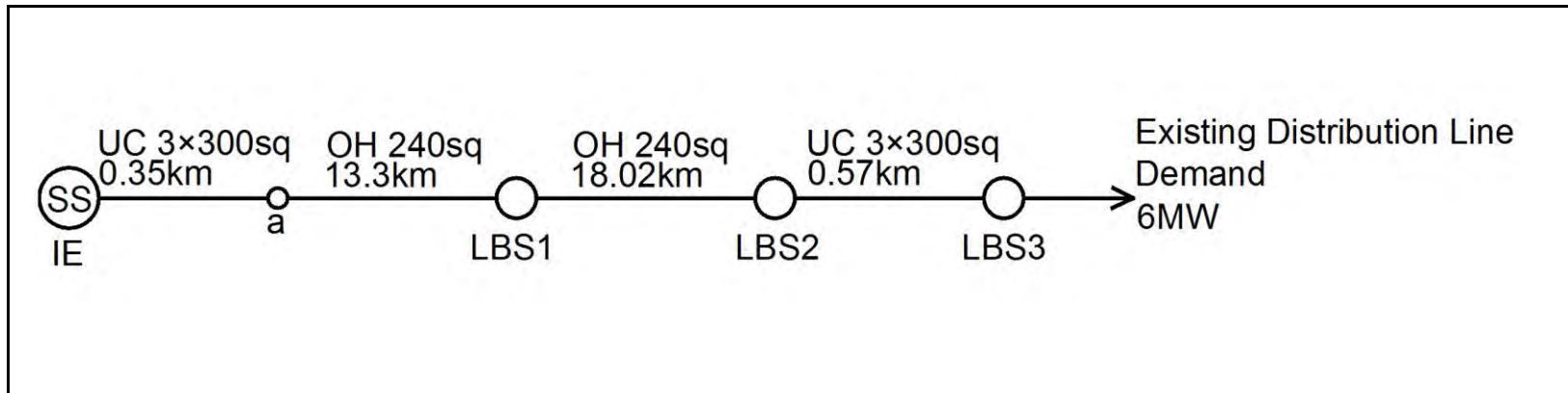
Impedance (Ω /km)

	R	X
1 AAC-1x150sq	0.2060	0.2507
2 AAC-1x240sq	0.1620	0.2364
3 PC-3x240sq	0.1620	0.1100
4 PC-3x300sq	0.1290	0.1070
5 AAC-1x185sq	0.1840	0.2409

Load characteristic table

Load characteristic number	F	Load spread	Load state
1	1	↓	End centralized load
2	0.5	⇄	Equality spread load(+End centralized load)
3	0.667	⇄	End maximum spread load(+End centralized load)
4	0.5	⇄	Center maximum spread load(+End centralized load)
5	0.333	⇄	Sending end maximum spread load(+End centralized load)

### Voltage drop calculation of P1



Sending voltage(V)	22,000
--------------------	--------

Load (kW)	6,000
Sending current(A)	157.5

Voltage drop (V)	-1,984
Voltage drop rate	-9.0%

	IE SS~a	a~LBS1	LBS1~	LBS2~	5th section	6th section	7th section	8th section	9th section	10th section
Transmission method	Three-phase three-wire	Three-phase three-wire	Three-phase three-wire	Three-phase three-wire						
Line type	4 PC-3x300sq	2 AAC-1x240sq	2 AAC-1x240sq	4 PC-3x300sq						
Distance(km)	0.35	13.30	18.02	0.57						
Load spread(Refer to load characteristic table)	1	1	1	1						
Section power factor cosθ	0.95	0.95	0.95	0.95						
Section load (kW)				6,000						
Section voltage drop (V)	14.9	825.9	1,119.0	24.2						
Section end voltage (V)	21,985	21,159	20,040	20,016						

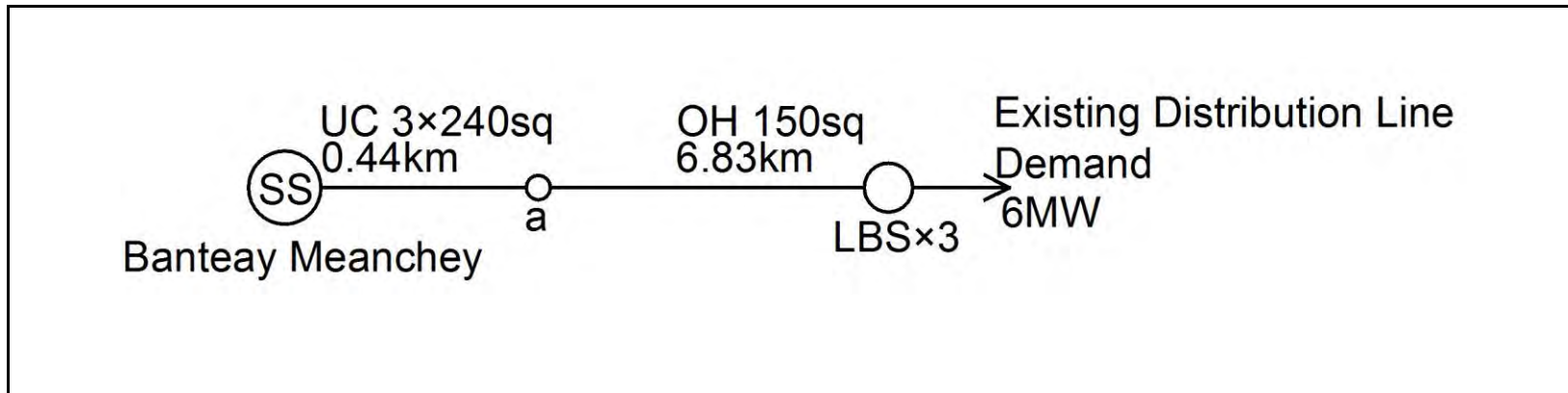
Impedance (Ω /km)

	R	X
1 AAC-1x150sq	0.2060	0.2507
2 AAC-1x240sq	0.1620	0.2364
3 PC-3x240sq	0.1620	0.1100
4 PC-3x300sq	0.1290	0.1070

Load characteristic table

Load characteristic number	F	Load spread	Load state
1	1	↓	End centralized load
2	0.5	└─┘	Equality spread load(+End centralized load)
3	0.667	└─┘	End maximum spread load(+End centralized load)
4	0.5	└─┘	Center maximum spread load(+End centralized load)
5	0.333	└─┘	Sending end maximum spread load(+End centralized load)

### Voltage drop calculation of P2



Sending voltage(V)	22,000
--------------------	--------

Load (kW)	6,000
Sending current(A)	157.5

Voltage drop (V)	-533
Voltage drop rate	-2.4%

	IE SS~a	a~LBS x 3	3rd section	4th section	5th section	6th section	7th section	8th section	9th section	10th section
Transmission method	Three-phase three-wire	Three-phase three-wire								
Line type	3 PC-3x240sq	1 AAC-1x150sq								
Distance(km)	0.44	6.83								
Load spread(Refer to load characteristic table)	1	1								
Section power factor cosθ	0.95	0.95								
Section load (kW)		6,000								
Section voltage drop (V)	22.6	510.3								
Section end voltage (V)	21,977	21,467								

Impedance (Ω /km)

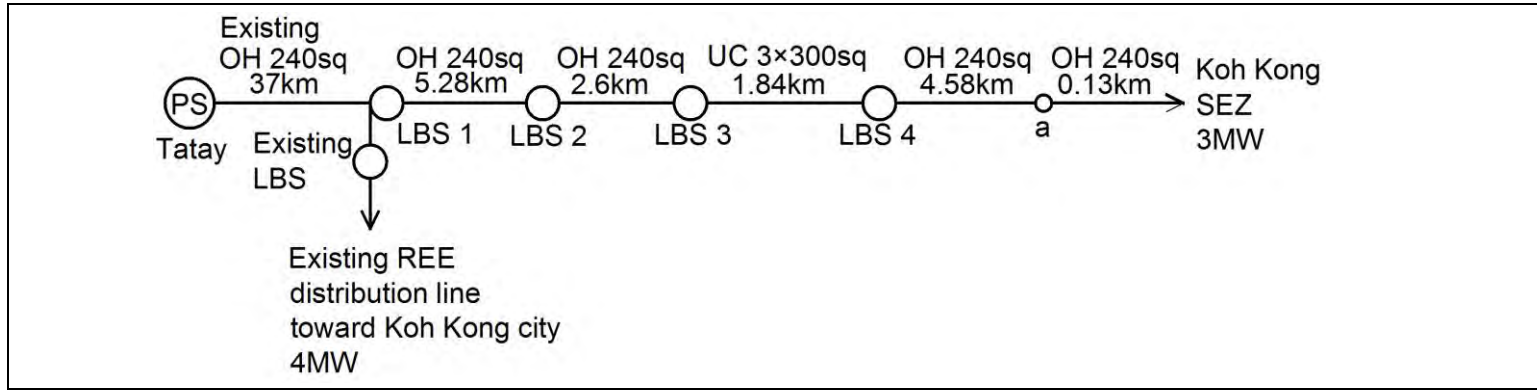
	R	X
1 AAC-1x150sq	0.2060	0.2507
2 AAC-1x240sq	0.1620	0.2364
3 PC-3x240sq	0.1620	0.1100
4 PC-3x300sq	0.1290	0.1070

Load characteristic table

Load characteristic number	F	Load spread	Load state
1	1	↓	End centralized load
2	0.5	↘	Equality spread load(+End centralized load)
3	0.667	↘	End maximum spread load(+End centralized load)
4	0.5	↘	Center maximum spread load(+End centralized load)
5	0.333	↘	Sending end maximum spread load(+End centralized load)



### Voltage drop calculation of K1



Sending voltage(V)	23,600
--------------------	--------

Load (kW)	7,000
Sending current(A)	171.2

Voltage drop (V)	-1,532
Voltage drop rate	-7.0%

	Tatay PS~ LBS1	LBS1~ LBS2	LBS2~ LBS3	LBS3~ LBS4	LBS4~a	a~Koh Kong SEZ	7th section	8th section	9th section	10th section
Transmission method	Three-phase	Three-phase	Three-phase	Three-phase	Three-phase	Three-phase				
Line type	2 AAC-1x240sq	2 AAC-1x240sq	2 AAC-1x240sq	4 PC-3x300sq	2 AAC-1x240sq	2 AAC-1x240sq				
Distance (km)	37.0	5.28	2.60	1.84	4.58	0.13				
Load spread (Refer to load characteristic table)	1	1	1	1	1	1				
Section power factor cosθ	0.9	0.95	0.95	0.95	0.95	0.95				
Section load (kW)	4,000					3,000				
Section voltage drop (V)	2,730.7	152.8	75.3	36.5	132.6	3.8				
Section end voltage (V)	20,869	20,716	20,641	20,605	20,472	20,468				

Impedance (Ω / km)

	R	X
1 AAC-1x150sq	0.2060	0.2507
2 AAC-1x240sq	0.1620	0.2364
3 PC-3x240sq	0.1620	0.1100
4 PC-3x300sq	0.1290	0.1070

Load characteristic table

Load characteristic number	F	Load spread	Load state
1	1	↓	End centralized load
2	0.5	┌─┴─┐	Equality spread load(+End centralized load)
3	0.667	┌─┬─┐	End maximum spread load(+End centralized load)
4	0.5	┌─┴─┐	Center maximum spread load(+End centralized load)
5	0.333	┌─┬─┐	Sending end maximum spread load(+End centralized load)

# **APPENDIX 9**

## **LIST OF COLLECTED DATA AND DOCUMENTS**

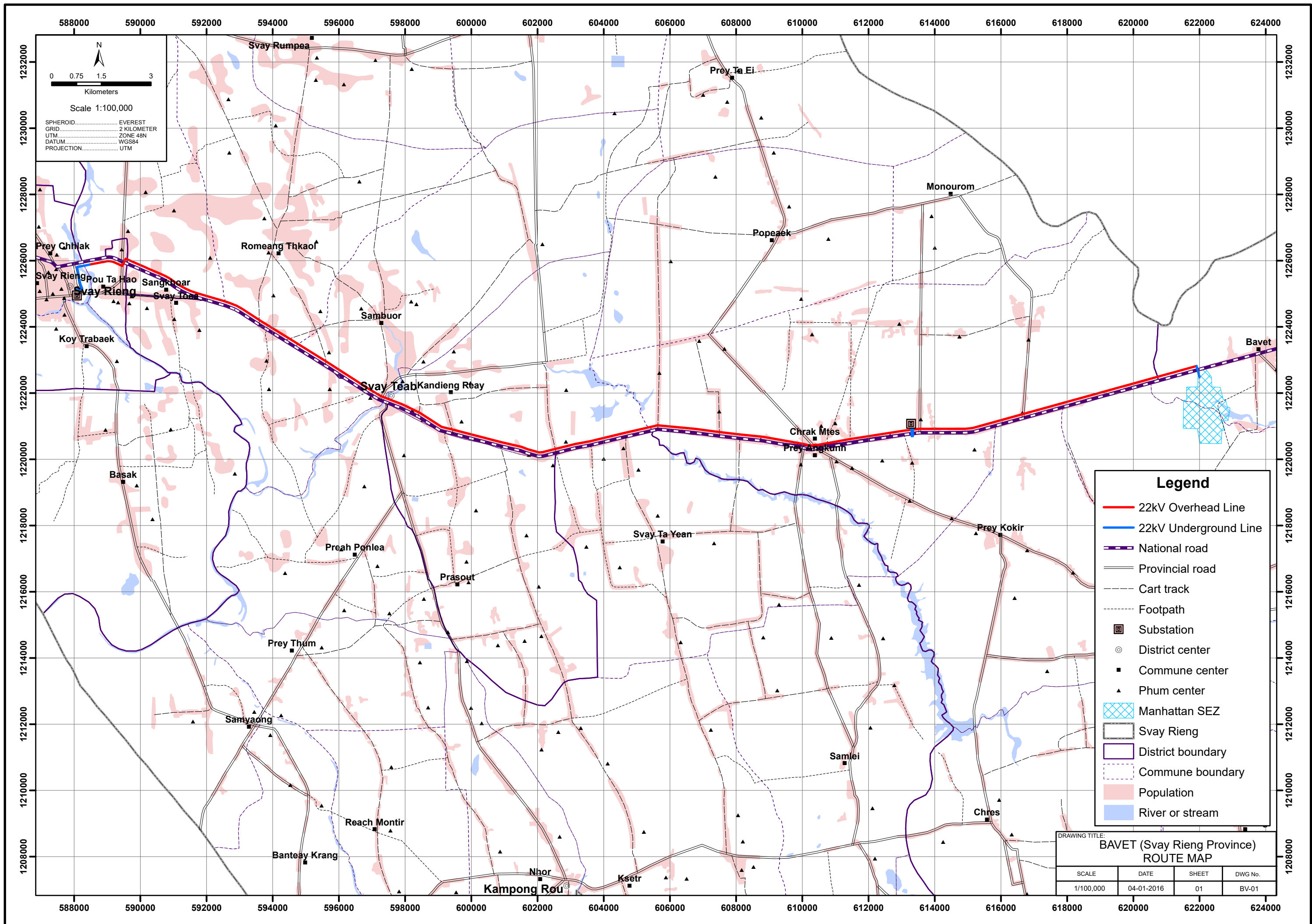
**APPENDIX 9 : List of Collected Data and Documents**

No.	Title	Author / Publisher	Type
1	Economy, Trade, Investment Climate and Japanese Company in Cambodia	JETRO	Hardcopy
2	SEZ map in Cambodia	JETRO	Brochure
3	Master Land-Use Planning of PPSEZ Project-357.3179Ha	Phnom Penh SEZ	Hard Copy
4	Welcome to SANCO POI PET	SANKO SEZ	Brochure
5	Master Plan of SANKO SEZ	SANKO SEZ	Brochure
6	Cambodia Industrial Development Policy 2015-2025	RGC	PDF
7	Statistical Yearbook 2011	MOP	CD
8	Labor Force Report 2012	MOP	Booklet
9	Labor Force and Child labor survey Report 2012	MOP	Booklet
10	Cambodia inter-censual Population survey 2013	MOP	Booklet
11	Cambodia Factsheet June2014	MOP	Brochure
12	Demand, Number and Type of Customer Data (REE areas)	EAC	Excel
13	List of Location and Transformer Capacity for JICA's Project in Svay Rieng Province	EDC	PDF
14	License Area Map (Bavet, Poipet, Koh Kong)	EDC	PDF
15	Transmission Lines Development Plan	EDC	PDF
16	GIS Data	EDC	GIS data
17	Demand, Number and Type of Customer Data (EDC areas)	EDC	Excel
18	Meteorological Data (Bavet, Poipet, Koh Kong)	MOWRAM	Excel
19	Distribution System 22kV in Svay Rieng	EDC	PDF
20	Annual Report 2012-2014	EDC	PDF
21	Distribution System Diagram in Svay Rieng	EDC	PDF
22	Organization Chart (EDC HQ, Head of EDC Svay Rieng, Electricity of Banteay Meanchey)	EDC	PDF
23	Record of power failure in YORKS factory	YORKS CO., LTD	PDF

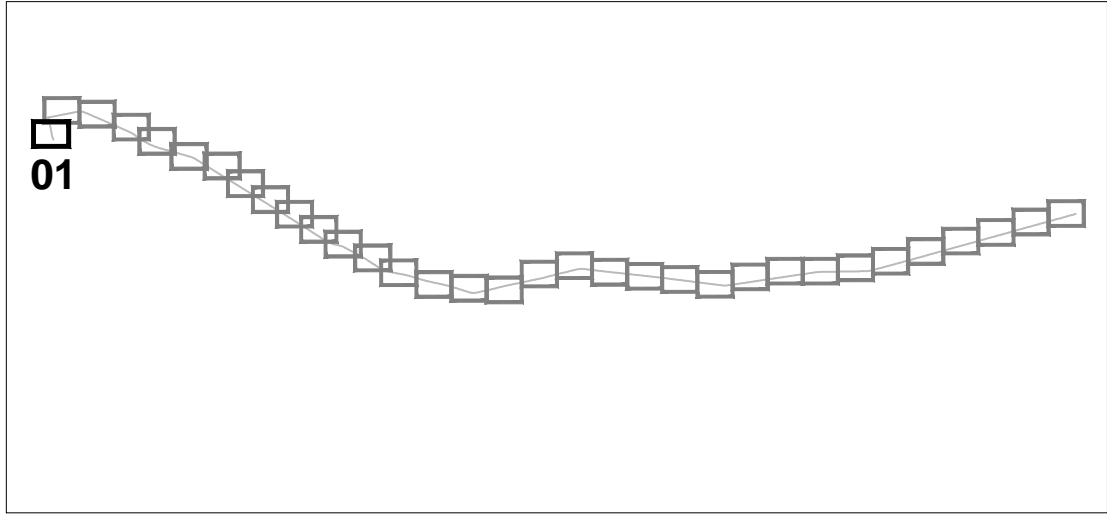
No.	Title	Author / Publisher	Type
24	Pole concrete of Koh Kong	RYP Group Co., LTD	Hardcopy
25	IEE Report Rural Energy Pilot Project 2012.2	ADB	PDF
26	Updated Resettlement Plan Rural Energy Pilot Project 2014.12	ADB	PDF
27	IEE Report Medium-Voltage Sub-Transmission Expansion Sector Project (Package 2) 2014.11	ADB	PDF
28	Resettlement Plan Medium-Voltage Sub-Transmission Expansion Sector Project (Package 2) 2014.12	ADB	PDF
29	Resettlement Plan Medium-Voltage Sub-Transmission Expansion Sector Project (Package 1) 2014.11	ADB	PDF
30	Report on Power Sector of the Kingdom of Cambodia 2015 Edition	EAC	PDF
31	General Requirements of Electric Power Technical Standards 2004	EAC	PDF
32	General Requirements of Electric Power Technical Standards 2004	EAC	PDF
33	Overall Performance Standards for Electricity Suppliers	EAC	PDF
34	Specific Requirements For Transmission and Distribution Facilities	EAC	PDF
35	Design standard distribution networks	EDC	PDF
36	Drawings of Chrak Mtes substation	EDC	PDF
37	Drawings of EDC Bavet switching station	EDC	PDF
38	Drawings of IE substation	EDC	PDF
39	Drawings of Banteay Meanchey substation	EDC	PDF

# **APPENDIX 10**

## **ROUTE MAP OF BAVET**



\*Original drawing has A3 size



**LEGEND:**

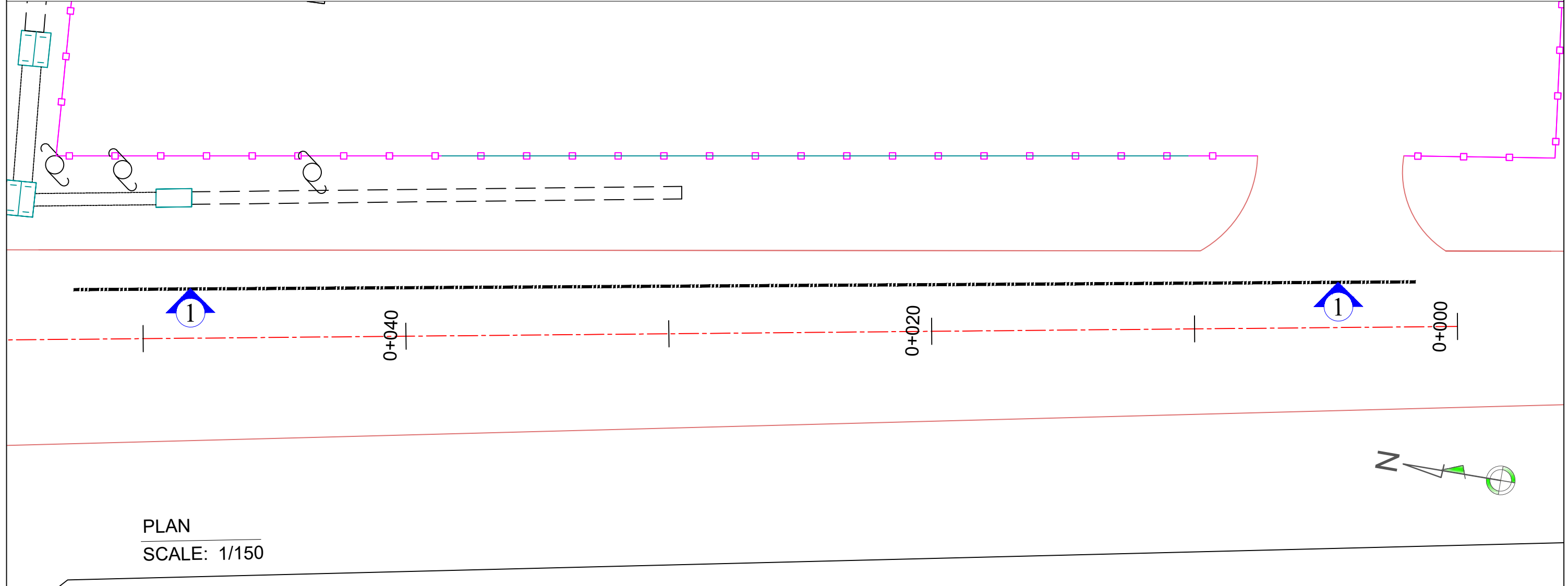
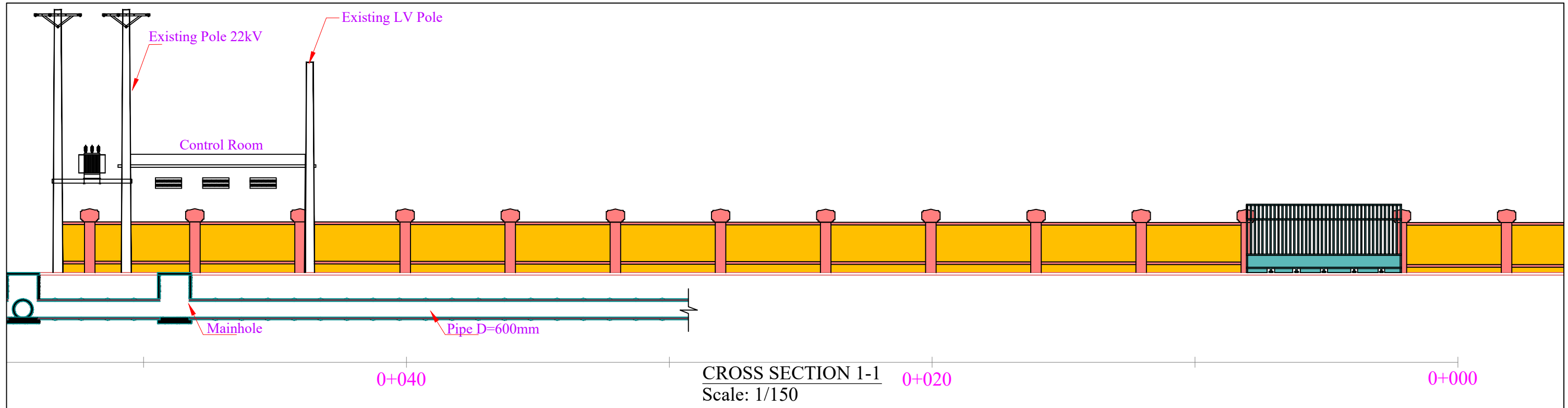
- 22kV Overhead Line (New)
- 22kV Underground Line (New)
- ▲ Transformer (New)
- Load Breaking Switch (New)
- 22kV Overhead Line (Exist.)
- 22kV Underground Line (Exist.)
- 22kV Pole (Exist.)
- ◆ LV Pole (Exist.)
- ⊕ Telecommunication Pole (Exist.)
- Road
- Road Center
- Pond
- House, Cottage
- Bridge
- ▤ Ditch
- Pipe Culvert
- Wiremesh Fence
- Brickwall Fence



JICA PROJECT NAME:	Preparatory Survey for Southern Economic Corridor Distribution Expansion Project
CONTRACTOR:	NEWJEC Inc. THE CHUGOKU ELECTRIC POWER CO., INC.

DRAWING TITLE:			
BAVET (Svay Rieng Province) PLANE DRAWING			
SCALE	DATE	KEY PAGE	DWG No
H:1/3000	04-01-2016	01	BV-02

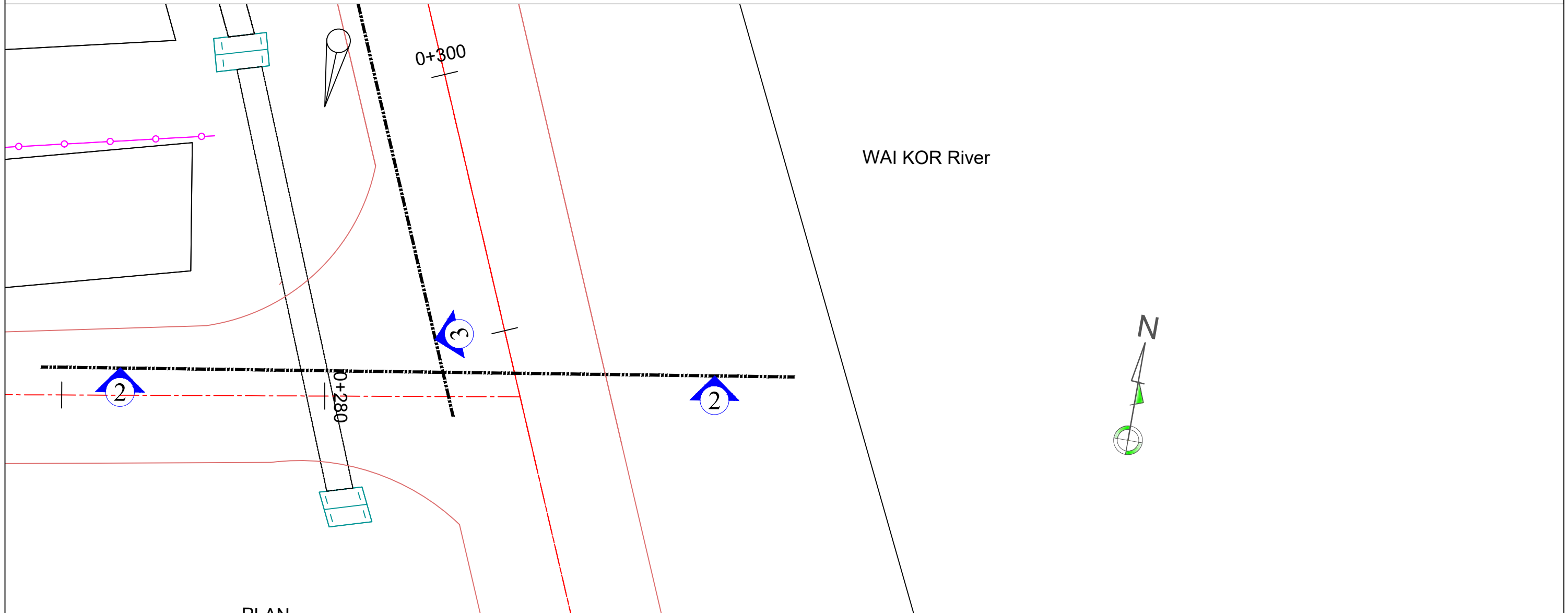
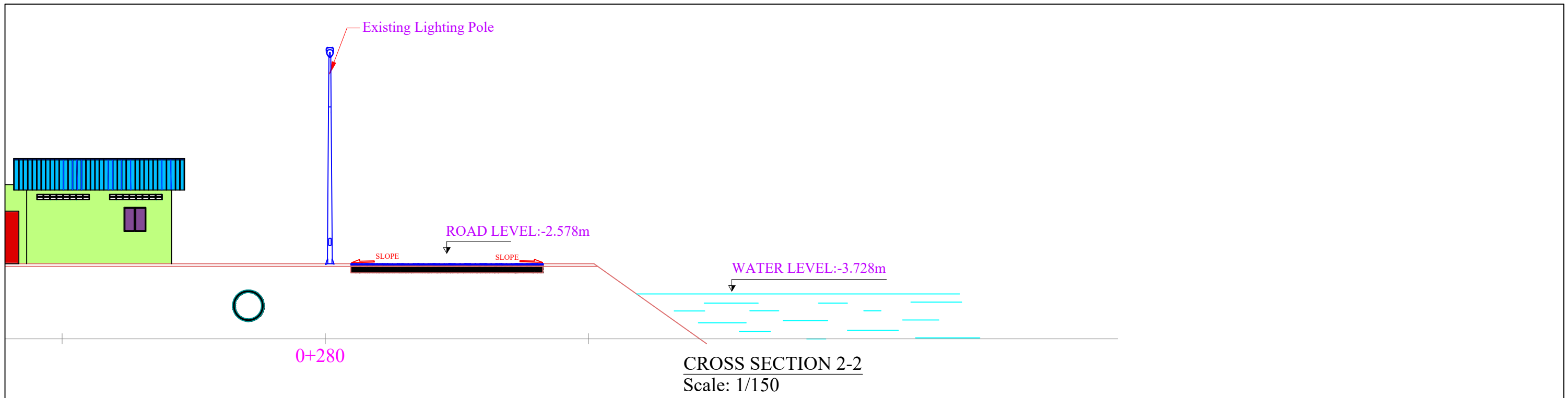
\*Original drawing has A3 size



JICA PROJECT NAME: Preparatory Survey for Southern Economic Corridor Distribution Expansion Project		DRAWING TITLE: BAVET (Svay Rieng Province) CROSS SECTION DRAWING		
CONTRACTOR: NEWJEC Inc., THE CHUGOKU ELECTRIC POWER CO., INC.	SCALE AS SHOWN	DATE 04-01-2016	SHEET 02	DWG No BV-03
SUB CONTRACTOR: Cheang Engineering Consultants, Co. Ltd.				

\*Original drawing has A3 size





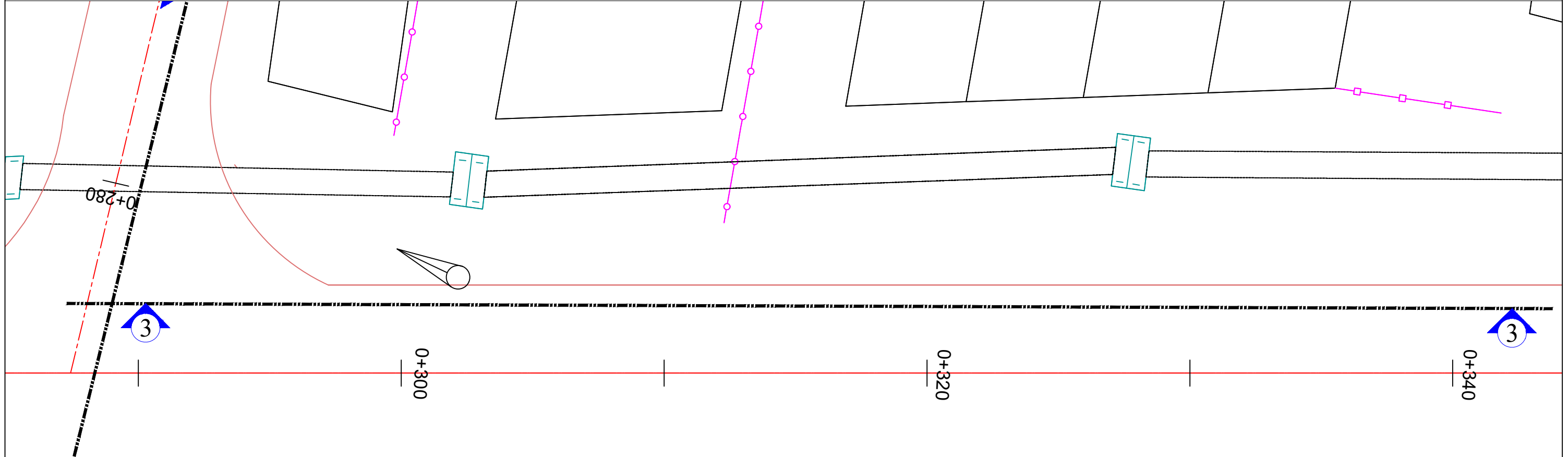
JICA PROJECT NAME: Preparatory Survey for Southern Economic Corridor Distribution Expansion Project		DRAWING TITLE: BAVET (Svay Rieng Province) CROSS SECTION DRAWING		
CONTRACTOR:	NEWJEC Inc., THE CHUGOKU ELECTRIC POWER CO., INC.	SCALE	DATE	SHEET
SUB CONTRACTOR:	Cheang Engineering Consultants, Co. Ltd.	AS SHOWN	04-01-2016	07
				DWG No BV-03

\*Original drawing has A3 size

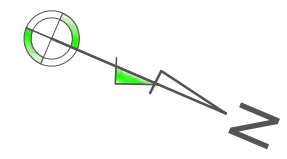


CROSS SECTION 3-3  
Scale: 1/150

0+300 0+320 0+340

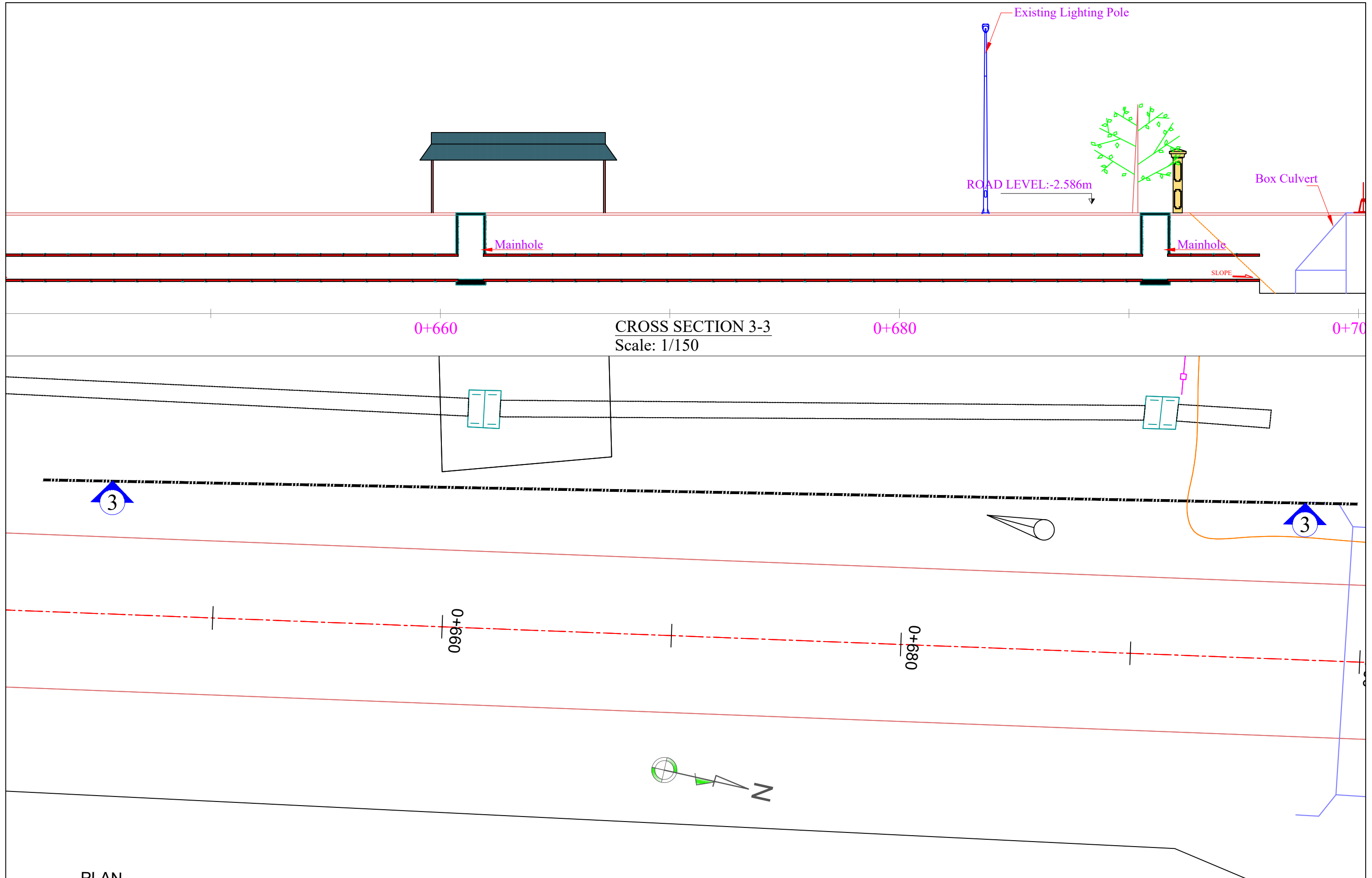


PLAN  
SCALE: 1/150



JICA PROJECT NAME: Preparatory Survey for Southern Economic Corridor Distribution Expansion Project		DRAWING TITLE: BAVET (Svay Rieng Province) CROSS SECTION DRAWING		
CONTRACTOR:	NEWJEC Inc., THE CHUGOKU ELECTRIC POWER CO., INC.	SCALE	DATE	SHEET
SUB CONTRACTOR:	Cheang Engineering Consultants, Co. Ltd.	AS SHOWN	04-01-2016	08
				DWG No BV-03

\*Original drawing has A3 size



0+660

CROSS SECTION 3-3  
Scale: 1/150

0+680

0+700

0+660

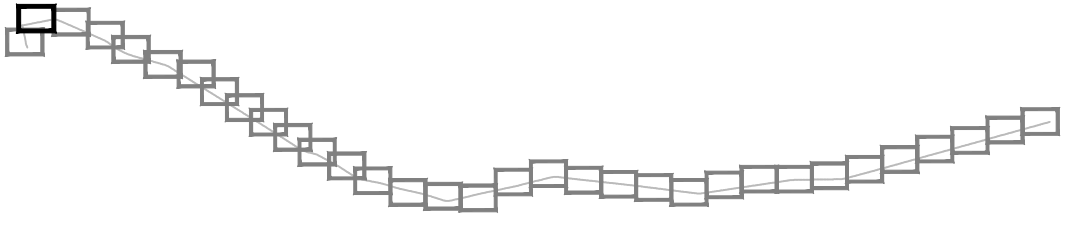
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PLAN  
SCALE: 1/150

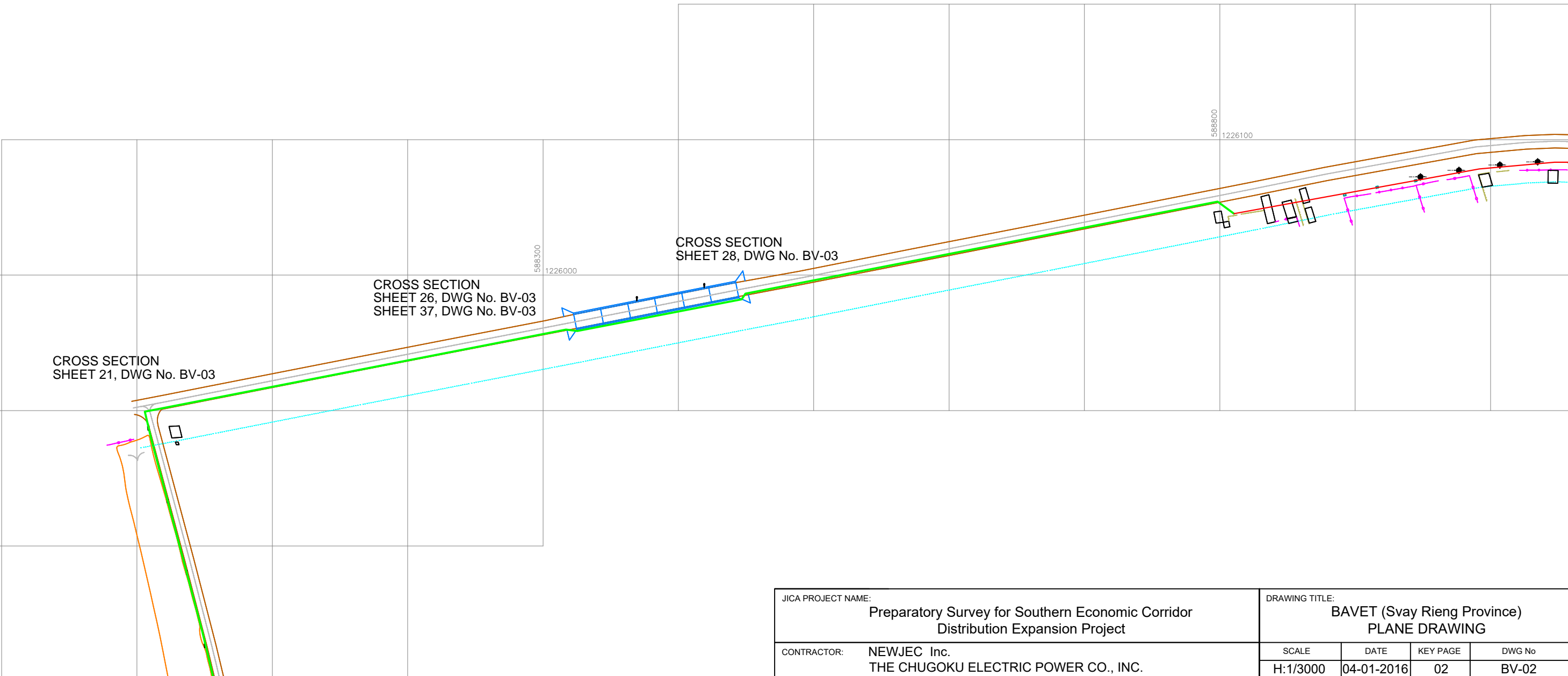
JICA PROJECT NAME: Preparatory Survey for Southern Economic Corridor Distribution Expansion Project		DRAWING TITLE: BAVET (Svay Rieng Province) CROSS SECTION DRAWING		
CONTRACTOR: NEWJEC Inc., THE CHUGOKU ELECTRIC POWER CO., INC.	SCALE AS SHOWN	DATE 04-01-2016	SHEET 14	DWG No BV-03
SUB CONTRACTOR: Cheang Engineering Consultants, Co. Ltd.				

\*Original drawing has A3 size

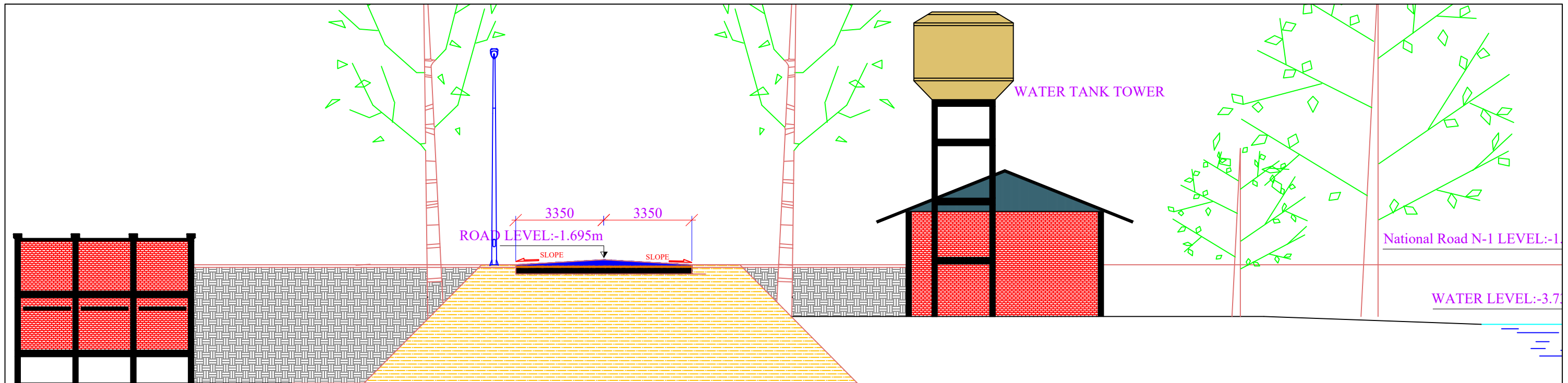
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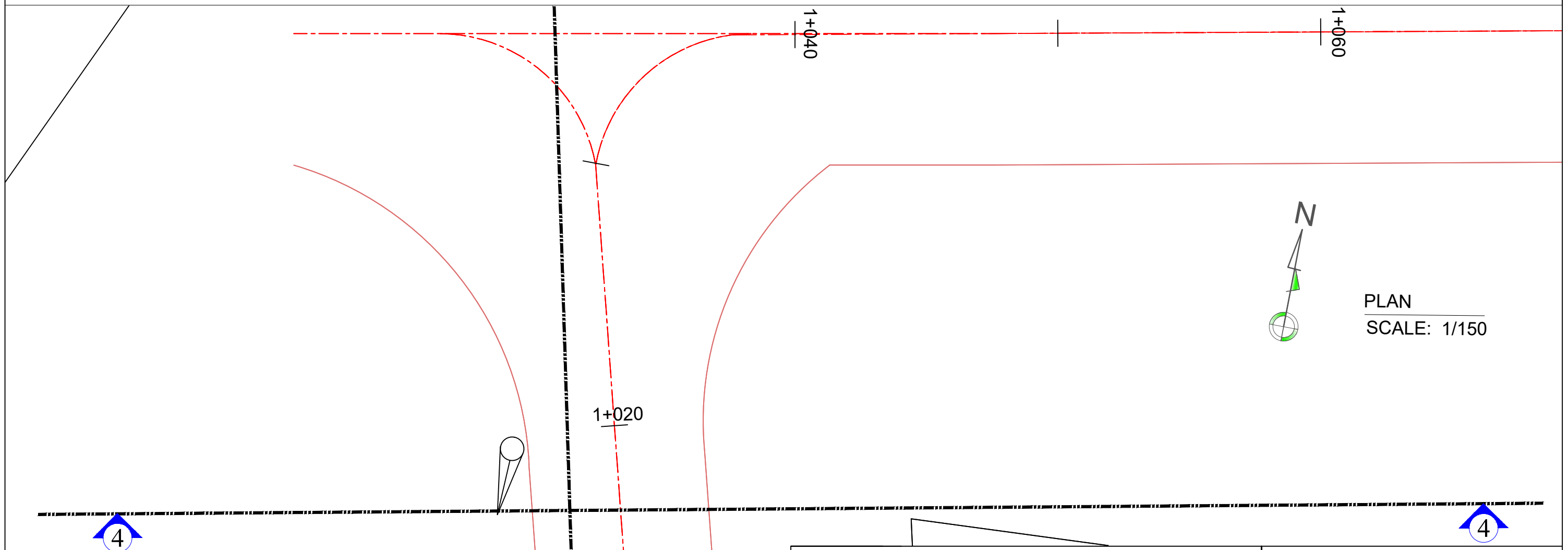
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- 22kV Overhead Line (New)
  - 22kV Underground Line (New)
  - ▲ Transformer (New)
  - Load Breaking Switch (New)
  - 22kV Overhead Line (Exist.)
  - 22kV Underground Line (Exist.)
  - ⊗ 22kV Pole (Exist.)
  - ◆ LV Pole (Exist.)
  - ⊙ Telecommunication Pole (Exist.)
  - Road
  - Road Center
  - Pond
  - House, Cottage
  - ▭ Bridge
  - ▧ Ditch
  - ⌒ Pipe Culvert
  - Wiremesh Fence
  - Brickwall Fence



\*Original drawing has A3 size



CROSS SECTION 4-4  
Scale: 1/150

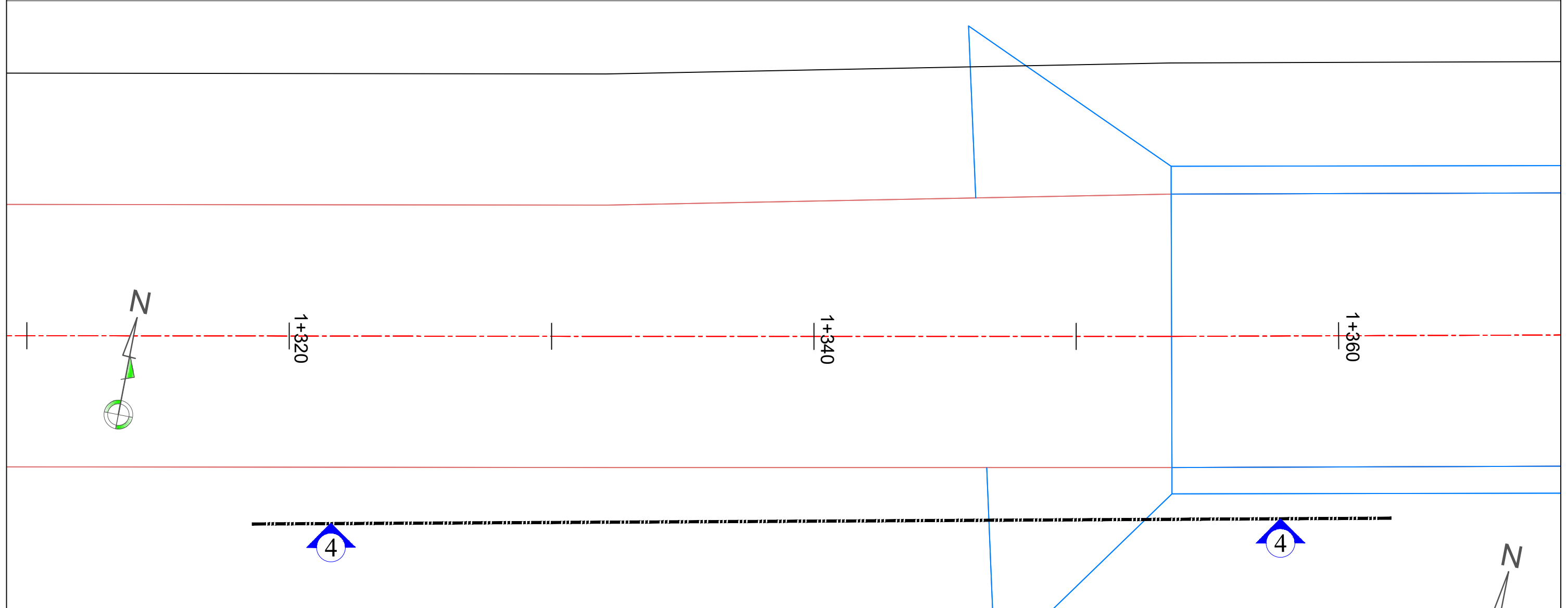
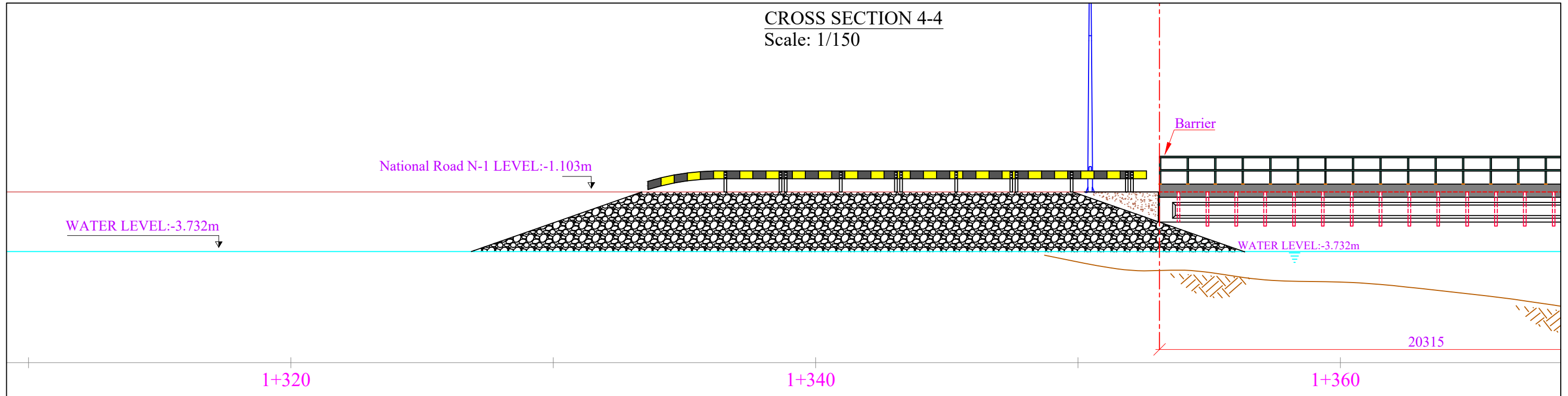


PLAN  
SCALE: 1/150

JICA PROJECT NAME: Preparatory Survey for Southern Economic Corridor Distribution Expansion Project		DRAWING TITLE: BAVET (Svay Rieng Province) CROSS SECTION DRAWING		
CONTRACTOR:	NEWJEC Inc., THE CHUGOKU ELECTRIC POWER CO., INC.	SCALE	DATE	SHEET
SUB CONTRACTOR:	Cheang Engineering Consultants, Co. Ltd.	AS SHOWN	04-01-2016	21
				DWG No BV-03

\*Original drawing has A3 size

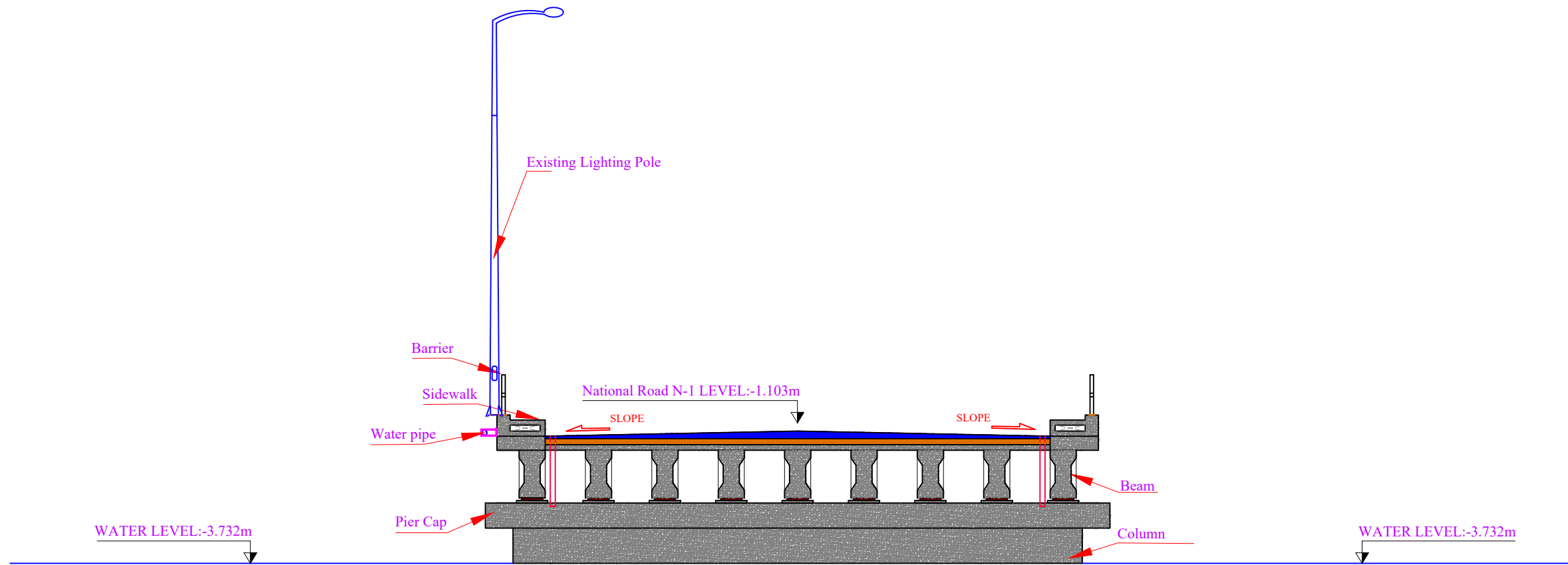
CROSS SECTION 4-4  
Scale: 1/150



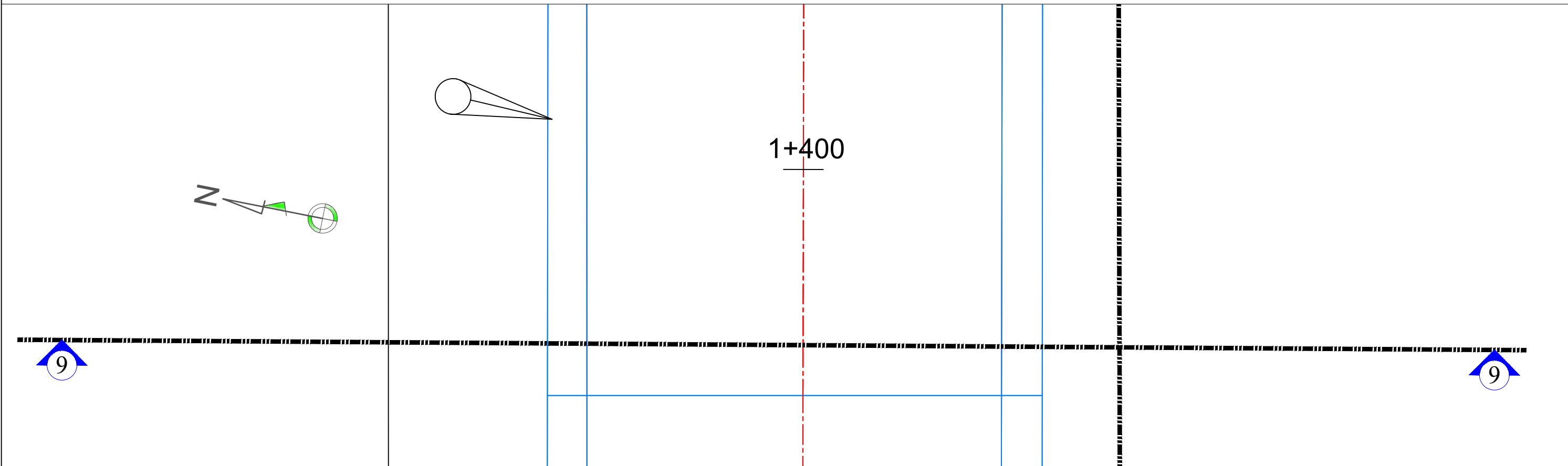
PLAN  
SCALE: 1/150

JICA PROJECT NAME: Preparatory Survey for Southern Economic Corridor Distribution Expansion Project		DRAWING TITLE: BAVET (Svay Rieng Province) CROSS SECTION DRAWING		
CONTRACTOR:	NEWJEC Inc., THE CHUGOKU ELECTRIC POWER CO., INC.	SCALE	DATE	SHEET
SUB CONTRACTOR:	Cheang Engineering Consultants, Co. Ltd.	AS SHOWN	04-01-2016	26
				DWG No BV-03

\*Original drawing has A3 size

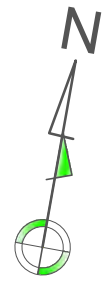
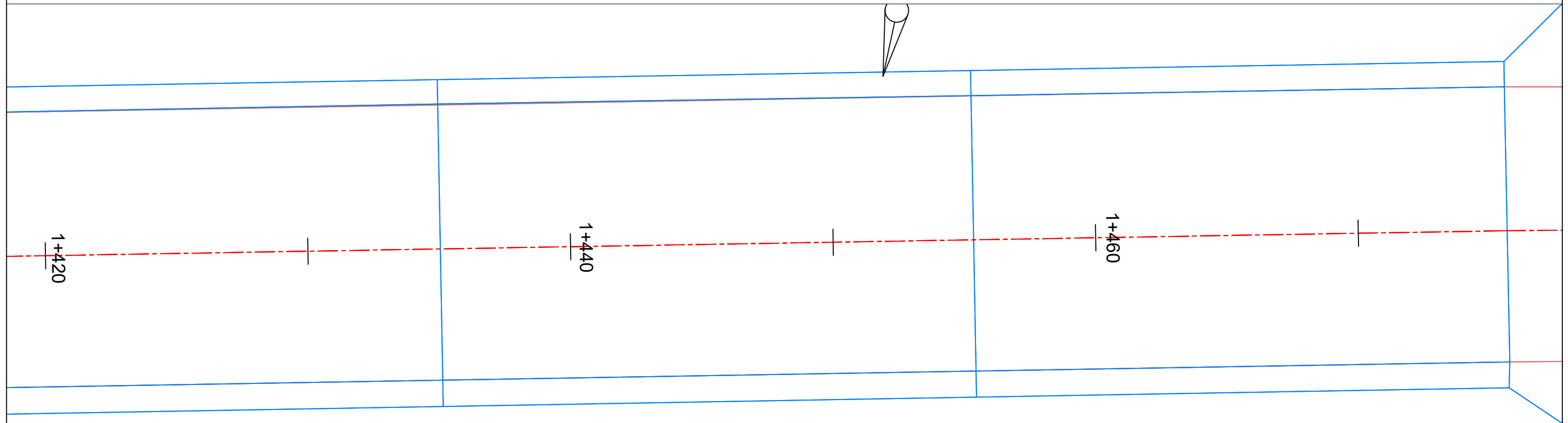
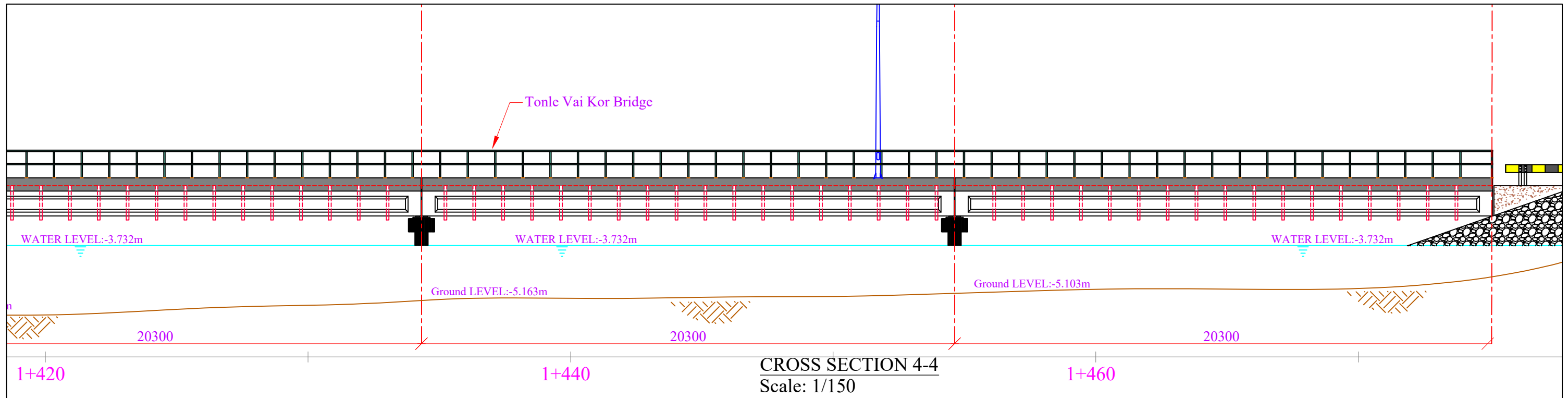


CROSS SECTION 9-9  
Scale: 1/200



JICA PROJECT NAME: Preparatory Survey for Southern Economic Corridor Distribution Expansion Project		DRAWING TITLE: BAVET (Svay Rieng Province) CROSS SECTION DRAWING		
CONTRACTOR:	NEWJEC Inc., THE CHUGOKU ELECTRIC POWER CO., INC.	SCALE	DATE	SHEET
SUB CONTRACTOR:	Cheang Engineering Consultants, Co. Ltd.	AS SHOWN	04-01-2016	37
				DWG No BV-03

\*Original drawing has A3 size



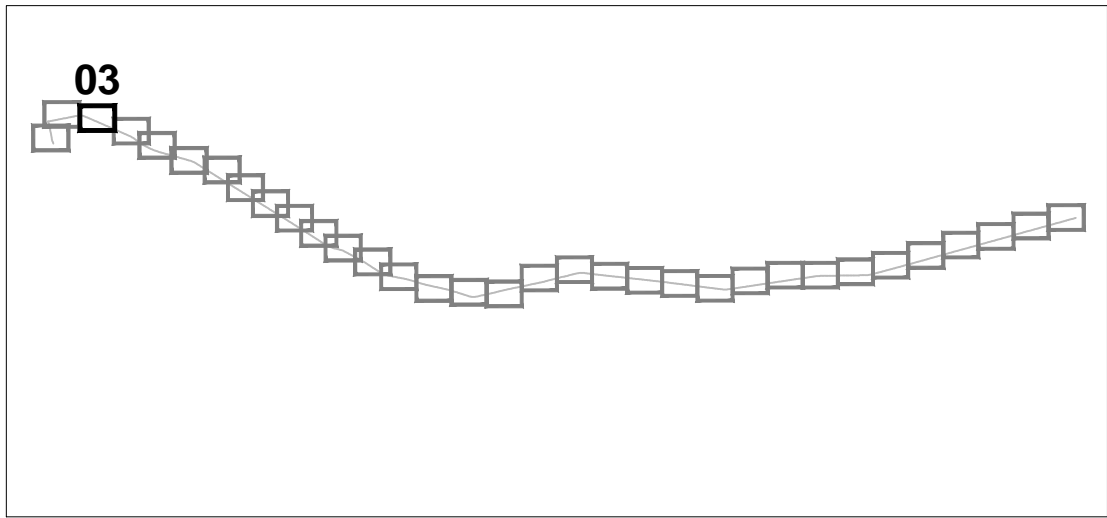
4

4

JICA PROJECT NAME: Preparatory Survey for Southern Economic Corridor Distribution Expansion Project		DRAWING TITLE: BAVET (Svay Rieng Province) CROSS SECTION DRAWING		
CONTRACTOR:	NEWJEC Inc., THE CHUGOKU ELECTRIC POWER CO., INC.	SCALE	DATE	SHEET
SUB CONTRACTOR:	Cheang Engineering Consultants, Co. Ltd.	AS SHOWN	04-01-2016	28
				DWG No BV-03

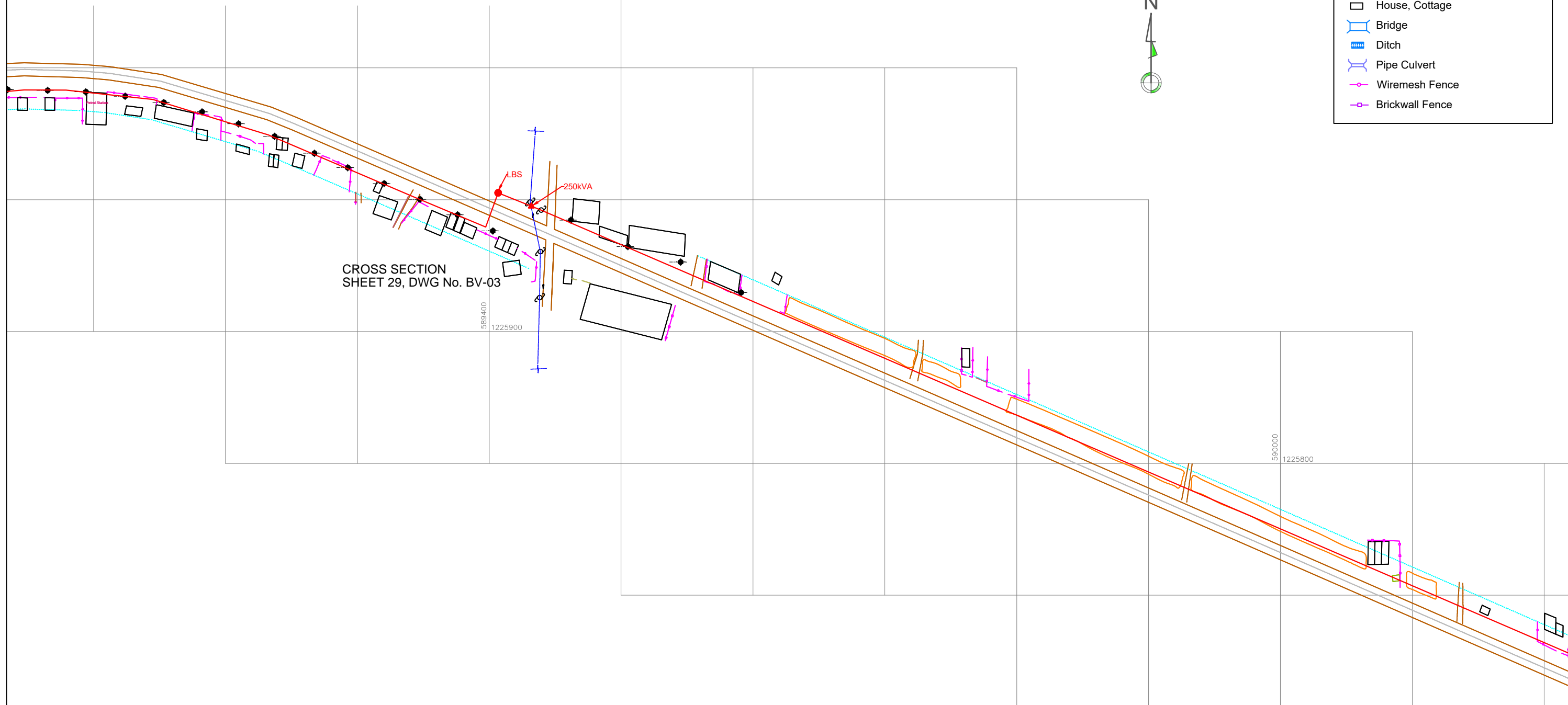
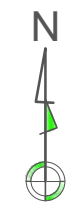
\*Original drawing has A3 size





**LEGEND:**

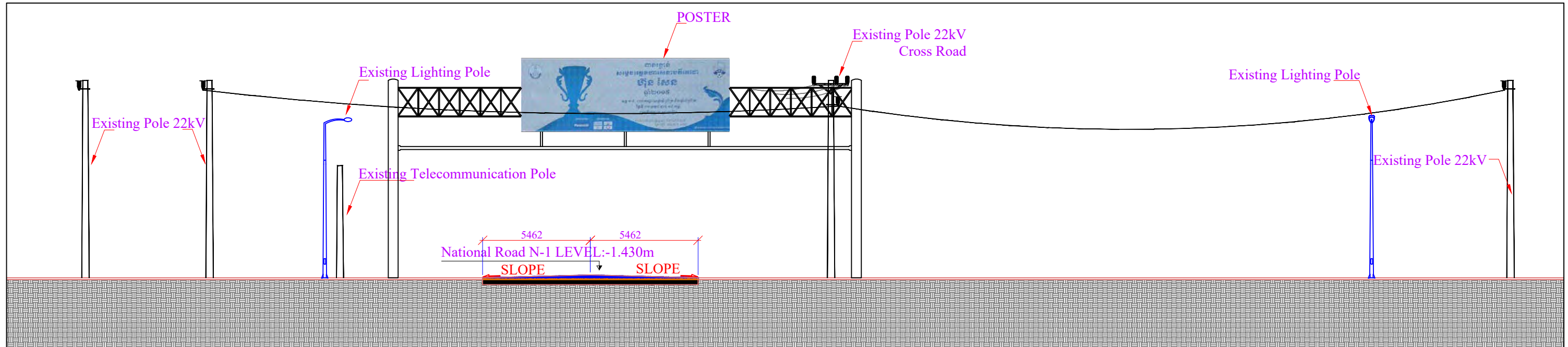
- 22kV Overhead Line (New)
- 22kV Underground Line (New)
- ▲ Transformer (New)
- Load Breaking Switch (New)
- 22kV Overhead Line (Exist.)
- 22kV Underground Line (Exist.)
- 22kV Pole (Exist.)
- ◆ LV Pole (Exist.)
- Telecommunication Pole (Exist.)
- Road
- Road Center
- ▭ Pond
- ▭ House, Cottage
- ▭ Bridge
- ▭ Ditch
- ▭ Pipe Culvert
- Wiremesh Fence
- Brickwall Fence



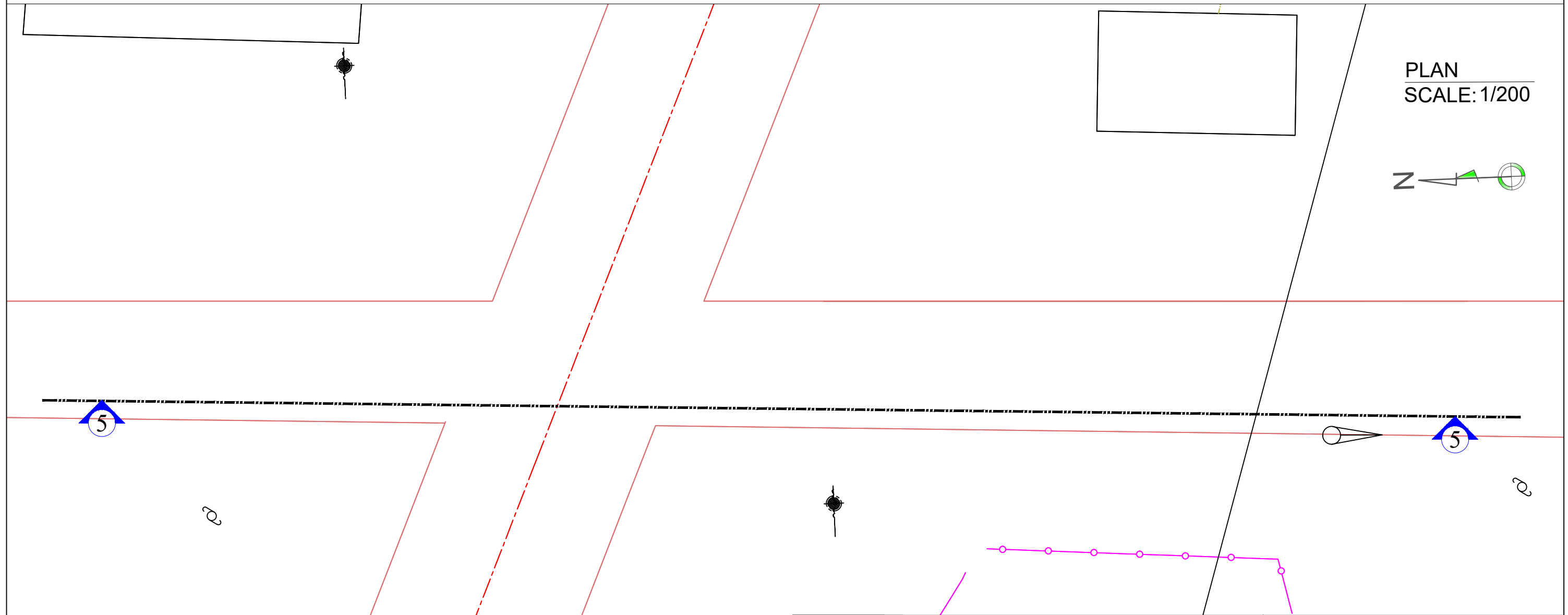
CROSS SECTION  
SHEET 29, DWG No. BV-03

JICA PROJECT NAME: <b>Preparatory Survey for Southern Economic Corridor Distribution Expansion Project</b>		DRAWING TITLE: <b>BAVET (Svay Rieng Province) PLANE DRAWING</b>			
CONTRACTOR: <b>NEWJEC Inc. THE CHUGOKU ELECTRIC POWER CO., INC.</b>		SCALE	DATE	KEY PAGE	DWG No
		H:1/3000	04-01-2016	03	BV-02

\*Original drawing has A3 size

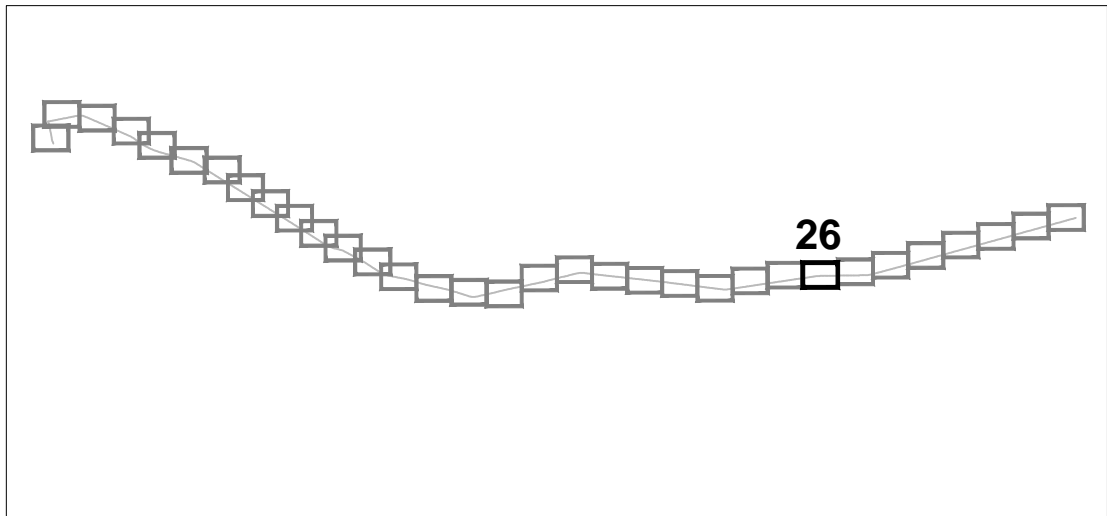


**CROSS SECTION 5-5**  
Scale: 1/200



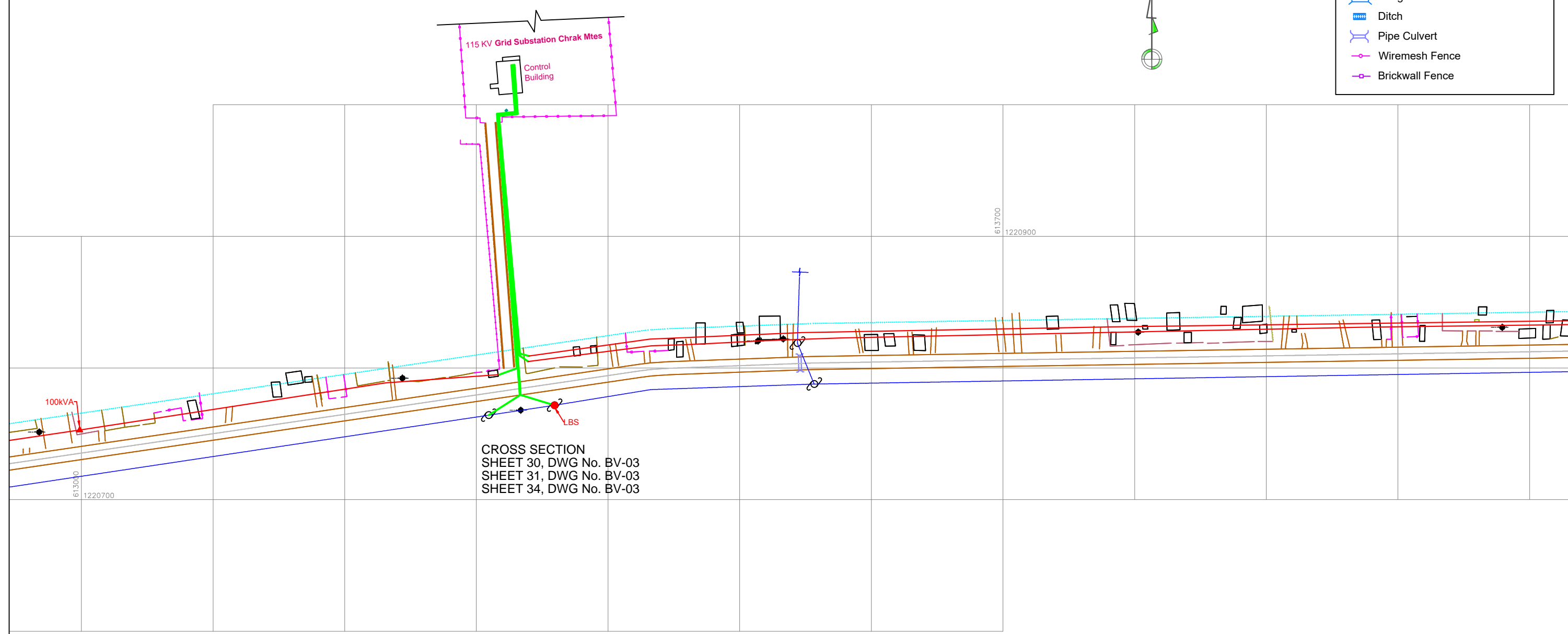
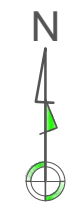
JICA PROJECT NAME: <b>Preparatory Survey for Southern Economic Corridor          Distribution Expansion Project</b>		DRAWING TITLE: <b>BAVET (Svay Rieng Province)          CROSS SECTION DRAWING</b>		
CONTRACTOR: <b>NEWJEC Inc., THE CHUGOKU ELECTRIC POWER CO., INC.</b>	SCALE <b>AS SHOWN</b>	DATE <b>04-01-2016</b>	SHEET <b>29</b>	DWG No <b>BV-03</b>
SUB CONTRACTOR: <b>Cheang Engineering Consultants, Co. Ltd.</b>				

\*Original drawing has A3 size



**LEGEND:**

- 22kV Overhead Line (New)
- 22kV Underground Line (New)
- ▲ Transformer (New)
- Load Breaking Switch (New)
- 22kV Overhead Line (Exist.)
- 22kV Underground Line (Exist.)
- ⊙ 22kV Pole (Exist.)
- ◆ LV Pole (Exist.)
- ♀ Telecommunication Pole (Exist.)
- Road
- Road Center
- Pond
- House, Cottage
- Bridge
- Ditch
- Pipe Culvert
- Wiremesh Fence
- Brickwall Fence



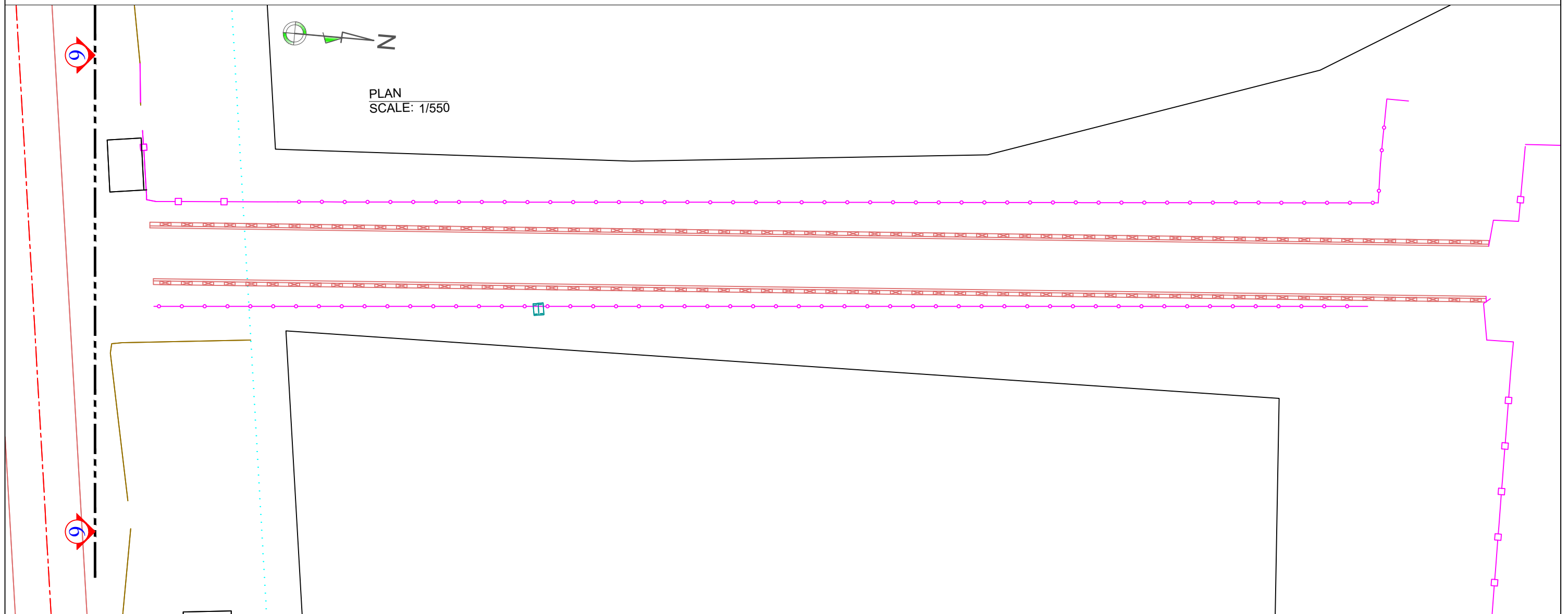
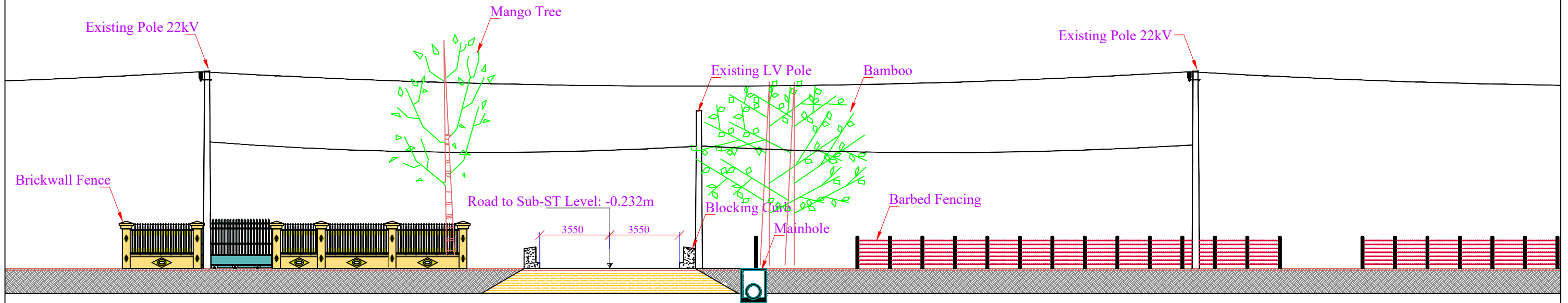
CROSS SECTION  
 SHEET 30, DWG No. BV-03  
 SHEET 31, DWG No. BV-03  
 SHEET 34, DWG No. BV-03

JICA PROJECT NAME: Preparatory Survey for Southern Economic Corridor Distribution Expansion Project		DRAWING TITLE: BAVET (Svay Rieng Province) PLANE DRAWING			
CONTRACTOR: NEWJEC Inc. THE CHUGOKU ELECTRIC POWER CO., INC.		SCALE	DATE	KEY PAGE	DWG No
		H:1/3000	04-01-2016	26	BV-02

\*Original drawing has A3 size

# CROSS SECTION 6-6

Scale: 1/200

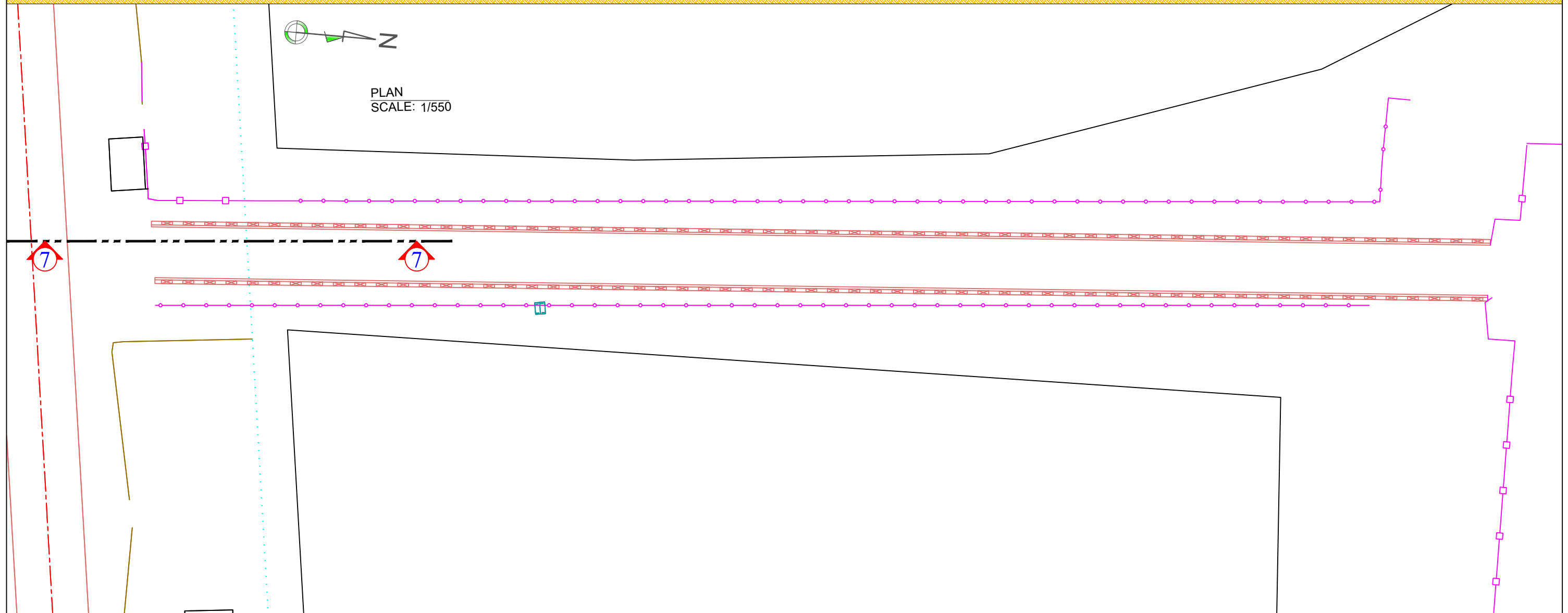
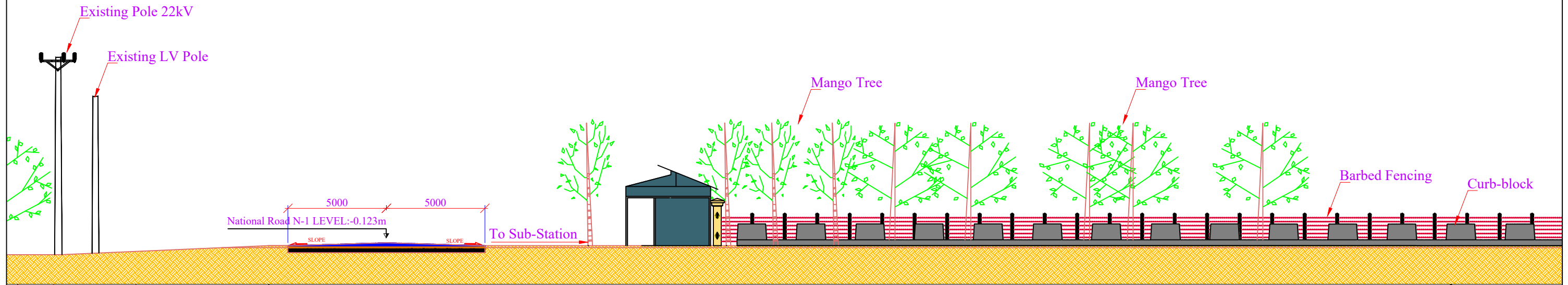


JICA PROJECT NAME: Preparatory Survey for Southern Economic Corridor Distribution Expansion Project		DRAWING TITLE: BAVET (Svay Rieng Province) CROSS SECTION DRAWING		
CONTRACTOR:	NEWJEC Inc., THE CHUGOKU ELECTRIC POWER CO., INC.	SCALE	DATE	SHEET
SUB CONTRACTOR:	Cheang Engineering Consultants, Co. Ltd.	AS SHOWN	04-01-2016	30
				DWG No BV-03

\*Original drawing has A3 size

# CROSS SECTION 7-7

Scale: 1/200

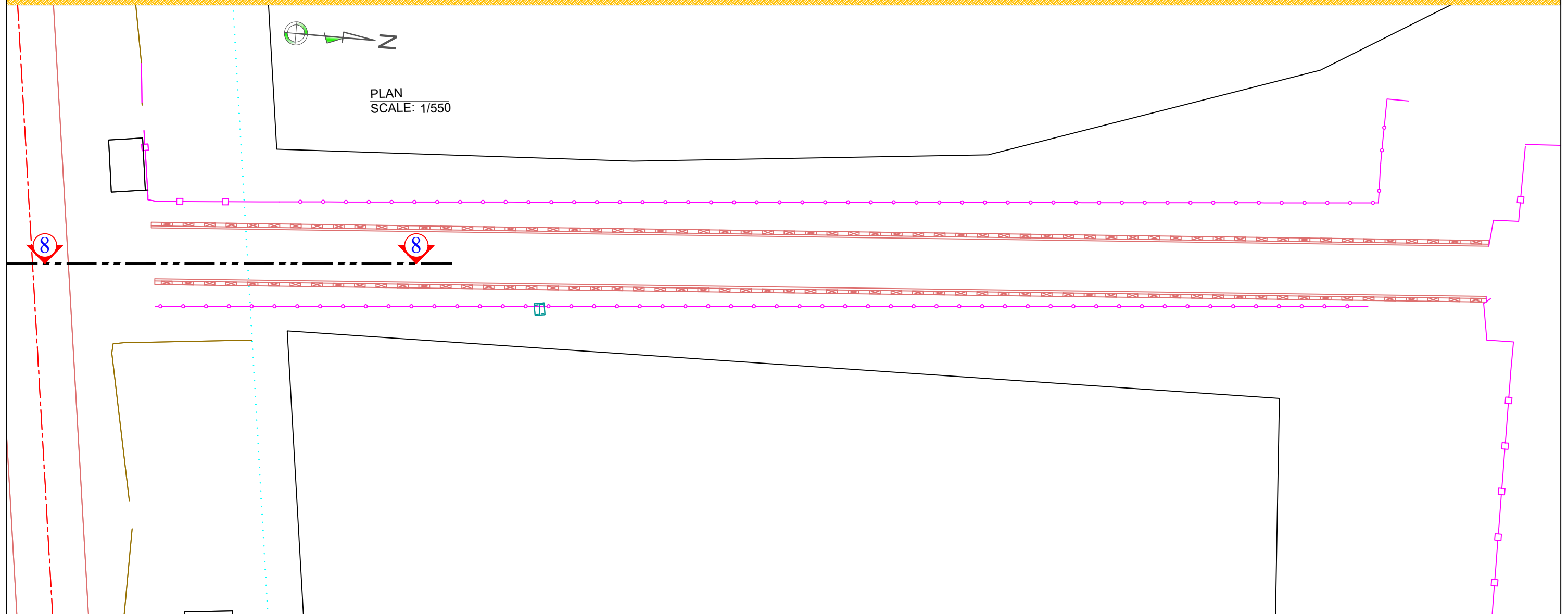
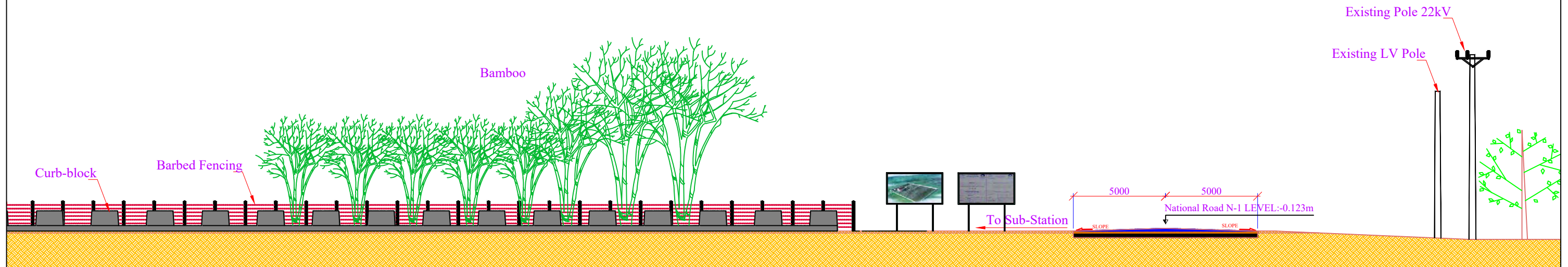


JICA PROJECT NAME: Preparatory Survey for Southern Economic Corridor Distribution Expansion Project		DRAWING TITLE: BAVET (Svay Rieng Province) CROSS SECTION DRAWING		
CONTRACTOR: NEWJEC Inc., THE CHUGOKU ELECTRIC POWER CO., INC.	SCALE AS SHOWN	DATE 04-01-2016	SHEET 31	DWG No BV-03
SUB CONTRACTOR: Cheang Engineering Consultants, Co. Ltd.				

\*Original drawing has A3 size

CROSS SECTION 8-8

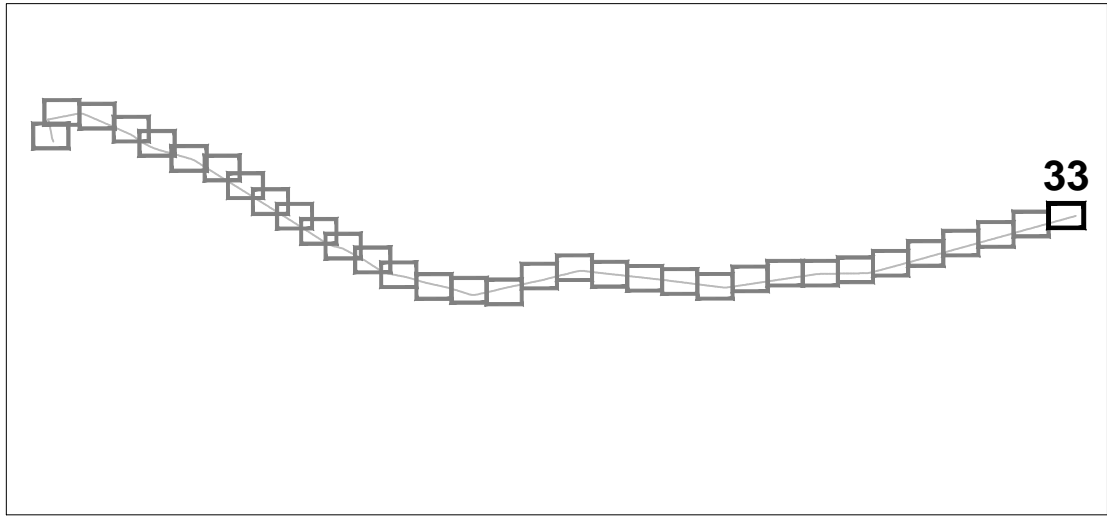
Scale: 1/200



JICA PROJECT NAME: Preparatory Survey for Southern Economic Corridor Distribution Expansion Project		DRAWING TITLE: BAVET (Svay Rieng Province) CROSS SECTION DRAWING		
CONTRACTOR:	NEWJEC Inc., THE CHUGOKU ELECTRIC POWER CO., INC.	SCALE	DATE	SHEET
SUB CONTRACTOR:	Cheang Engineering Consultants, Co. Ltd.	AS SHOWN	04-01-2016	34
				DWG No BV-03

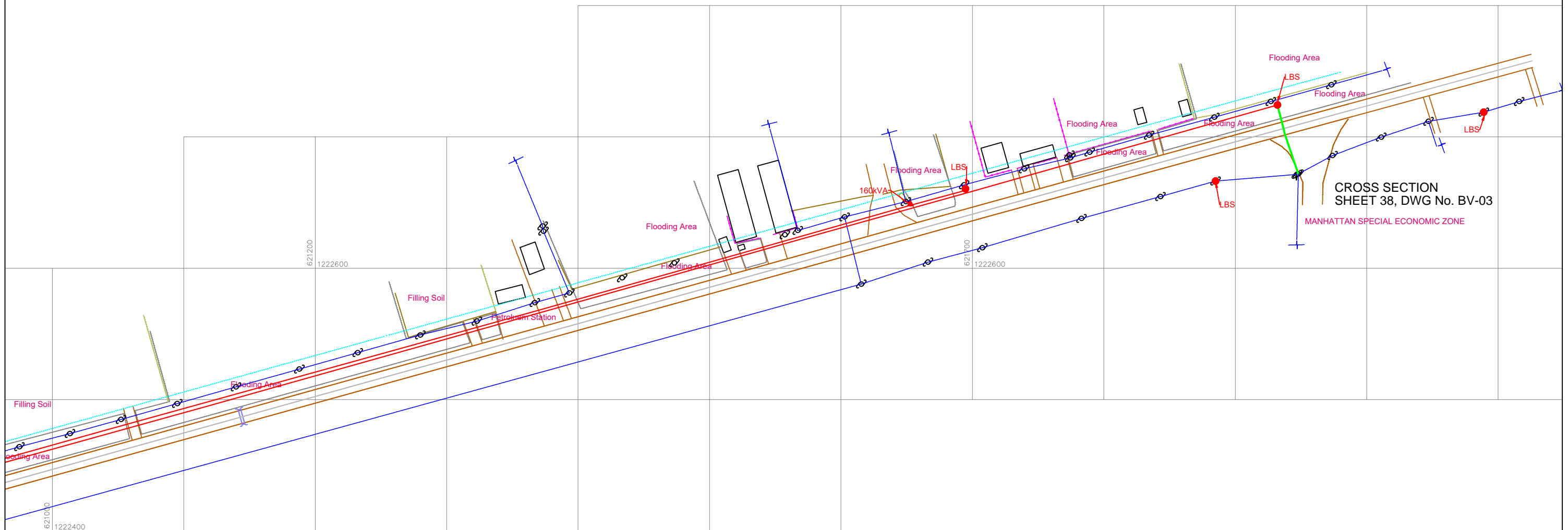
\*Original drawing has A3 size





**LEGEND:**

- 22kV Overhead Line (New)
- 22kV Underground Line (New)
- ▲ Transformer (New)
- Load Breaking Switch (New)
- 22kV Overhead Line (Exist.)
- 22kV Underground Line (Exist.)
- $\odot$  22kV Pole (Exist.)
- $\blacklozenge$  LV Pole (Exist.)
- $\circ$  Telecommunication Pole (Exist.)
- Road
- Road Center
- ▭ Pond
- ▭ House, Cottage
- ▭ Bridge
- ▭ Ditch
- ▭ Pipe Culvert
- Wiremesh Fence
- Brickwall Fence



CROSS SECTION  
SHEET 38, DWG No. BV-03

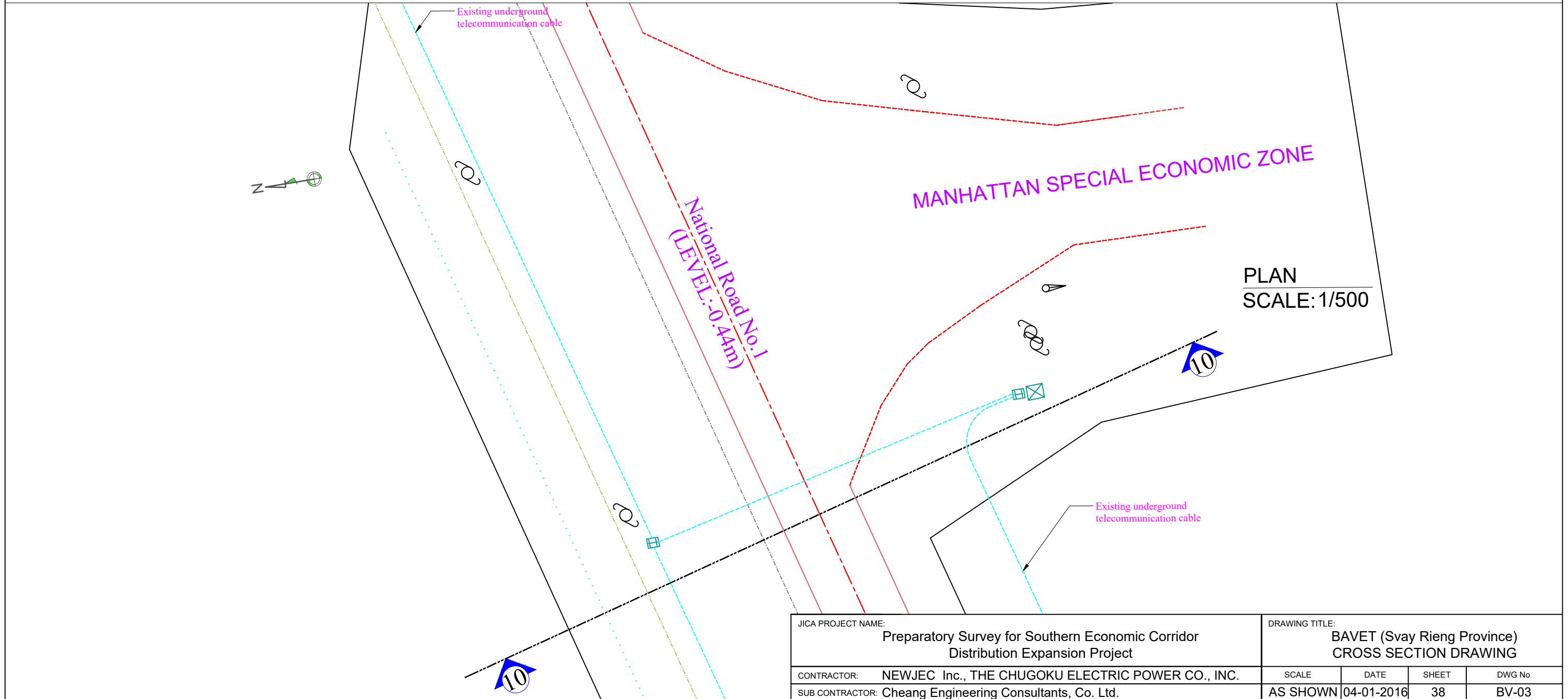
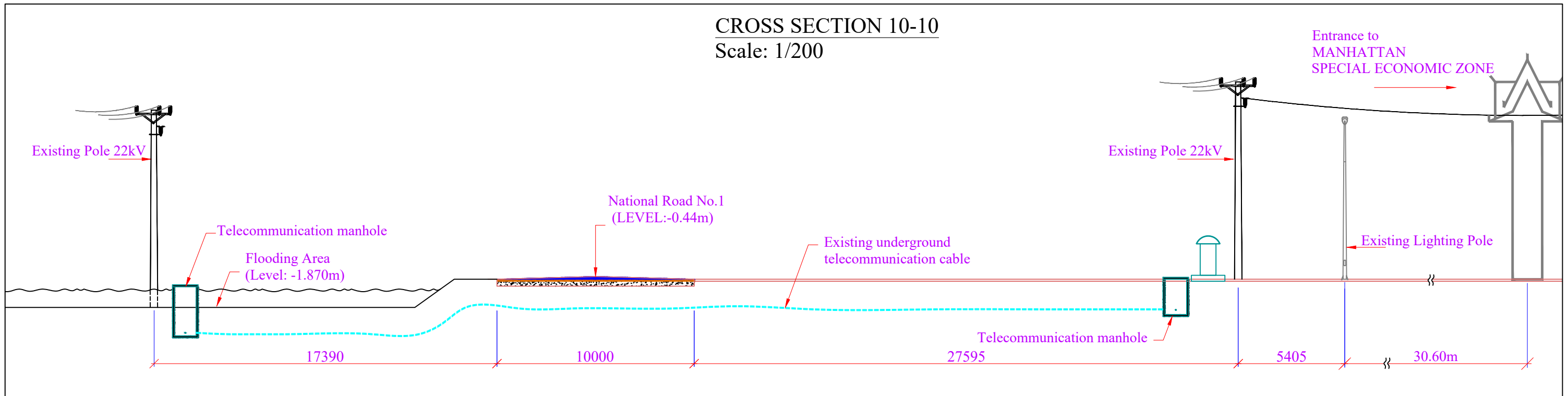
MANHATTAN SPECIAL ECONOMIC ZONE

JICA PROJECT NAME: Preparatory Survey for Southern Economic Corridor Distribution Expansion Project		DRAWING TITLE: BAVET (Svay Rieng Province) PLANE DRAWING			
CONTRACTOR: NEWJEC Inc. THE CHUGOKU ELECTRIC POWER CO., INC.		SCALE H:1/3000	DATE 04-01-2016	KEY PAGE 33	DWG No BV-02

\*Original drawing has A3 size

**CROSS SECTION 10-10**

Scale: 1/200



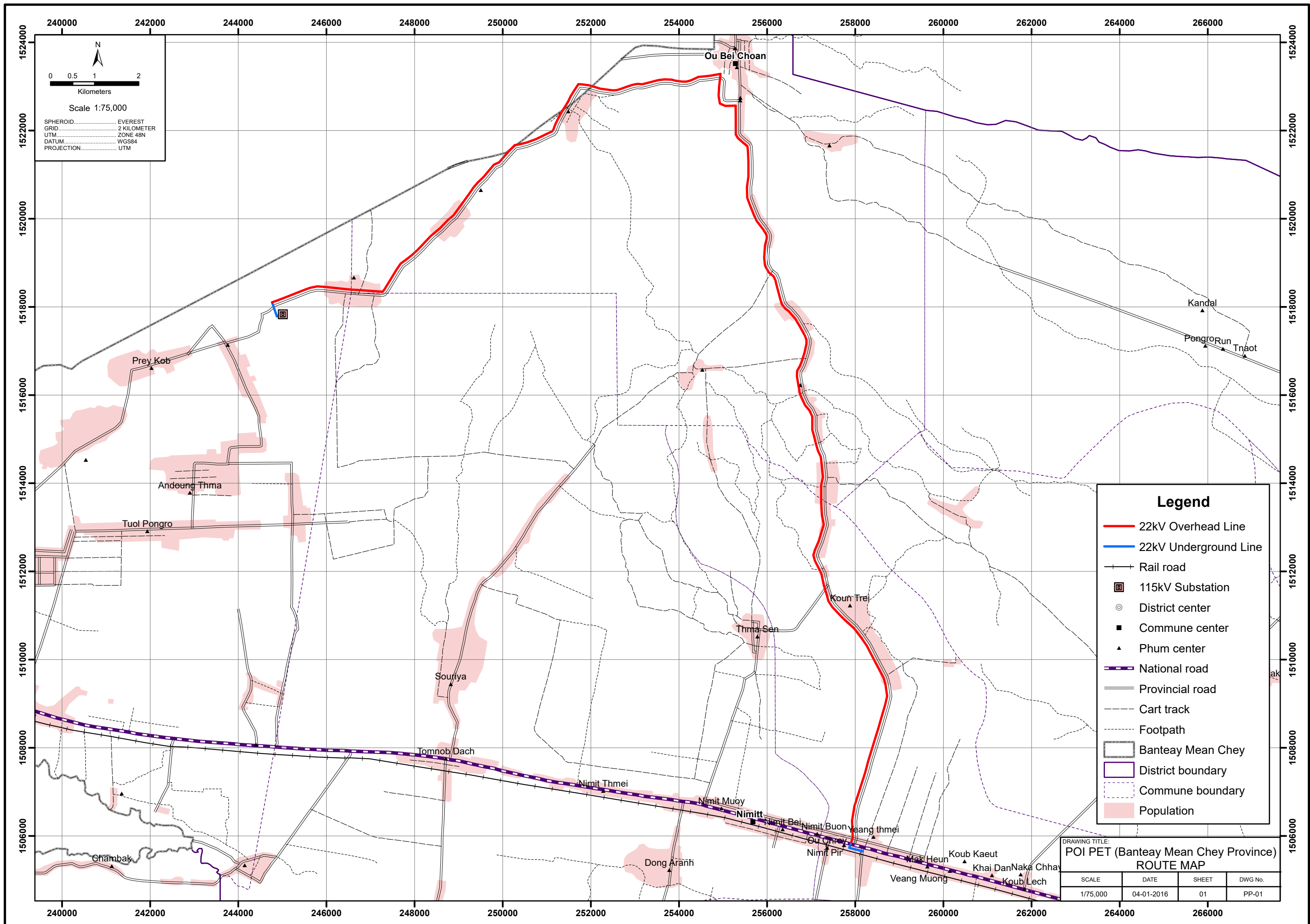
JICA PROJECT NAME: Preparatory Survey for Southern Economic Corridor Distribution Expansion Project		DRAWING TITLE: BAVET (Svay Rieng Province) CROSS SECTION DRAWING			
CONTRACTOR: NEWJEC Inc., THE CHUGOKU ELECTRIC POWER CO., INC.		SCALE	DATE	SHEET	DWG No
SUB CONTRACTOR: Cheang Engineering Consultants, Co. Ltd.		AS SHOWN	04-01-2016	38	BV-03

\*Original drawing has A3 size

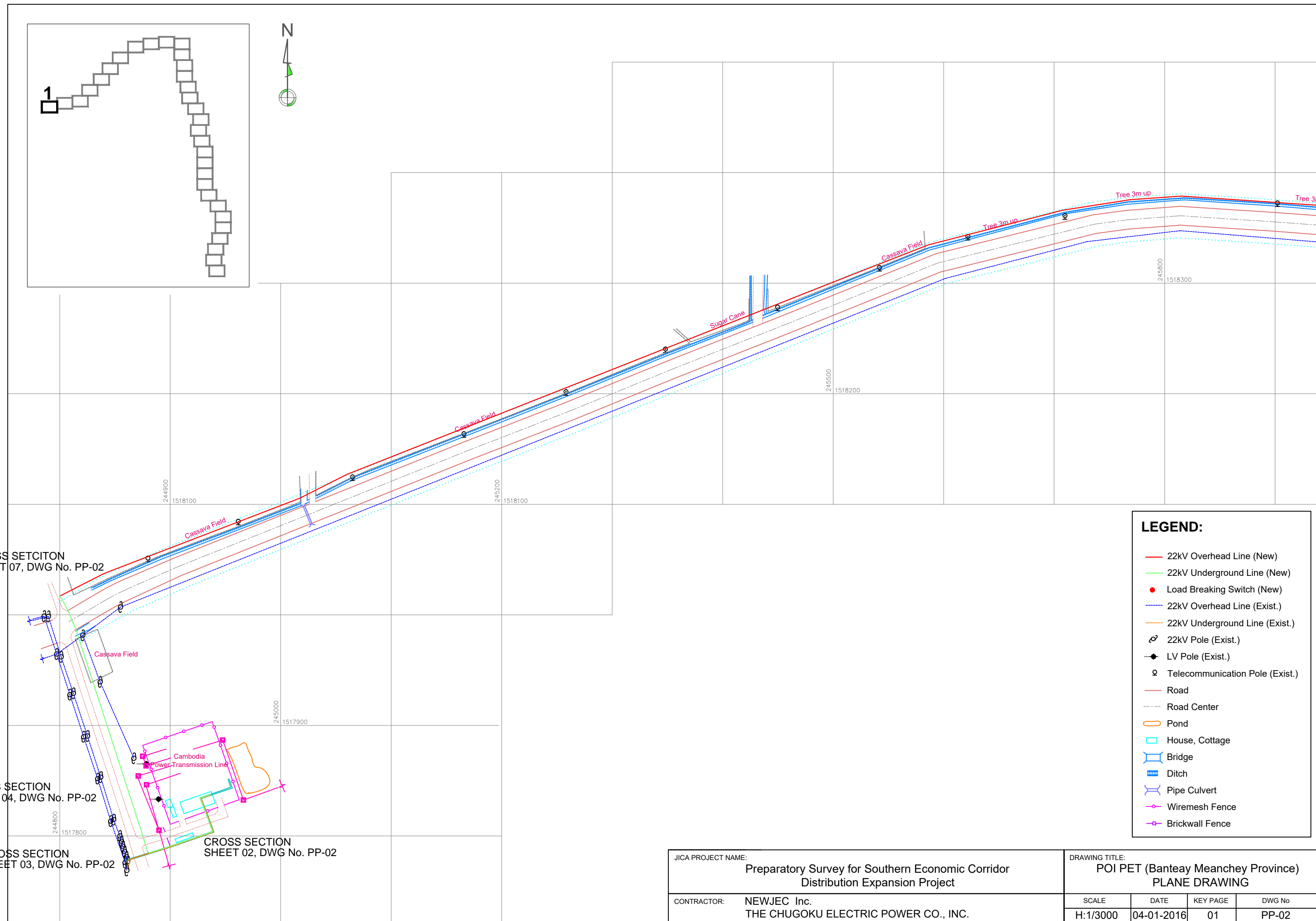
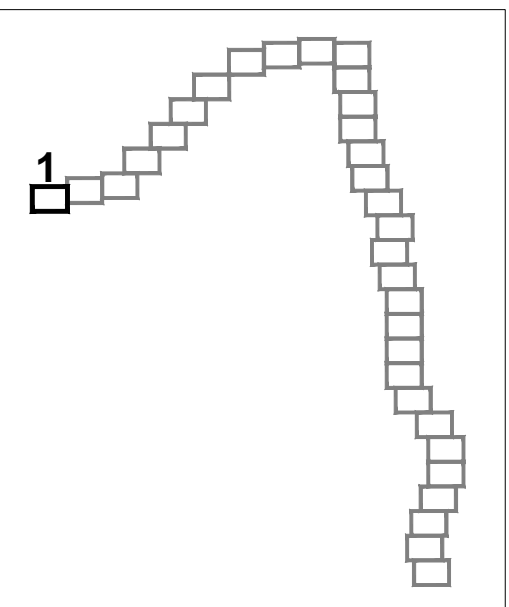


# **APPENDIX 11**

## **ROUTE MAP OF POIPET (1)**



\*Original drawing has A3 size



**LEGEND:**

- 22kV Overhead Line (New)
- 22kV Underground Line (New)
- Load Breaking Switch (New)
- 22kV Overhead Line (Exist.)
- 22kV Underground Line (Exist.)
- 22kV Pole (Exist.)
- ◊ LV Pole (Exist.)
- ⊙ Telecommunication Pole (Exist.)
- Road
- - - Road Center
- Pond
- House, Cottage
- = Bridge
- = Ditch
- = Pipe Culvert
- Wiremesh Fence
- Brickwall Fence

CROSS SECTION SHEET 07, DWG No. PP-02

CROSS SECTION SHEET 04, DWG No. PP-02

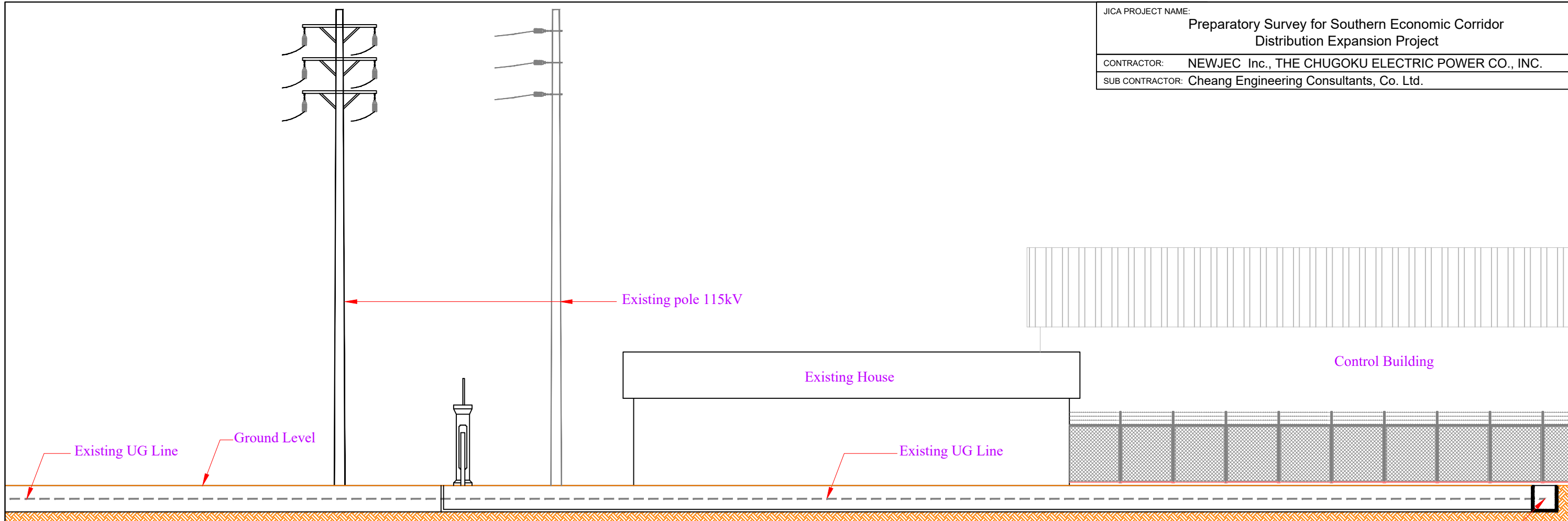
CROSS SECTION SHEET 03, DWG No. PP-02

CROSS SECTION SHEET 02, DWG No. PP-02

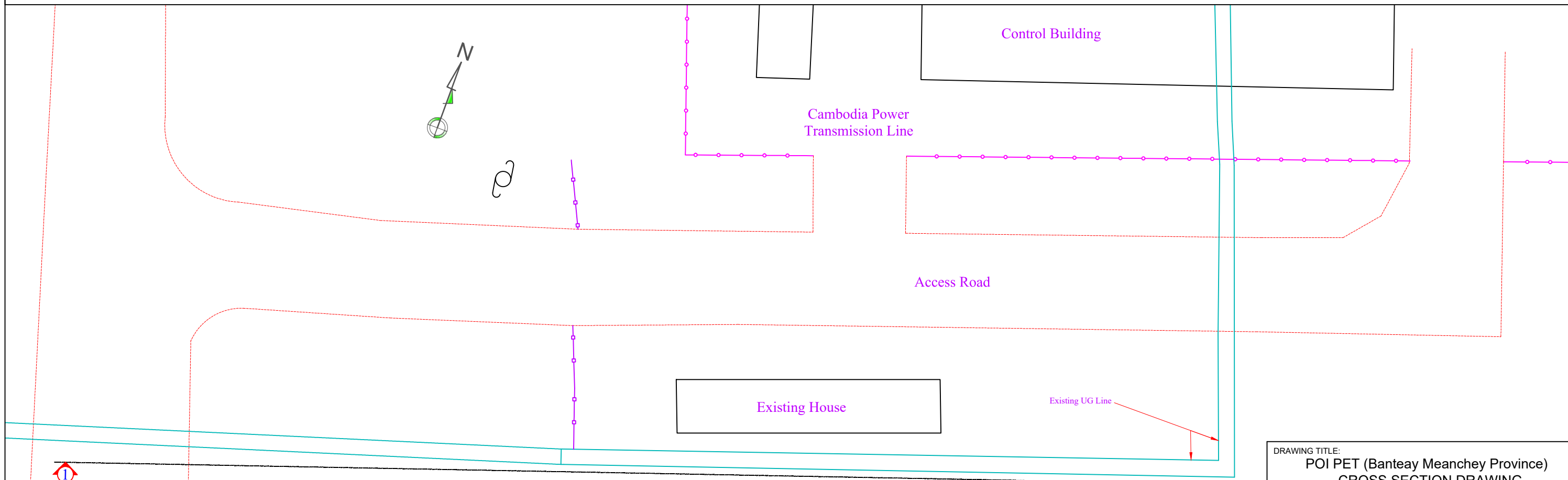
JICA PROJECT NAME: <b>Preparatory Survey for Southern Economic Corridor          Distribution Expansion Project</b>		DRAWING TITLE: <b>POI PET (Banteay Meanchey Province)          PLANE DRAWING</b>			
CONTRACTOR: <b>NEWJEC Inc.          THE CHUGOKU ELECTRIC POWER CO., INC.</b>		SCALE H:1/3000	DATE 04-01-2016	KEY PAGE 01	DWG No PP-02

\*Original drawing has A3 size

JICA PROJECT NAME: Preparatory Survey for Southern Economic Corridor Distribution Expansion Project  
 CONTRACTOR: NEWJEC Inc., THE CHUGOKU ELECTRIC POWER CO., INC.  
 SUB CONTRACTOR: Cheang Engineering Consultants, Co. Ltd.



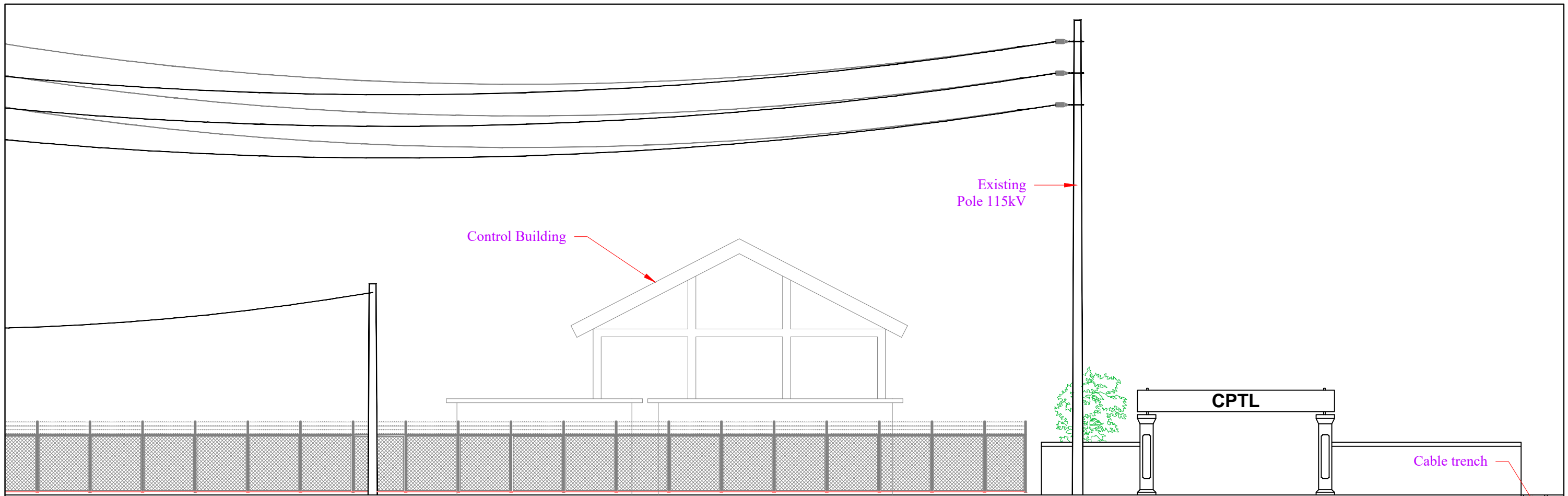
**CROSS SECTION 1-1**  
 SCALE: 1/150



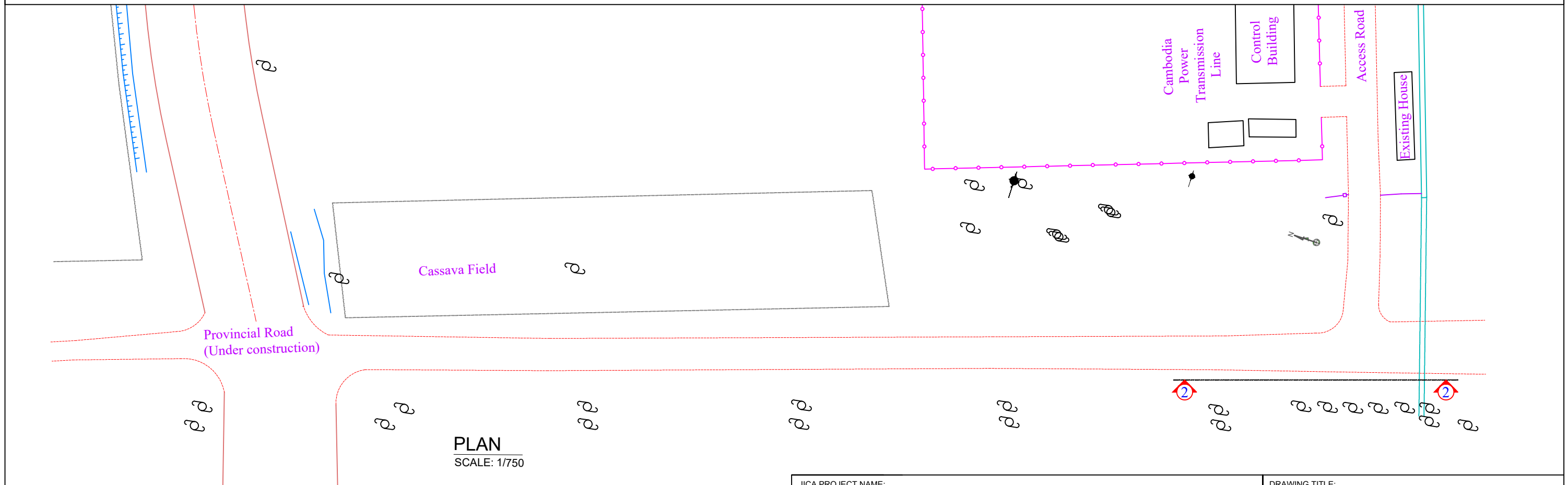
**PLAN**  
 SCALE: 1/250

DRAWING TITLE: POI PET (Banteay Meanchey Province) CROSS SECTION DRAWING			
SCALE	DATE	SHEET	DWG No
AS SHOWN	04-01-2016	02	PP-03

\*Original drawing has A3 size

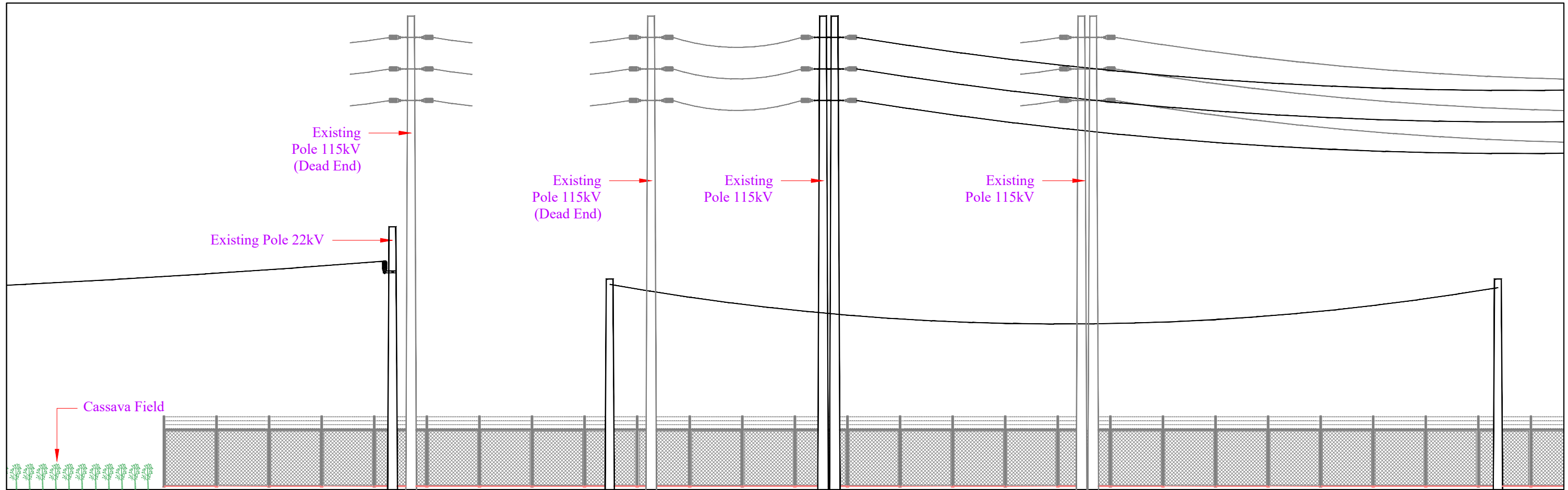


**CROSS SECTION 2-2**  
SCALE: 1/150

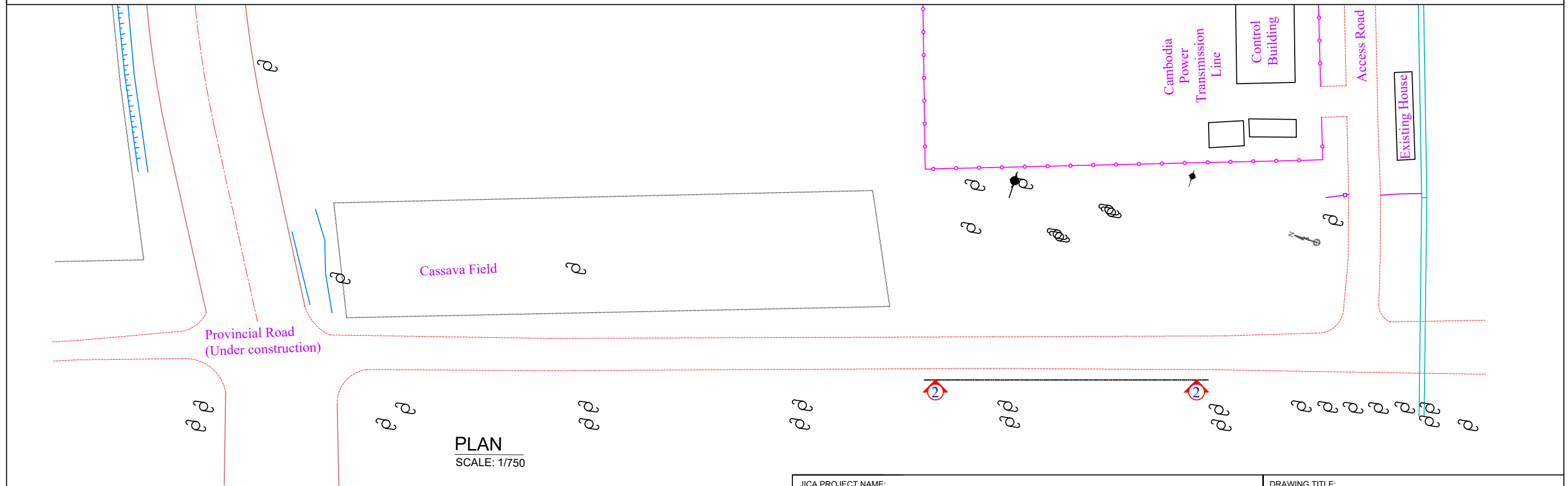


JICA PROJECT NAME: Preparatory Survey for Southern Economic Corridor Distribution Expansion Project		DRAWING TITLE: POI PET (Banteay Meanchey Province) CROSS SECTION DRAWING		
CONTRACTOR:	NEWJEC Inc., THE CHUGOKU ELECTRIC POWER CO., INC.	SCALE	DATE	SHEET
SUB CONTRACTOR:	Cheang Engineering Consultants, Co. Ltd.	AS SHOWN	04-01-2016	03
				DWG No PP-03

\*Original drawing has A3 size



**CROSS SECTION 2-2**  
SCALE: 1/150

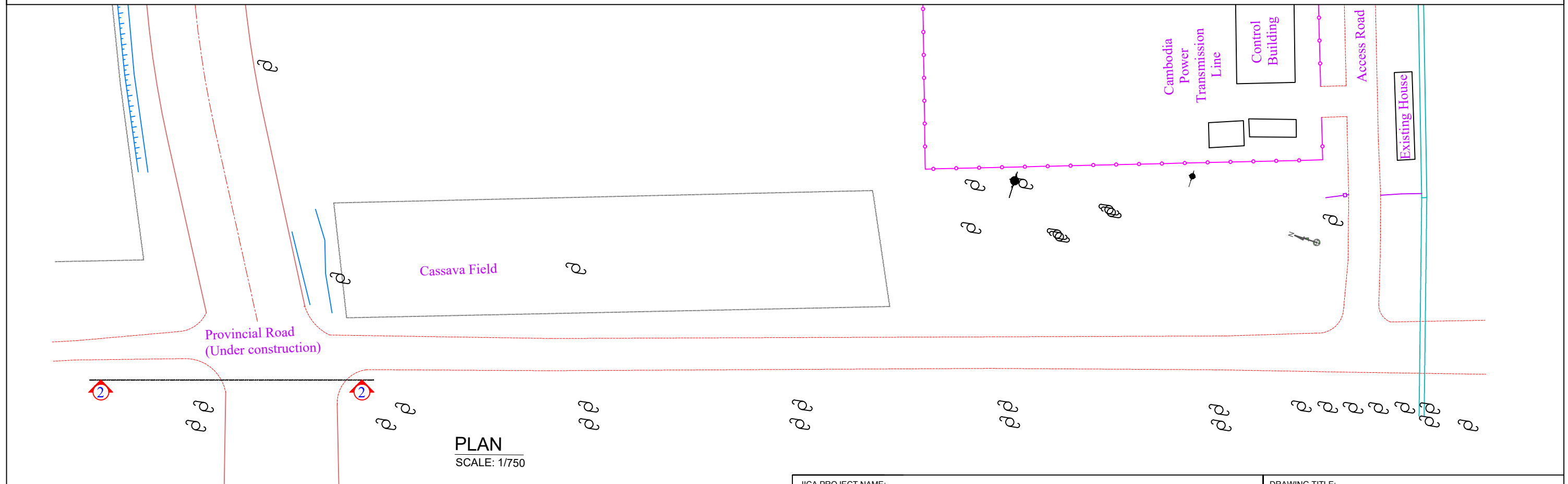
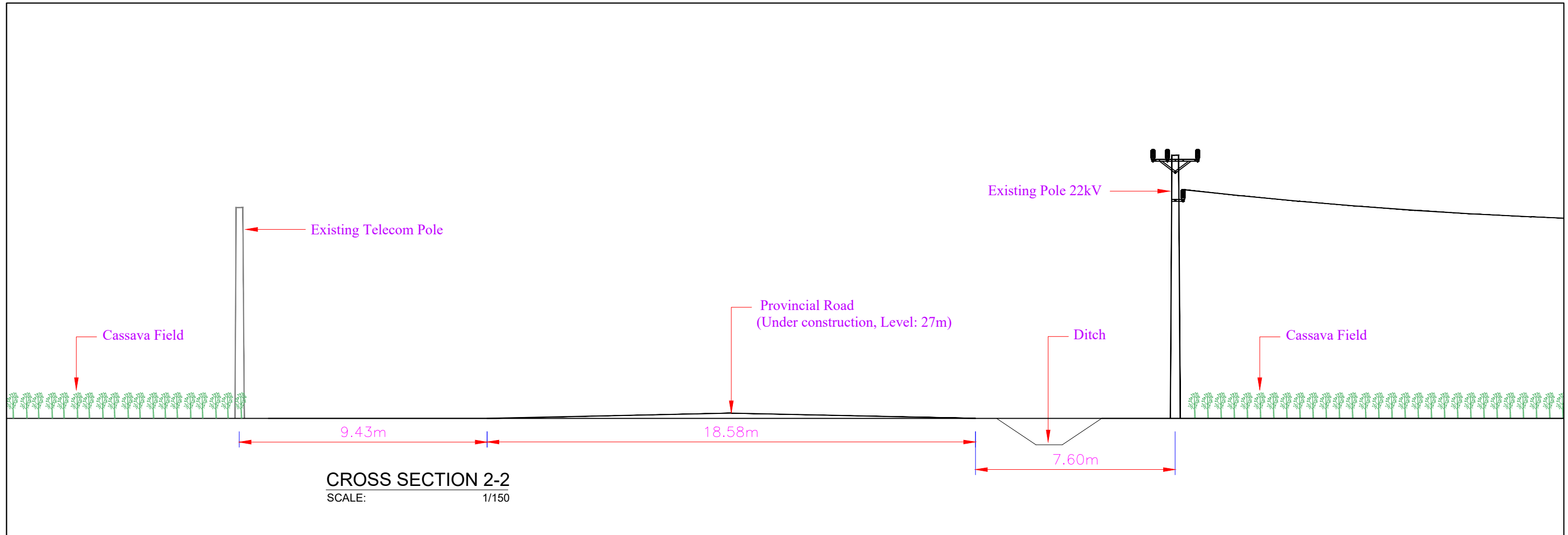


**PLAN**  
SCALE: 1/750

JICA PROJECT NAME: Preparatory Survey for Southern Economic Corridor Distribution Expansion Project		DRAWING TITLE: POI PET (Banteay Meanchey Province) CROSS SECTION DRAWING		
CONTRACTOR: NEWJEC Inc., THE CHUGOKU ELECTRIC POWER CO., INC.	SCALE AS SHOWN	DATE 04-01-2016	SHEET 04	DWG No PP-03
SUB CONTRACTOR: Cheang Engineering Consultants, Co. Ltd.				

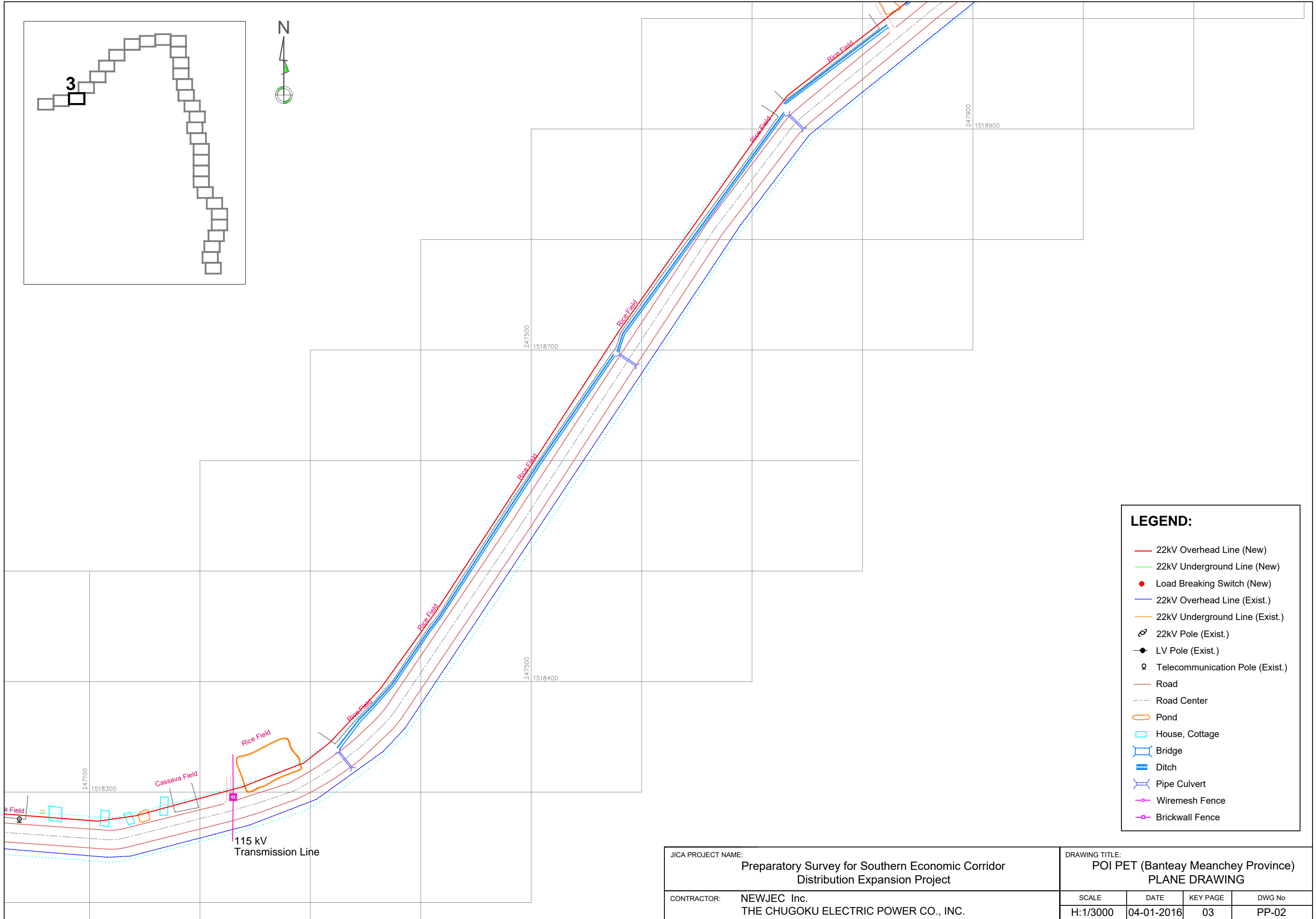
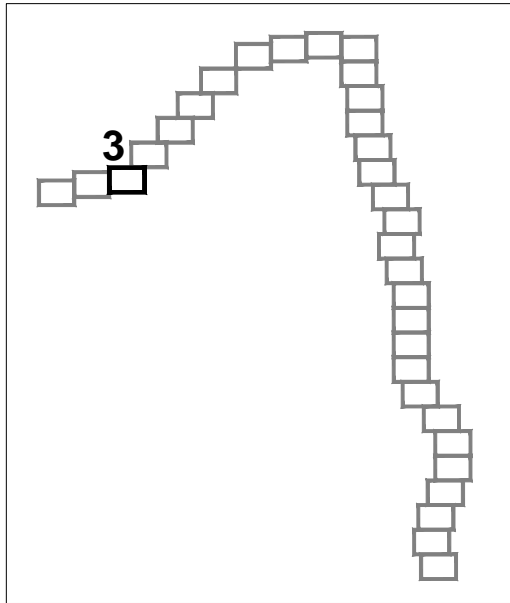
\*Original drawing has A3 size





JICA PROJECT NAME: Preparatory Survey for Southern Economic Corridor Distribution Expansion Project		DRAWING TITLE: POI PET (Banteay Meanchey Province) CROSS SECTION DRAWING			
CONTRACTOR:	NEWJEC Inc., THE CHUGOKU ELECTRIC POWER CO., INC.	SCALE	DATE	SHEET	DWG No
SUB CONTRACTOR:	Cheang Engineering Consultants, Co. Ltd.	AS SHOWN	04-01-2016	07	PP-03

\*Original drawing has A3 size



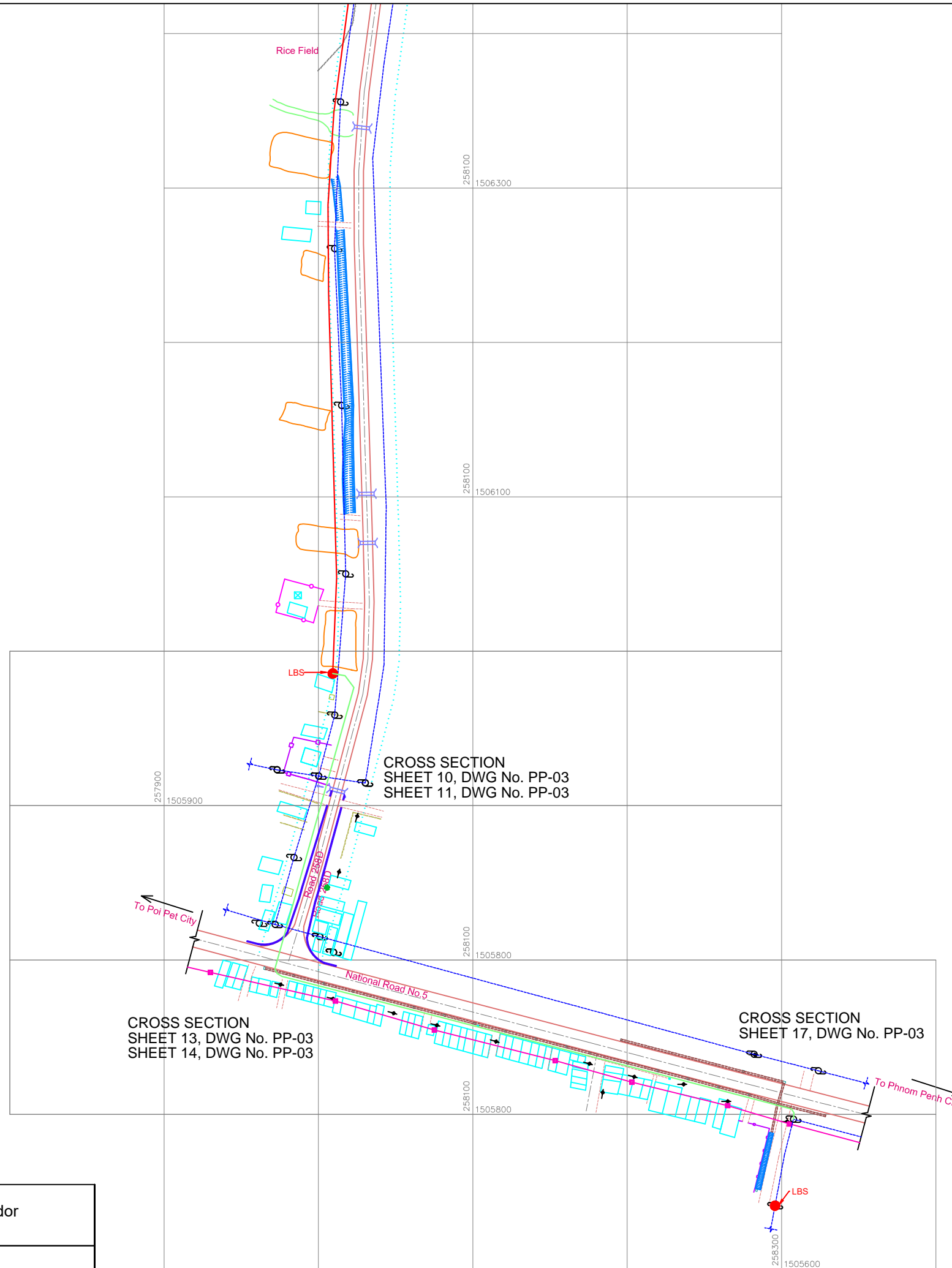
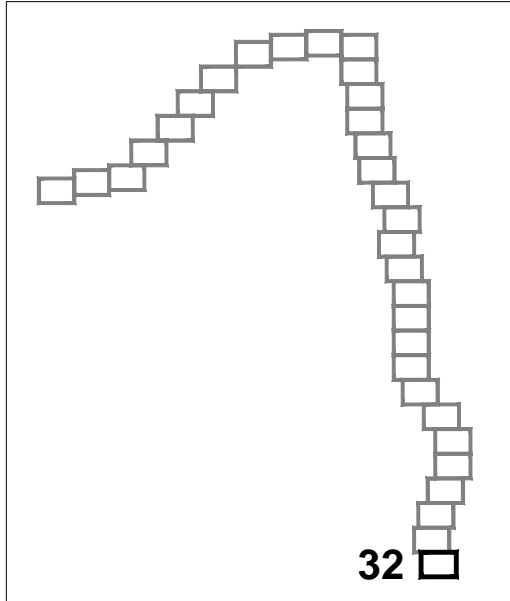
**LEGEND:**

- 22kV Overhead Line (New)
- 22kV Underground Line (New)
- Load Breaking Switch (New)
- 22kV Overhead Line (Exist.)
- 22kV Underground Line (Exist.)
- 22kV Pole (Exist.)
- LV Pole (Exist.)
- Telecommunication Pole (Exist.)
- Road
- - - Road Center
- Pond
- House, Cottage
- Bridge
- Ditch
- Pipe Culvert
- Wiremesh Fence
- Brickwall Fence

JICA PROJECT NAME: <b>Preparatory Survey for Southern Economic Corridor          Distribution Expansion Project</b>	DRAWING TITLE: <b>POI PET (Banteay Meanchey Province)          PLANE DRAWING</b>								
CONTRACTOR: <b>NEWJEC Inc.          THE CHUGOKU ELECTRIC POWER CO., INC.</b>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%; padding: 2px;">SCALE</td> <td style="width: 25%; padding: 2px;">DATE</td> <td style="width: 25%; padding: 2px;">KEY PAGE</td> <td style="width: 25%; padding: 2px;">DWG No</td> </tr> <tr> <td style="padding: 2px;">H:1/3000</td> <td style="padding: 2px;">04-01-2016</td> <td style="padding: 2px;">03</td> <td style="padding: 2px;">PP-02</td> </tr> </table>	SCALE	DATE	KEY PAGE	DWG No	H:1/3000	04-01-2016	03	PP-02
SCALE	DATE	KEY PAGE	DWG No						
H:1/3000	04-01-2016	03	PP-02						

\*Original drawing has A3 size





**LEGEND:**

- 22kV Overhead Line (New)
- 22kV Underground Line (New)
- Load Breaking Switch (New)
- 22kV Overhead Line (Exist.)
- 22kV Underground Line (Exist.)
- ⊗ 22kV Pole (Exist.)
- ◆ LV Pole (Exist.)
- ⊕ Telecommunication Pole (Exist.)
- Road
- Road Center
- Pond
- House, Cottage
- ⌒ Bridge
- ▬ Ditch
- ⌒ Pipe Culvert
- ⌒ Wiremesh Fence
- ⌒ Brickwall Fence

JICA PROJECT NAME:  
Preparatory Survey for Southern Economic Corridor  
Distribution Expansion Project

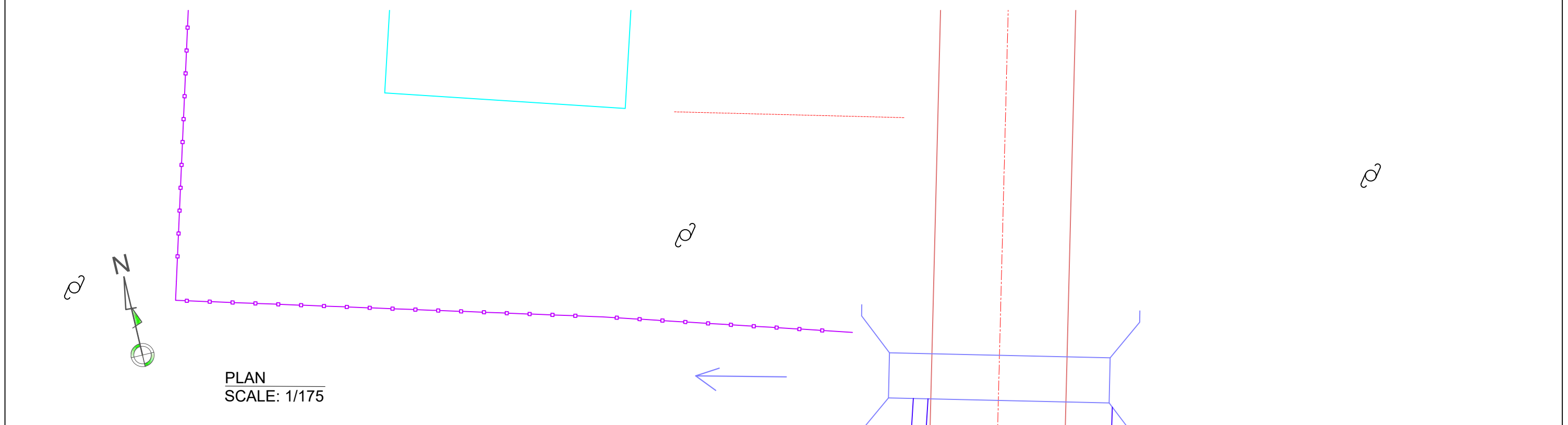
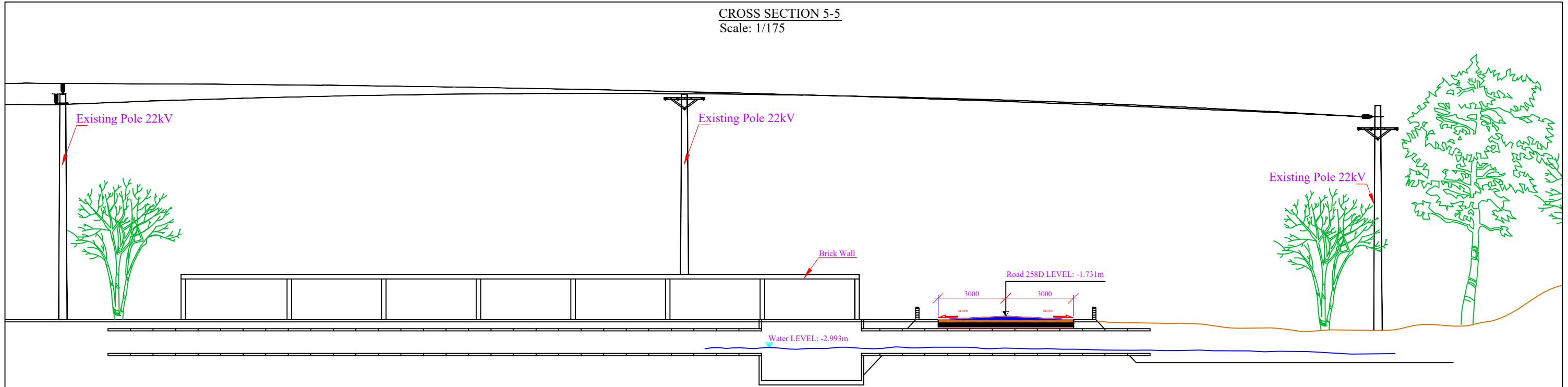
CONTRACTOR: NEWJEC Inc.  
THE CHUGOKU ELECTRIC POWER CO., INC.

DRAWING TITLE:  
POI PET (Banteay Meanchey Province)  
PLANE DRAWING

SCALE	DATE	KEY PAGE	DWG No
H:1/3000	04-01-2016	32	PP-02

\*Original drawing has A3 size

CROSS SECTION 5-5  
Scale: 1/175

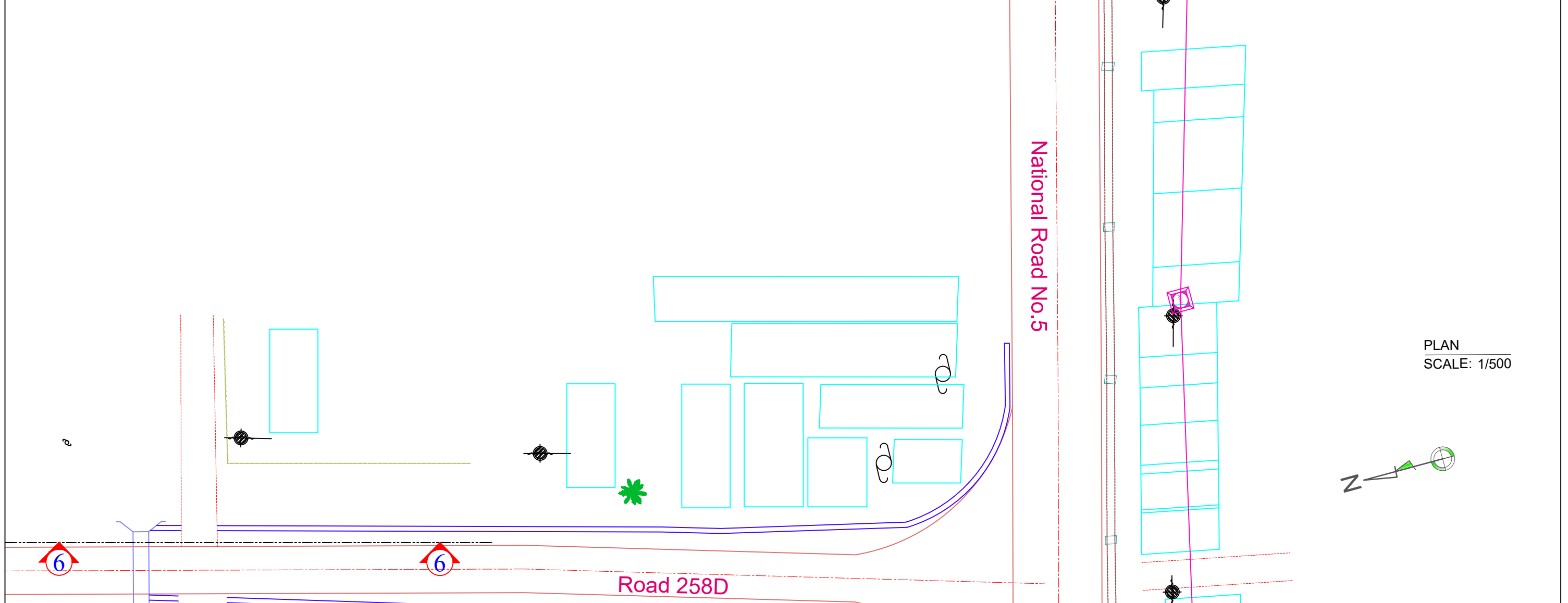
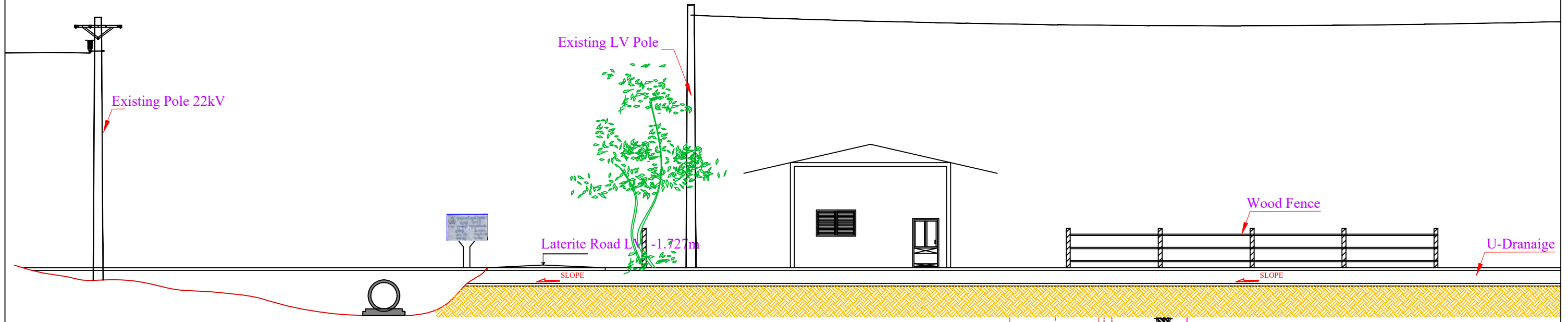


PLAN  
SCALE: 1/175

JICA PROJECT NAME: <b>Preparatory Survey for Southern Economic Corridor          Distribution Expansion Project</b>		DRAWING TITLE: <b>POI PET (Banteay Meanchey Province)          CROSS SECTION DRAWING</b>	
CONTRACTOR: <b>NEWJEC Inc., THE CHUGOKU ELECTRIC POWER CO., INC.</b>	SCALE AS SHOWN	DATE 04-01-2016	SHEET 10
SUB CONTRACTOR: <b>Cheang Engineering Consultants, Co. Ltd.</b>	DWG No PP-03		

\*Original drawing has A3 size

CROSS SECTION 6-6  
Scale: 1/150



JICA PROJECT NAME: Preparatory Survey for Southern Economic Corridor Distribution Expansion Project		DRAWING TITLE: POI PET (Banteay Meanchey Province) CROSS SECTION DRAWING			
CONTRACTOR: NEWJEC Inc., THE CHUGOKU ELECTRIC POWER CO., INC.		SCALE	DATE	SHEET	DWG No
SUB CONTRACTOR: Cheang Engineering Consultants, Co. Ltd.		AS SHOWN	04-01-2016	11	PP-03

\*Original drawing has A3 size

CROSS SECTION 6-6

Scale: 1/150

Existing LV Pole Existing Pole 115kV

National Road N-5 LEVEL:-1.407m

U-Drainage

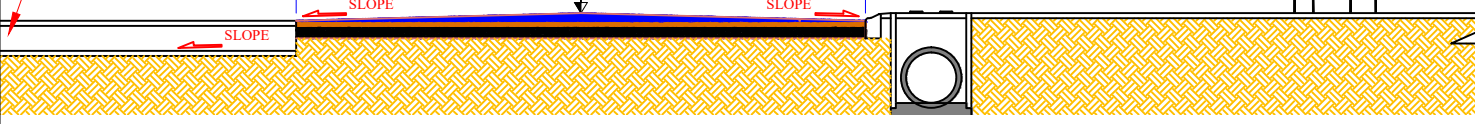
5650

5650

SLOPE

SLOPE

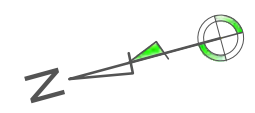
SLOPE



National Road No.5

Road 258D

PLAN SCALE: 1/500



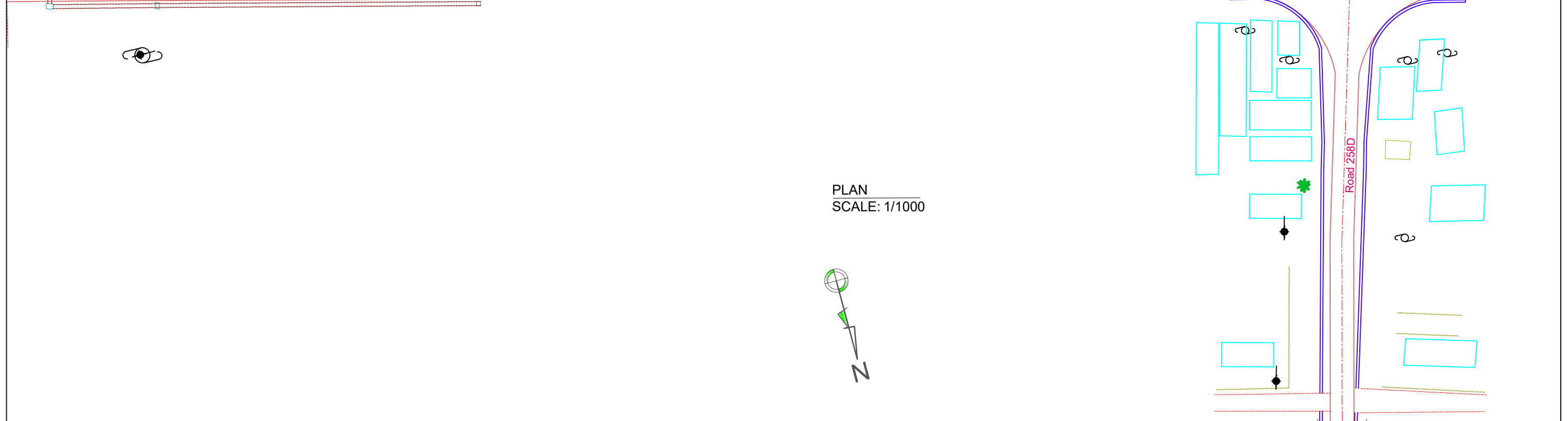
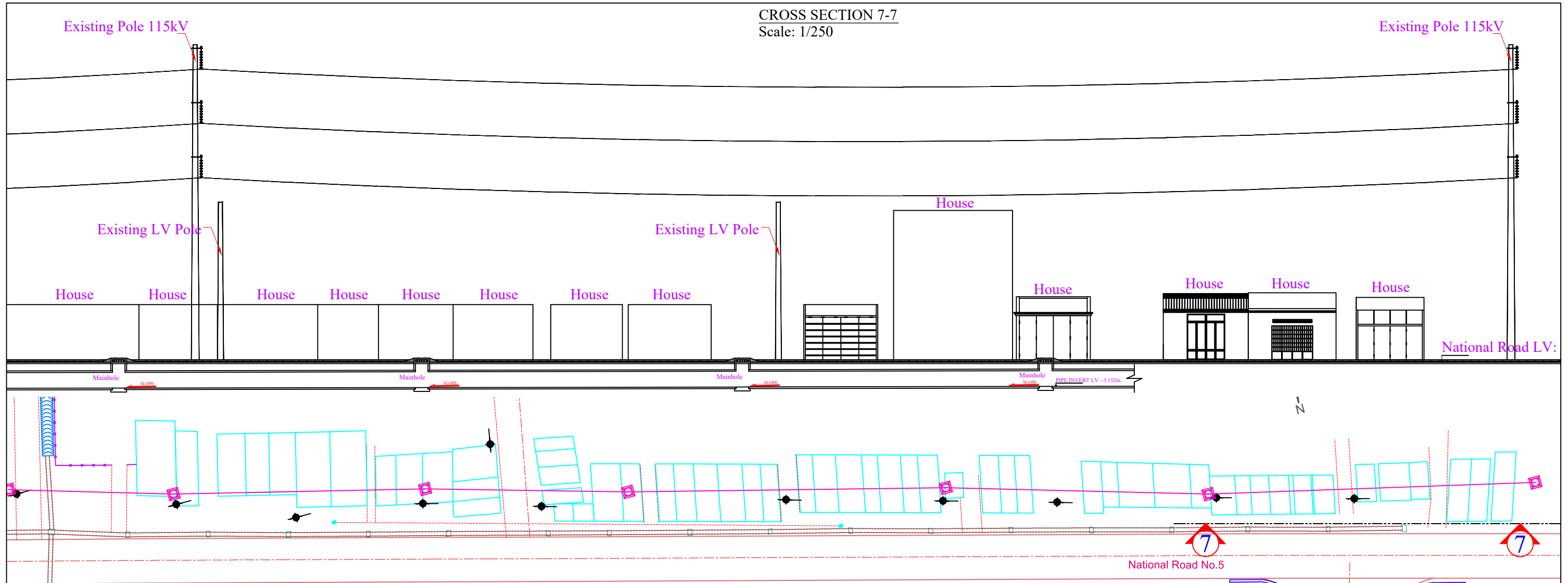
6

6

JICA PROJECT NAME: Preparatory Survey for Southern Economic Corridor Distribution Expansion Project		DRAWING TITLE: POI PET (Banteay Meanchey Province) CROSS SECTION DRAWING	
CONTRACTOR: NEWJEC Inc., THE CHUGOKU ELECTRIC POWER CO., INC.	SCALE AS SHOWN	DATE 04-01-2016	SHEET 13
SUB CONTRACTOR: Cheang Engineering Consultants, Co. Ltd.	DWG No PP-03		

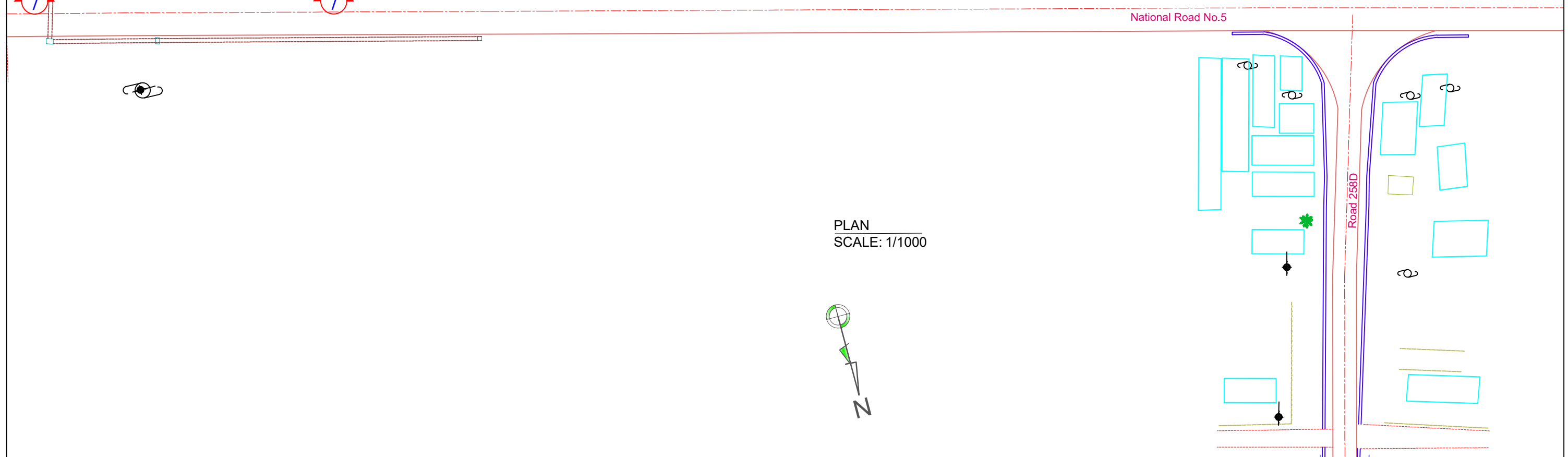
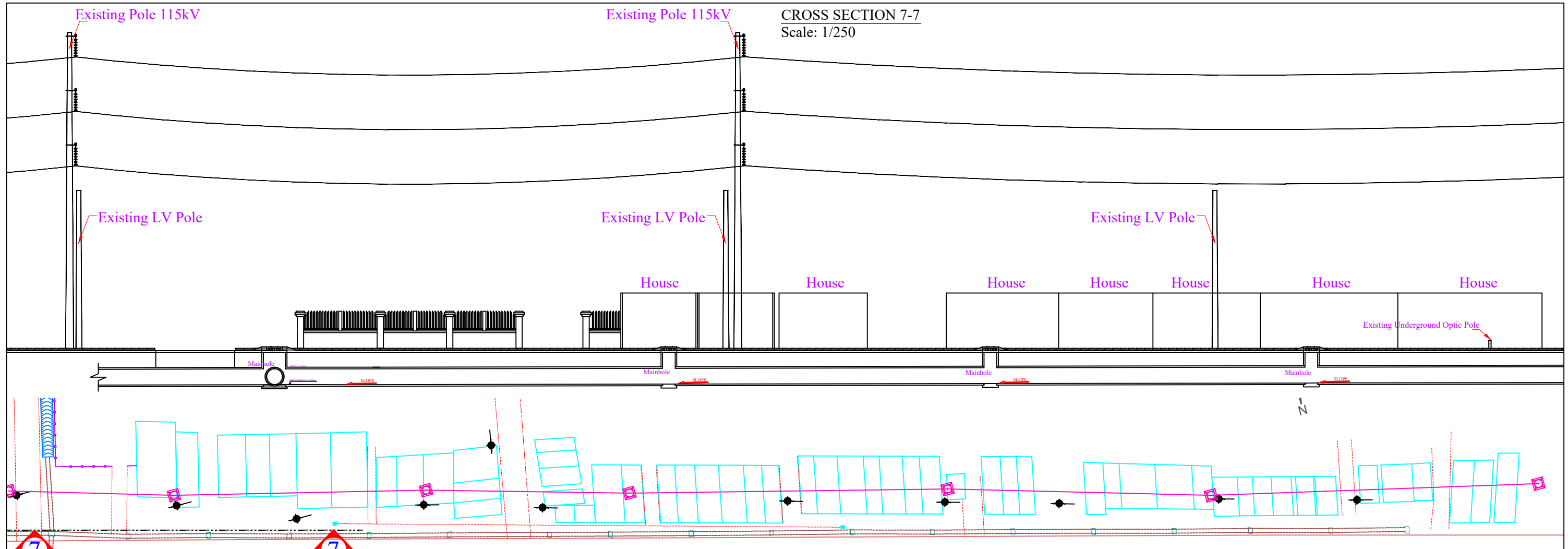
\*Original drawing has A3 size

CROSS SECTION 7-7  
Scale: 1/250



JICA PROJECT NAME: Preparatory Survey for Southern Economic Corridor Distribution Expansion Project		DRAWING TITLE: POI PET (Banteay Meanchey Province) CROSS SECTION DRAWING		
CONTRACTOR: NEWJEC Inc., THE CHUGOKU ELECTRIC POWER CO., INC.	SCALE AS SHOWN	DATE 04-01-2016	SHEET 14	DWG No PP-03
SUB CONTRACTOR: Cheang Engineering Consultants, Co. Ltd.				

\*Original drawing has A3 size

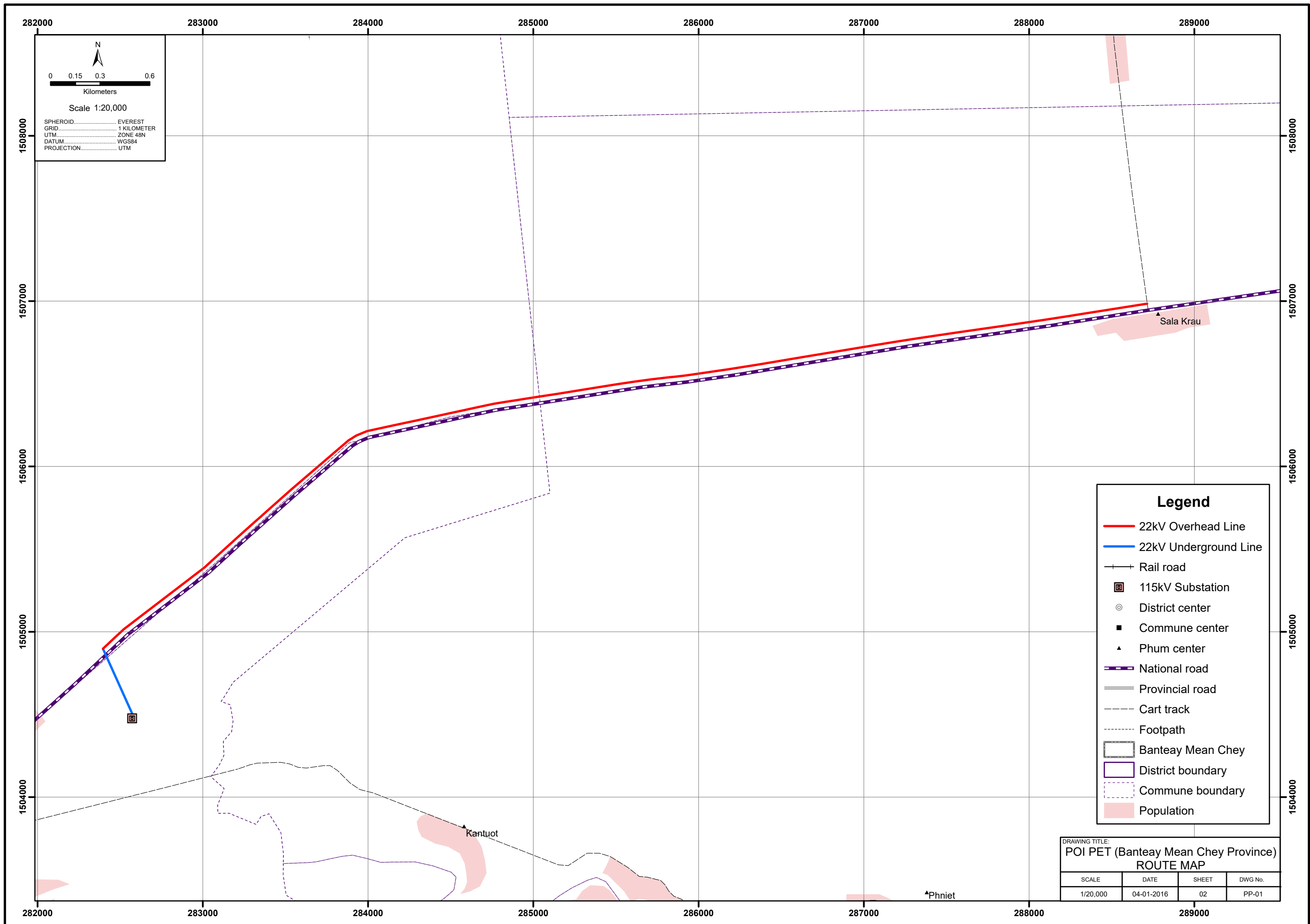


JICA PROJECT NAME: Preparatory Survey for Southern Economic Corridor Distribution Expansion Project		DRAWING TITLE: POI PET (Banteay Meanchey Province) CROSS SECTION DRAWING		
CONTRACTOR: NEWJEC Inc., THE CHUGOKU ELECTRIC POWER CO., INC.	SCALE AS SHOWN	DATE 04-01-2016	SHEET 17	DWG No PP-03
SUB CONTRACTOR: Cheang Engineering Consultants, Co. Ltd.				

\*Original drawing has A3 size

# **APPENDIX 12**

## **ROUTE MAP OF POIPET (2)**



\*Original drawing has A3 size



33



CROSS SECTION  
SHEET 22, DWG No. PP-03  
SHEET 18, DWG No. PP-03

CROSS SECTION  
SHEET 23, DWG No. PP-03

CROSS SECTION  
SHEET 24, DWG No. PP-03

See Section dwg. No. PP-03, Sheet 18 to 24

**LEGEND:**

- 22kV Overhead Line (New)
- 22kV Underground Line (New)
- Load Breaking Switch (New)
- - - 22kV Overhead Line (Exist.)
- 22kV Underground Line (Exist.)
- ⊙ 22kV Pole (Exist.)
- ◆ LV Pole (Exist.)
- ⊙ Telecommunication Pole (Exist.)
- Road
- - - Road Center
- ▭ Pond
- ▭ House, Cottage
- ▭ Bridge
- ▭ Ditch
- ▭ Pipe Culvert
- Wiremesh Fence
- Brickwall Fence

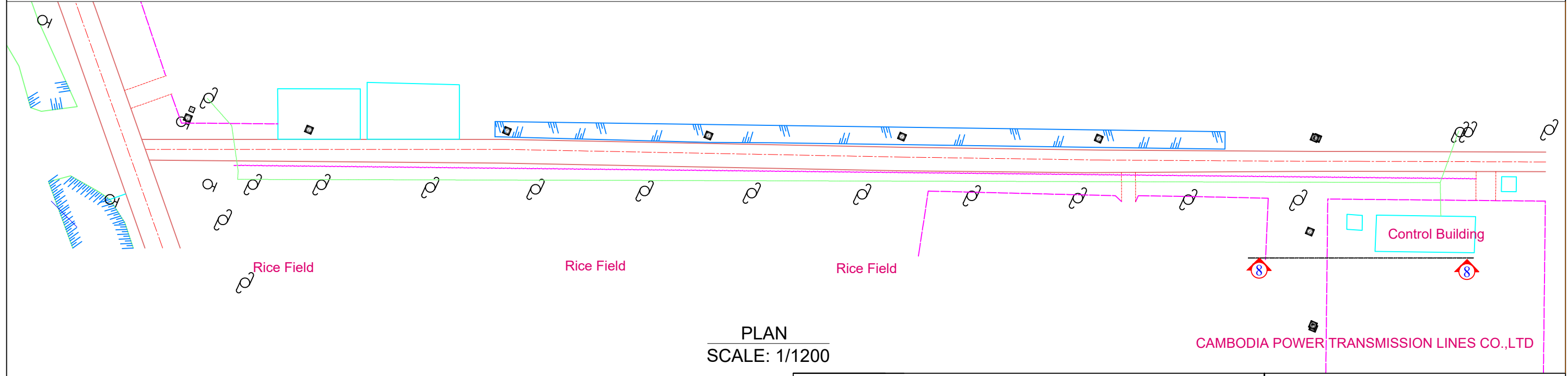
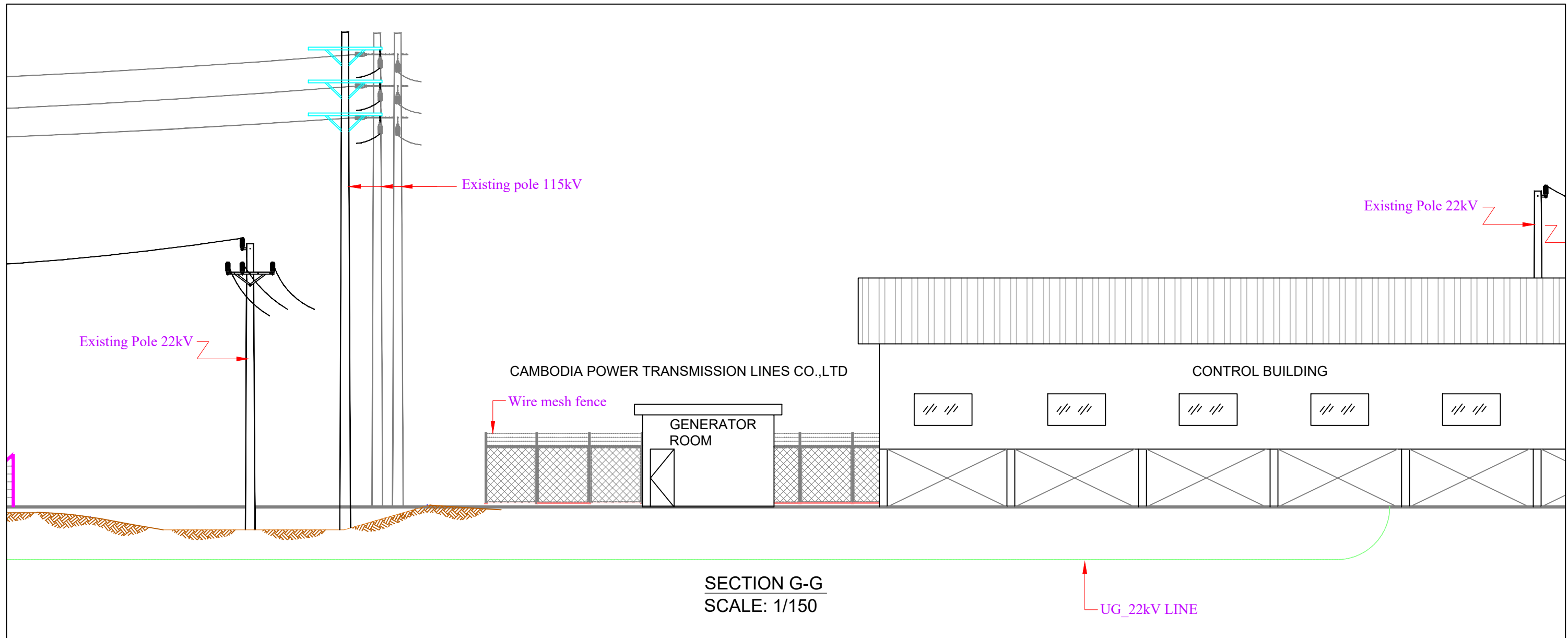
JICA PROJECT NAME:  
Preparatory Survey for Southern Economic Corridor  
Distribution Expansion Project

CONTRACTOR: NEWJEC Inc.  
THE CHUGOKU ELECTRIC POWER CO., INC.

DRAWING TITLE:  
POI PET (Banteay Meanchey Province)  
PLANE DRAWING

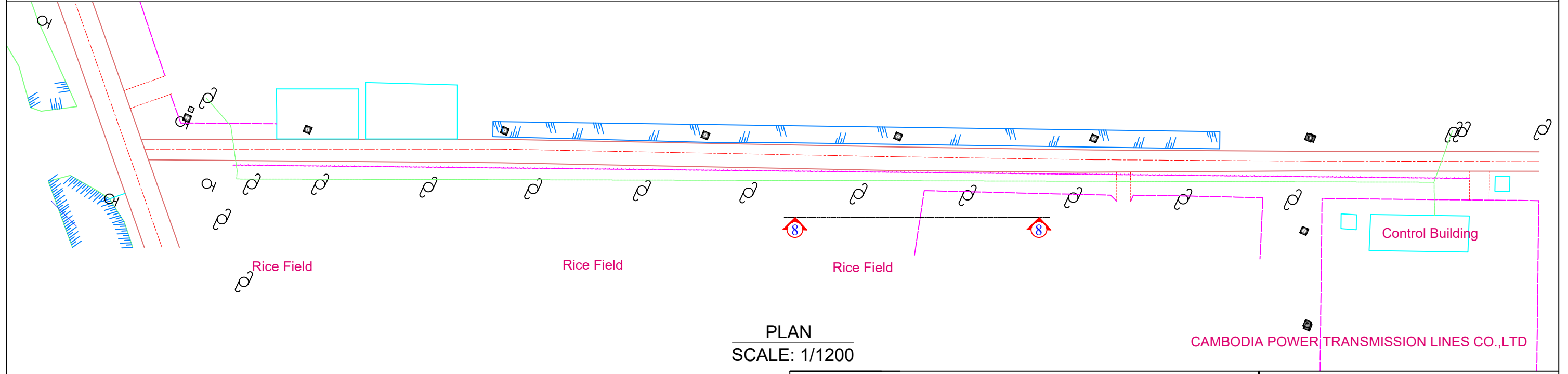
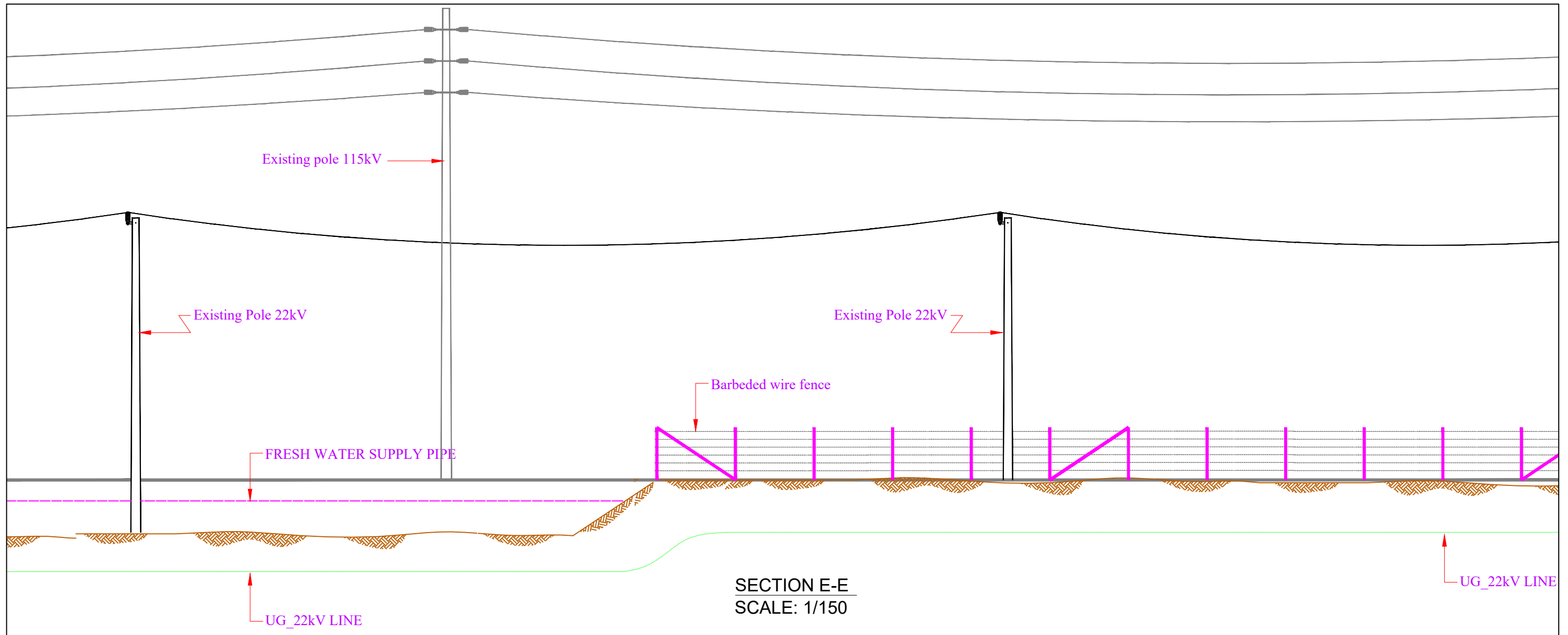
SCALE	DATE	KEY PAGE	DWG No
H:1/3000	04-01-2016	33	PP-02

\*Original drawing has A3 size



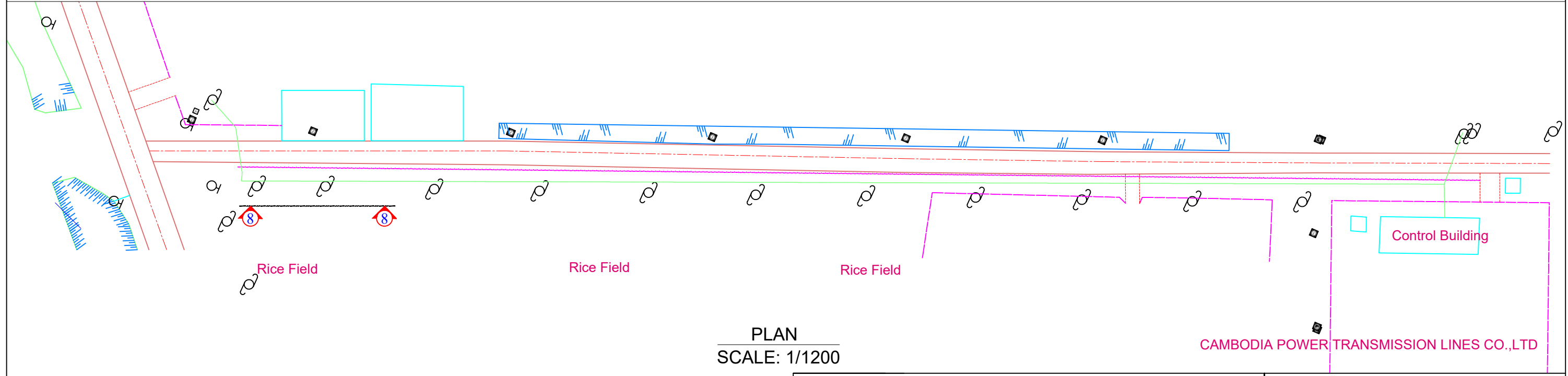
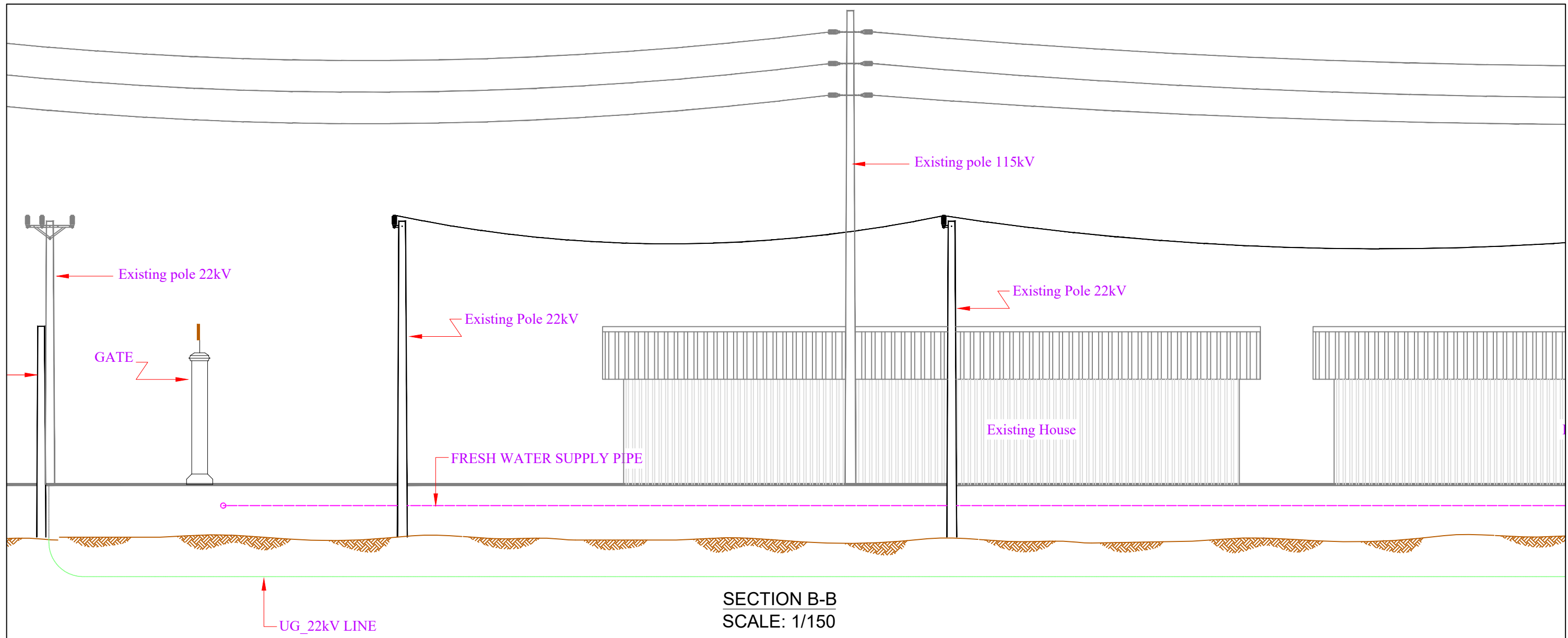
JICA PROJECT NAME: Preparatory Survey for Southern Economic Corridor Distribution Expansion Project		DRAWING TITLE: POI PET (Banteay Meanchey Province) CROSS SECTION DRAWING			
CONTRACTOR: NEWJEC Inc., THE CHUGOKU ELECTRIC POWER CO., INC.		SCALE	DATE	SHEET	DWG No
SUB CONTRACTOR: Cheang Engineering Consultants, Co. Ltd.		As Shown	04-01-2016	24	PP-03

\*Original drawing has A3 size



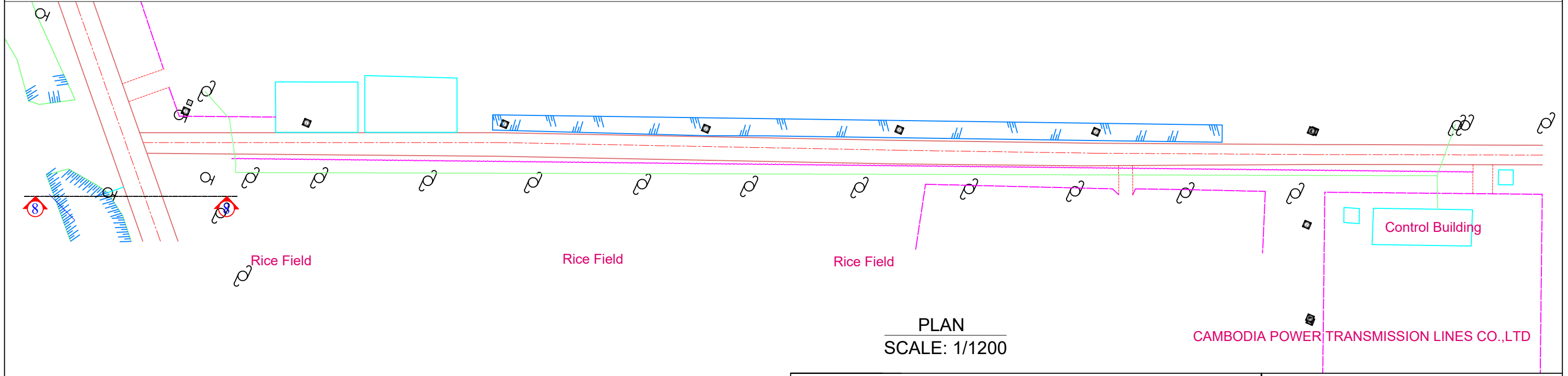
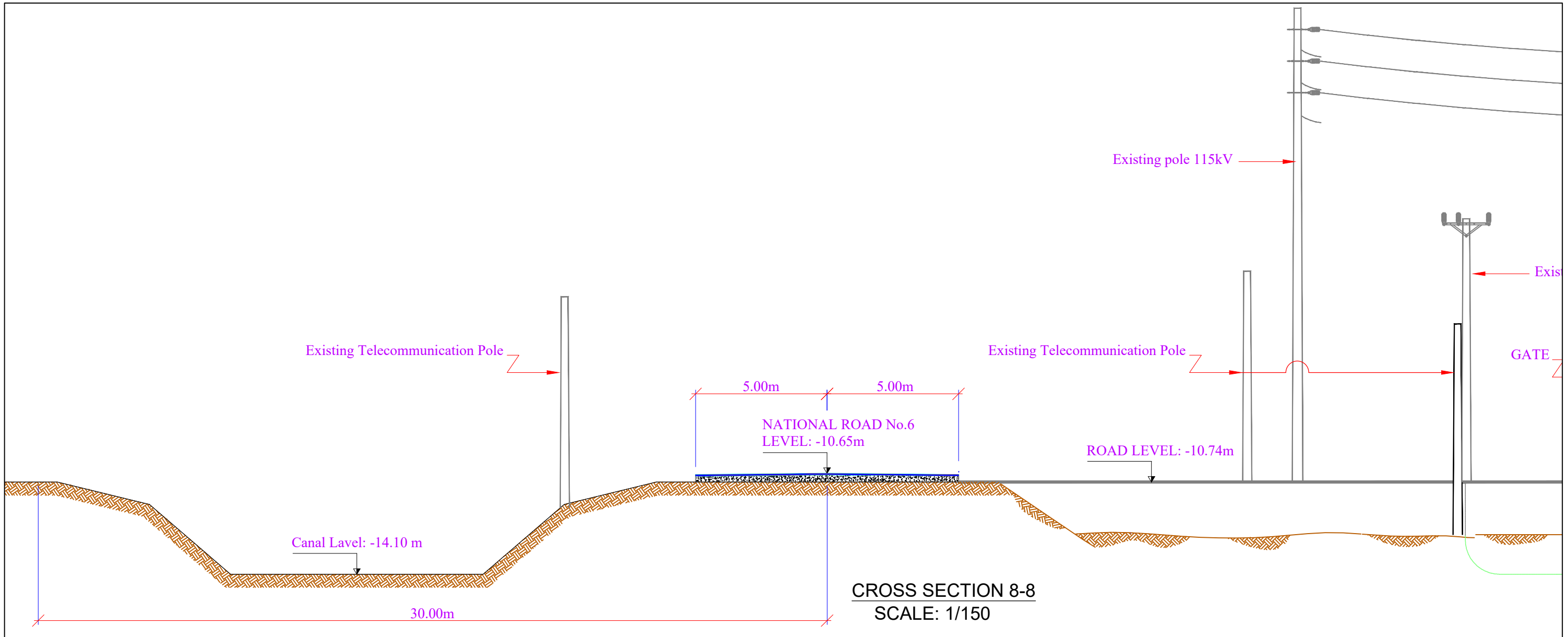
JICA PROJECT NAME: Preparatory Survey for Southern Economic Corridor Distribution Expansion Project		DRAWING TITLE: POI PET (Banteay Meanchey Province) CROSS SECTION DRAWING			
CONTRACTOR: NEWJEC Inc., THE CHUGOKU ELECTRIC POWER CO., INC.		SCALE	DATE	SHEET	DWG No
SUB CONTRACTOR: Cheang Engineering Consultants, Co. Ltd.		As Shown	04-01-2016	23	PP-03

\*Original drawing has A3 size



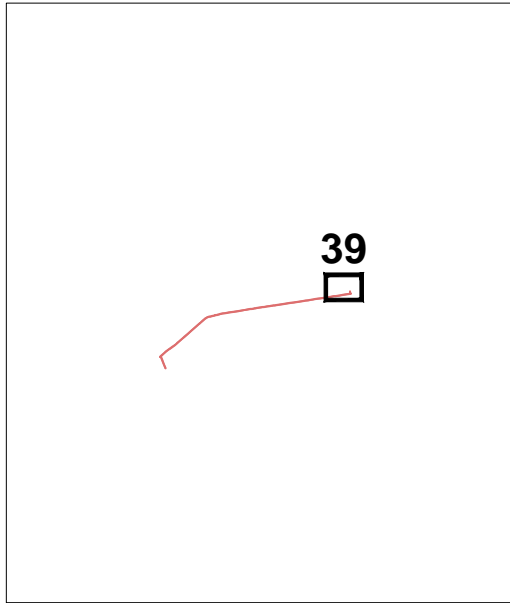
JICA PROJECT NAME: Preparatory Survey for Southern Economic Corridor Distribution Expansion Project		DRAWING TITLE: POI PET (Banteay Meanchey Province) CROSS SECTION DRAWING	
CONTRACTOR: NEWJEC Inc., THE CHUGOKU ELECTRIC POWER CO., INC.		SCALE	DATE
SUB CONTRACTOR: Cheang Engineering Consultants, Co. Ltd.		As Shown	04-01-2016
		SHEET	DWG No
		19	PP-03

\*Original drawing has A3 size



JICA PROJECT NAME: Preparatory Survey for Southern Economic Corridor Distribution Expansion Project		DRAWING TITLE: POI PET (Banteay Meanchey Province) CROSS SECTION DRAWING	
CONTRACTOR: NEWJEC Inc., THE CHUGOKU ELECTRIC POWER CO., INC.		SCALE	DATE
SUB CONTRACTOR: Cheang Engineering Consultants, Co. Ltd.		As Shown	04-01-2016
		SHEET	DWG No
		18	PP-03

\*Original drawing has A3 size

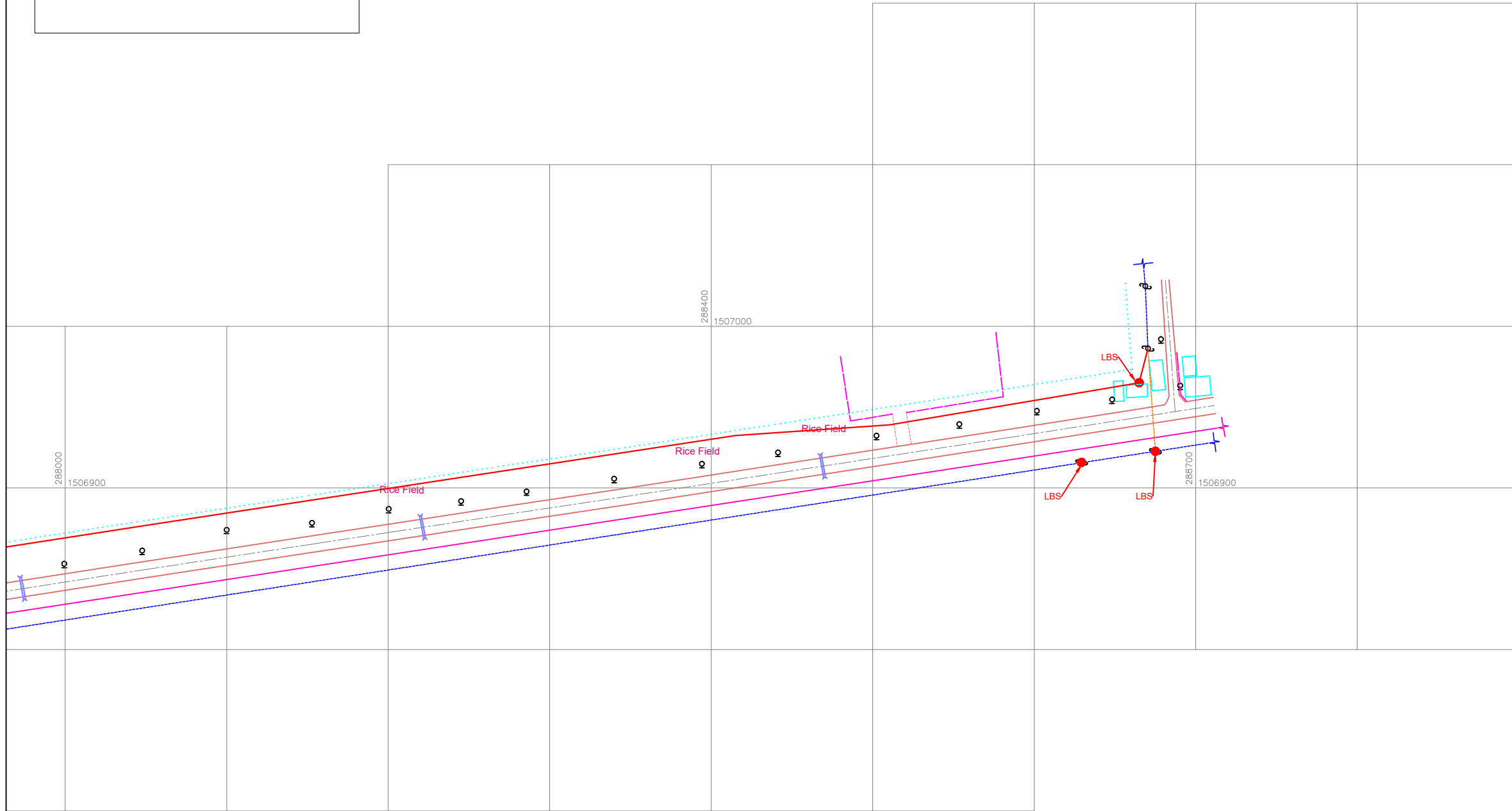


39



**LEGEND:**

- 22kV Overhead Line (New)
- 22kV Underground Line (New)
- Load Breaking Switch (New)
- 22kV Overhead Line (Exist.)
- 22kV Underground Line (Exist.)
- ⊙ 22kV Pole (Exist.)
- ◆ LV Pole (Exist.)
- ⊙ Telecommunication Pole (Exist.)
- Road
- - - Road Center
- ▭ Pond
- ▭ House, Cottage
- ▭ Bridge
- ▭ Ditch
- ▭ Pipe Culvert
- Wiremesh Fence
- Brickwall Fence

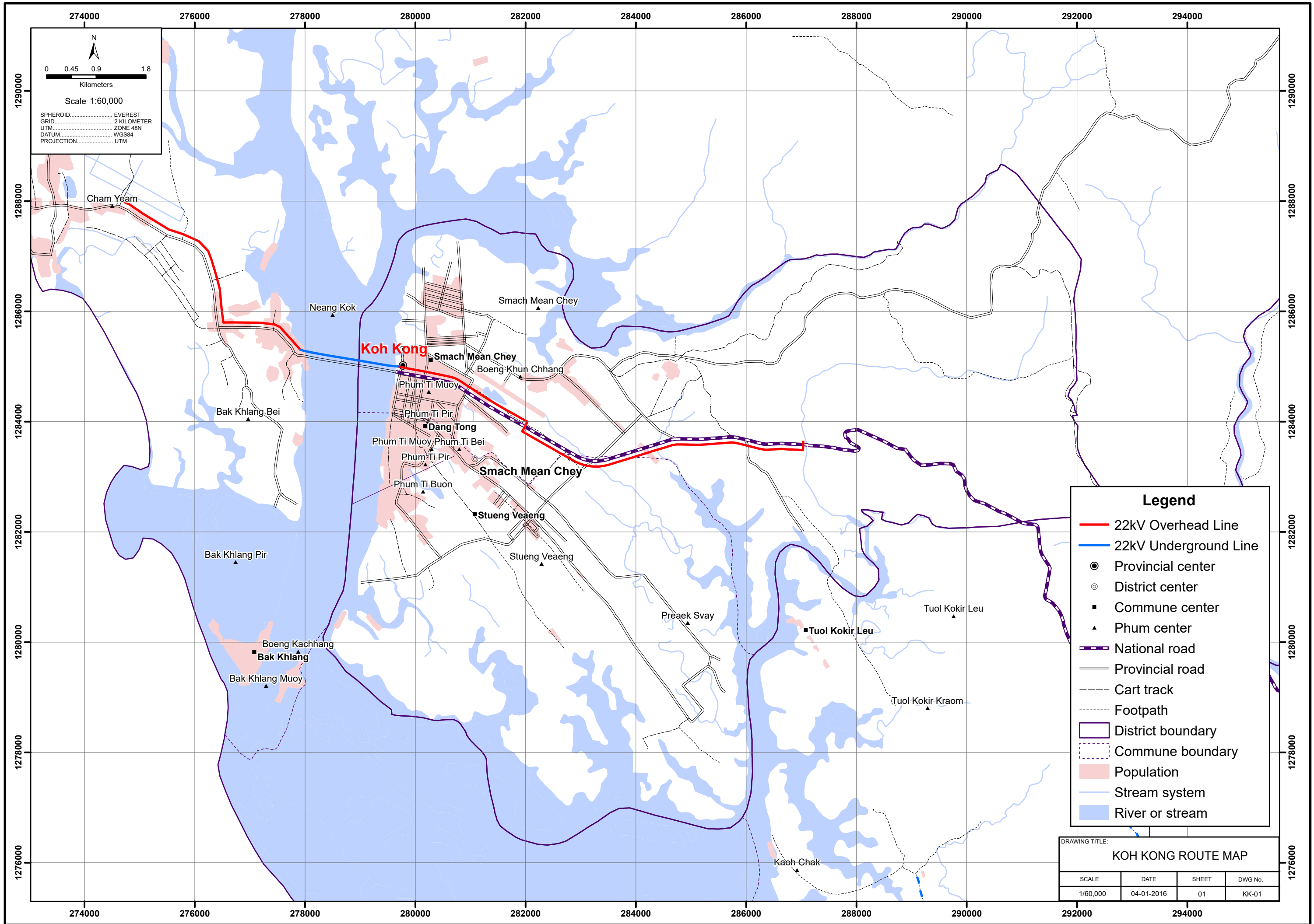


JICA PROJECT NAME: <b>Preparatory Survey for Southern Economic Corridor          Distribution Expansion Project</b>		DRAWING TITLE: <b>POI PET (Banteay Meanchey Province)          PLANE DRAWING</b>	
CONTRACTOR: <b>NEWJEC Inc.          THE CHUGOKU ELECTRIC POWER CO., INC.</b>		SCALE H:1/3000	DATE 04-01-2016
		KEY PAGE 39	DWG No PP-02

\*Original drawing has A3 size

# **APPENDIX 13**

## **ROUTE MAP OF KOH KONG**



N  
 0 0.45 0.9 1.8  
 Kilometers  
 Scale 1:60,000  
 SPHEROID..... EVEREST  
 GRID..... 2 KILOMETER  
 UTM..... ZONE 48N  
 DATUM..... WGS84  
 PROJECTION..... UTM

**Legend**

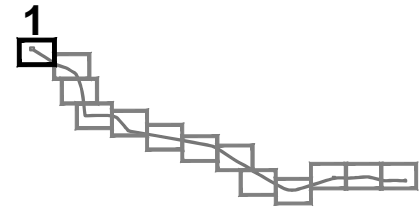
- 22kV Overhead Line
- 22kV Underground Line
- Provincial center
- ⊙ District center
- Commune center
- ▲ Phum center
- National road
- Provincial road
- Cart track
- Footpath
- District boundary
- Commune boundary
- Population
- Stream system
- River or stream

DRAWING TITLE:  
**KOH KONG ROUTE MAP**

SCALE	DATE	SHEET	DWG No.
1/60,000	04-01-2016	01	KK-01

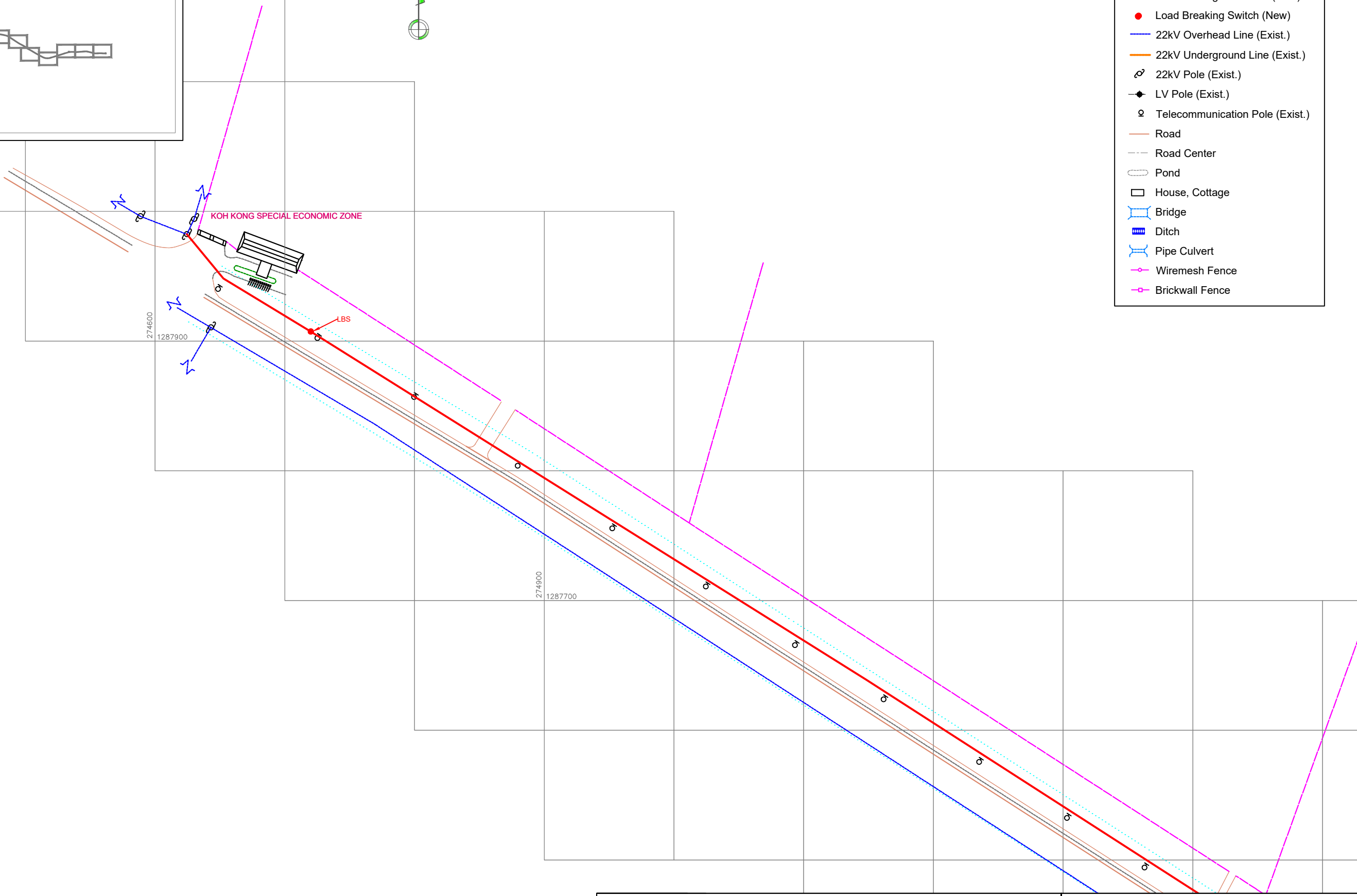
\*Original drawing has A3 size





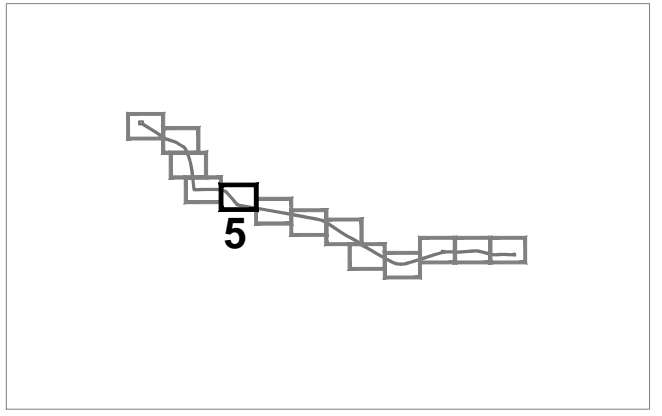
**LEGEND:**

- 22kV Overhead Line (New)
- 22kV Underground Line (New)
- Load Breaking Switch (New)
- 22kV Overhead Line (Exist.)
- 22kV Underground Line (Exist.)
- 22kV Pole (Exist.)
- ◆ LV Pole (Exist.)
- ♀ Telecommunication Pole (Exist.)
- Road
- - - Road Center
- Pond
- House, Cottage
- ▭ Bridge
- ▭ Ditch
- ▭ Pipe Culvert
- Wiremesh Fence
- Brickwall Fence



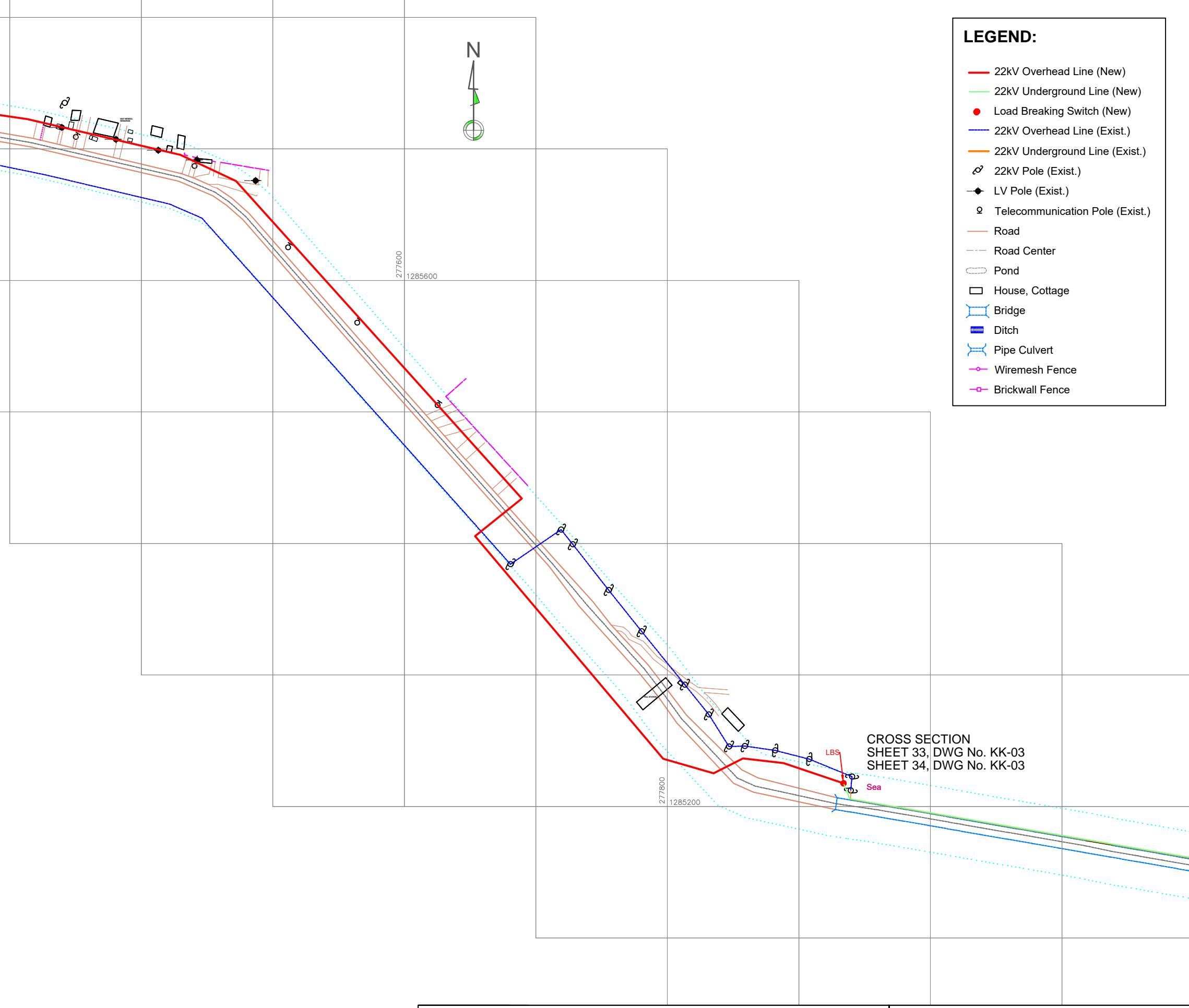
JICA PROJECT NAME: Preparatory Survey for Southern Economic Corridor Distribution Expansion Project		DRAWING TITLE: KOH KONG PLANE DRAWING			
CONTRACTOR: NEWJEC Inc. THE CHUGOKU ELECTRIC POWER CO., INC.		SCALE: H:1/3000	DATE: 04-01-2016	KEY PAGE: 01	DWG No: KK-02

\*Original drawing has A3 size



**LEGEND:**

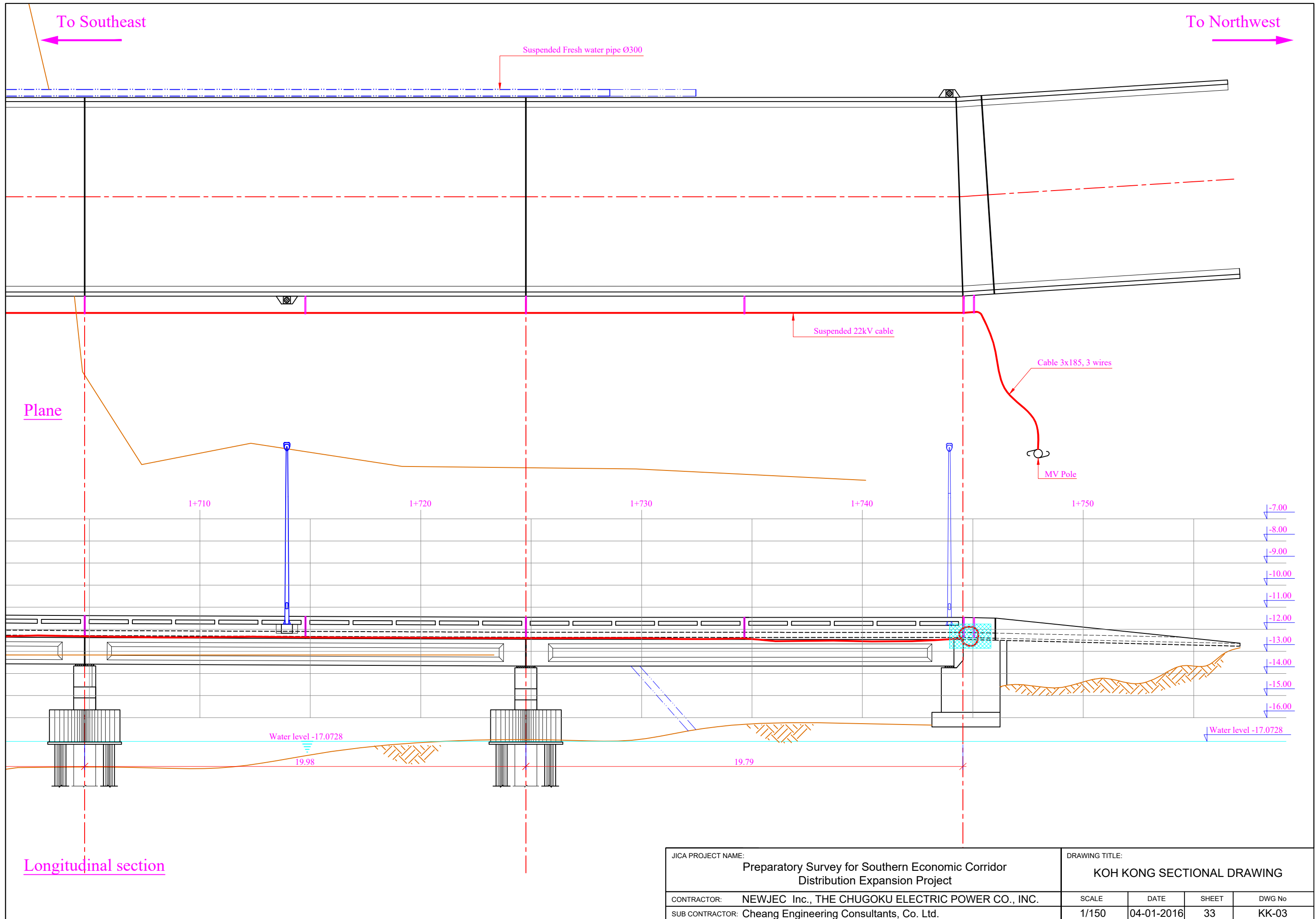
- 22kV Overhead Line (New)
- 22kV Underground Line (New)
- Load Breaking Switch (New)
- 22kV Overhead Line (Exist.)
- 22kV Underground Line (Exist.)
- 22kV Pole (Exist.)
- ◆ LV Pole (Exist.)
- ⊙ Telecommunication Pole (Exist.)
- Road
- Road Center
- Pond
- House, Cottage
- Bridge
- ▤ Ditch
- Pipe Culvert
- Wiremesh Fence
- Brickwall Fence



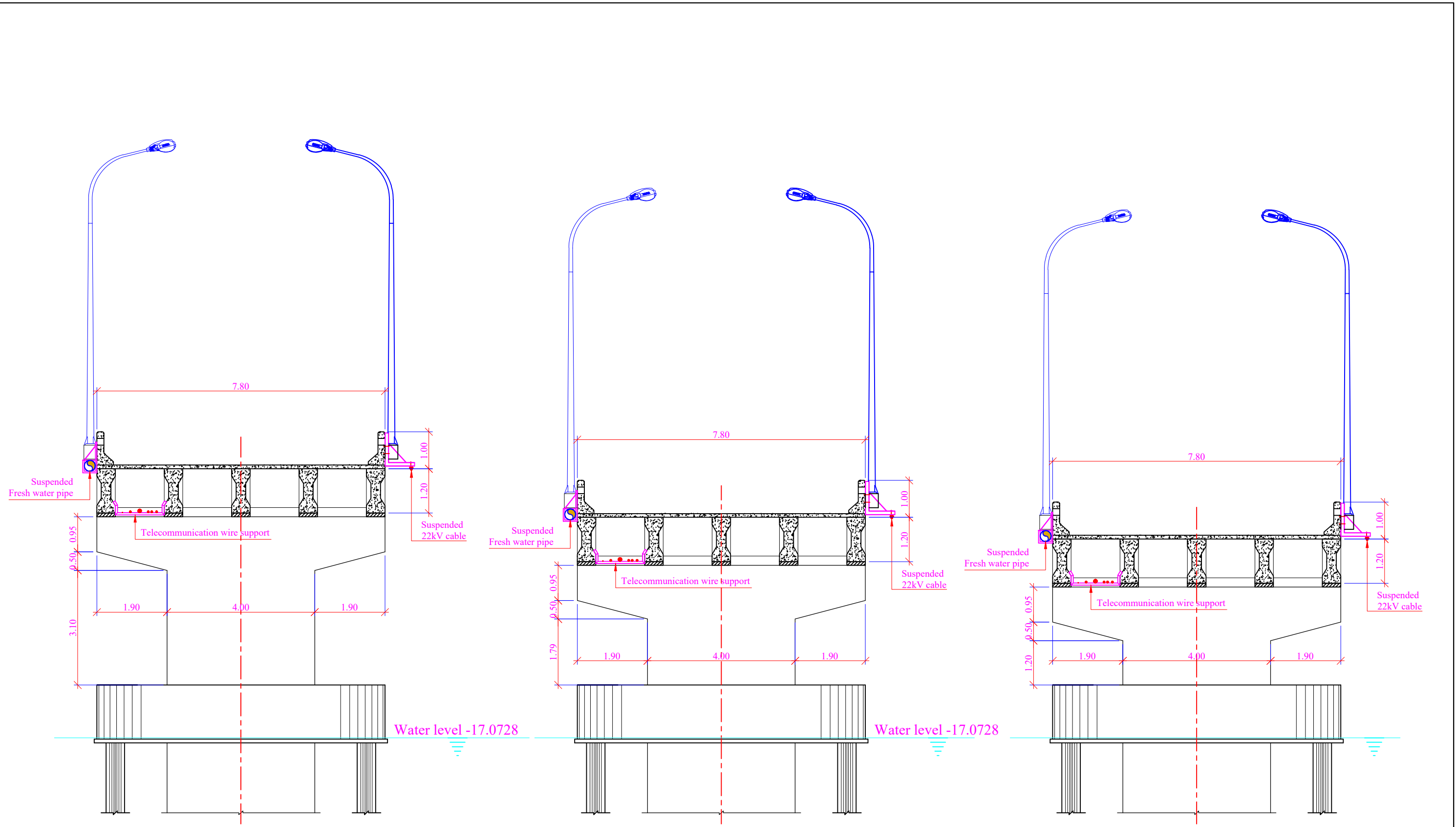
CROSS SECTION  
SHEET 33, DWG No. KK-03  
SHEET 34, DWG No. KK-03

JICA PROJECT NAME: <b>Preparatory Survey for Southern Economic Corridor Distribution Expansion Project</b>		DRAWING TITLE: <b>KOH KONG PLANE DRAWING</b>			
CONTRACTOR: <b>NEWJEC Inc. THE CHUGOKU ELECTRIC POWER CO., INC.</b>		SCALE H:1/3000	DATE 04-01-2016	KEY PAGE 05	DWG No KK-02

\*Original drawing has A3 size



\*Original drawing has A3 size



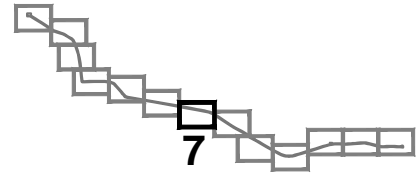
CROSS SECTION AT CHAINAGE 0+144

CROSS SECTION AT CHAINAGE 0+464

CROSS SECTION AT CHAINAGE 1+524

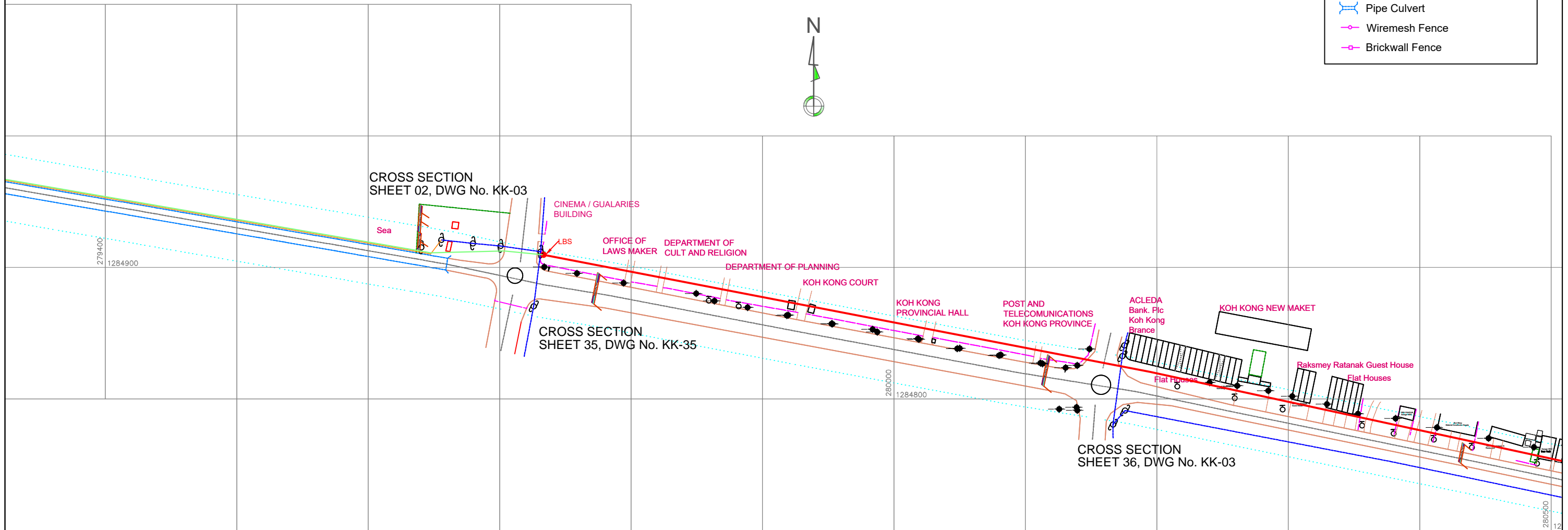
JICA PROJECT NAME: Preparatory Survey for Southern Economic Corridor Distribution Expansion Project		DRAWING TITLE: KOH KONG SECTIONAL DRAWING			
CONTRACTOR: NEWJEC Inc., THE CHUGOKU ELECTRIC POWER CO., INC.	SCALE 1/150	DATE 04-01-2016	SHEET 34	DWG No KK-03	
SUB CONTRACTOR: Cheang Engineering Consultants, Co. Ltd.					

\*Original drawing has A3 size



**LEGEND:**

- 22kV Overhead Line (New)
- 22kV Underground Line (New)
- Load Breaking Switch (New)
- 22kV Overhead Line (Exist.)
- 22kV Underground Line (Exist.)
- ⊙ 22kV Pole (Exist.)
- ◆ LV Pole (Exist.)
- ⊕ Telecommunication Pole (Exist.)
- Road
- Road Center
- Pond
- House, Cottage
- Bridge
- ▬ Ditch
- Pipe Culvert
- Wiremesh Fence
- Brickwall Fence

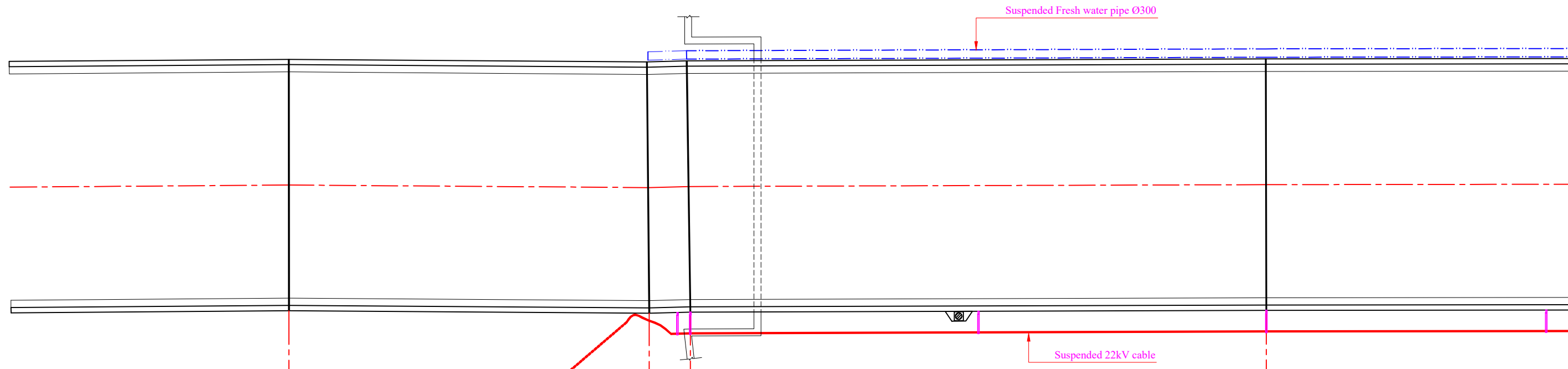


JICA PROJECT NAME: <b>Preparatory Survey for Southern Economic Corridor          Distribution Expansion Project</b>		DRAWING TITLE: <b>KOH KONG PLANE DRAWING</b>			
CONTRACTOR: <b>NEWJEC Inc.          THE CHUGOKU ELECTRIC POWER CO., INC.</b>		SCALE: <b>H:1/3000</b>	DATE: <b>04-01-2016</b>	KEY PAGE: <b>07</b>	DWG No: <b>KK-02</b>

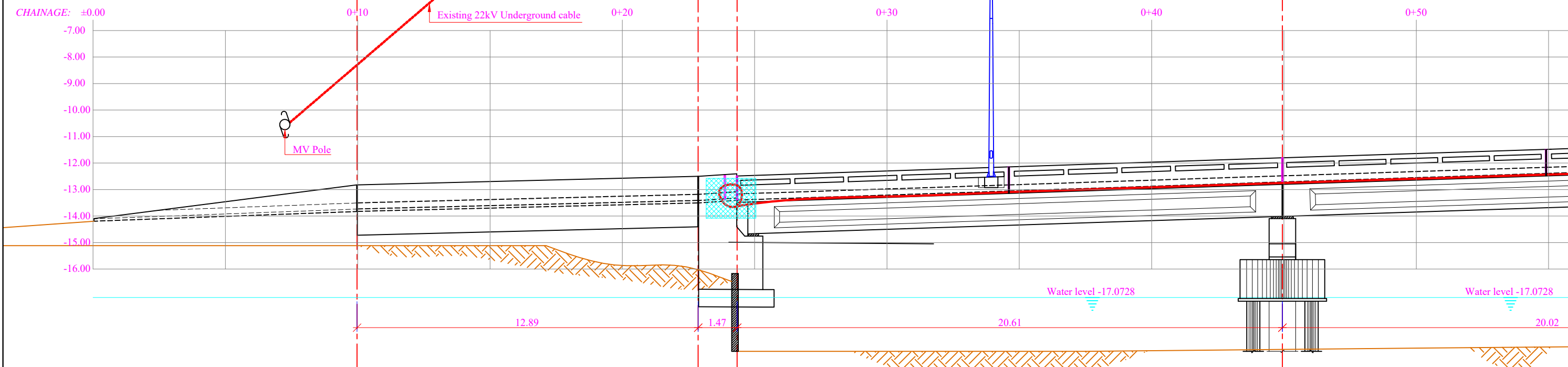
\*Original drawing has A3 size

To Southeast

To Northwest



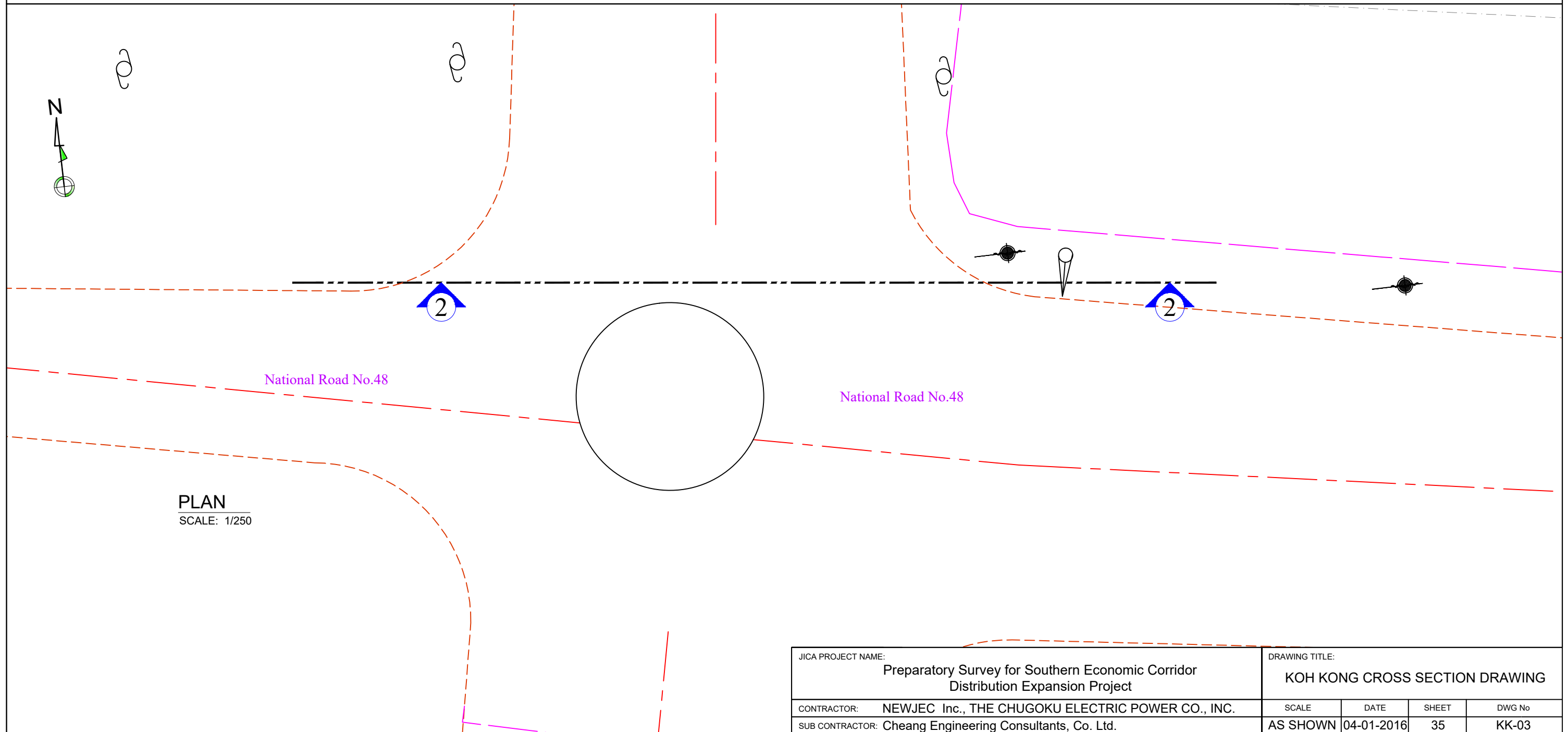
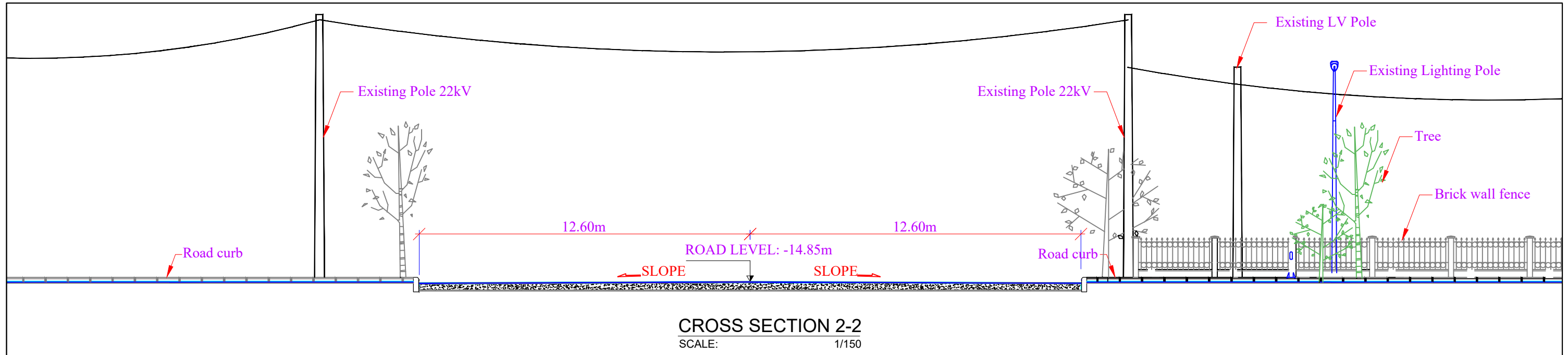
Plane



Longitudinal section

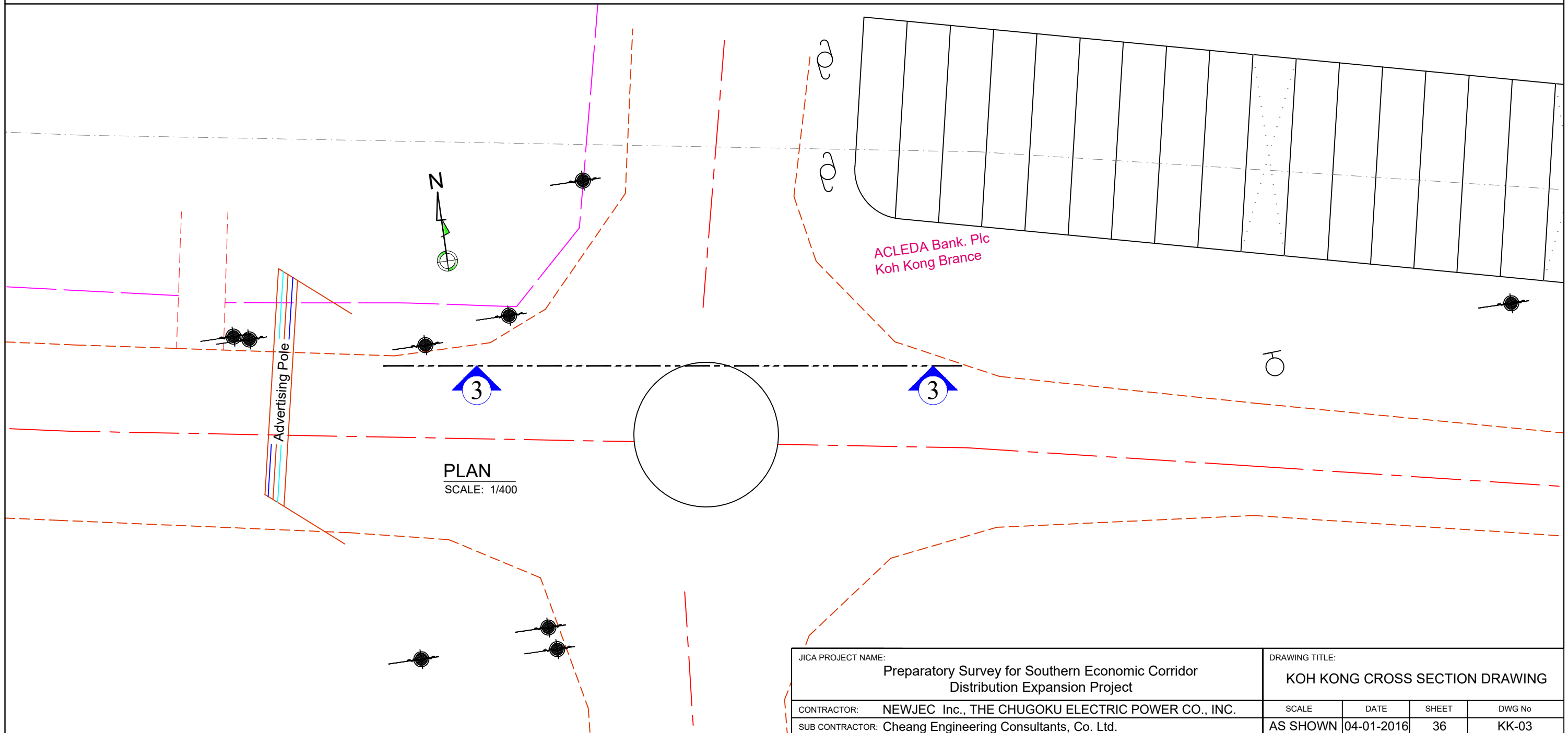
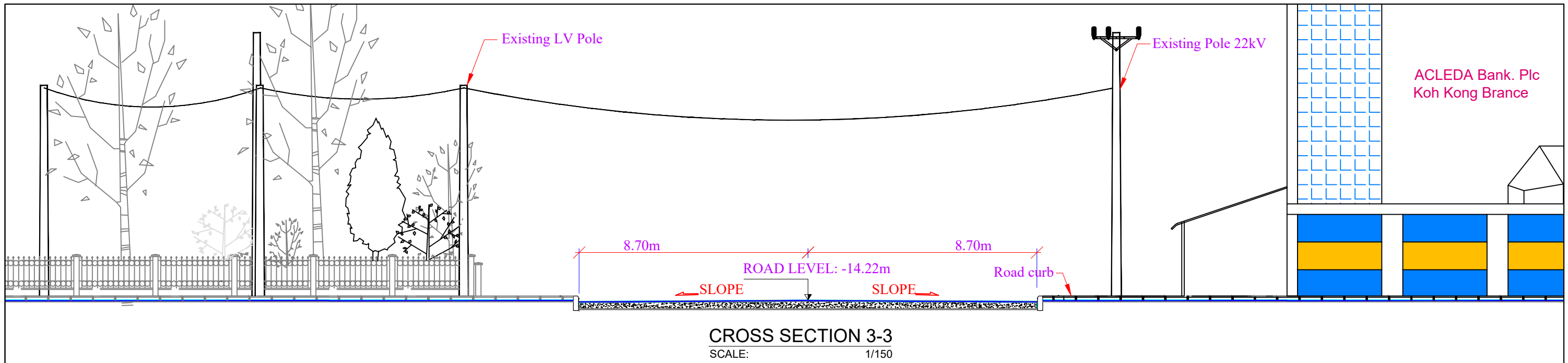
JICA PROJECT NAME: Preparatory Survey for Southern Economic Corridor Distribution Expansion Project		DRAWING TITLE: KOH KONG SECTIONAL DRAWING			
CONTRACTOR:	NEWJEC Inc., THE CHUGOKU ELECTRIC POWER CO., INC.	SCALE	DATE	SHEET	DWG No
SUB CONTRACTOR:	Cheang Engineering Consultants, Co. Ltd.	1/150	04-01-2016	02	KK-03

\*Original drawing has A3 size



JICA PROJECT NAME: Preparatory Survey for Southern Economic Corridor Distribution Expansion Project		DRAWING TITLE: KOH KONG CROSS SECTION DRAWING		
CONTRACTOR:	NEWJEC Inc., THE CHUGOKU ELECTRIC POWER CO., INC.	SCALE	DATE	SHEET
SUB CONTRACTOR:	Cheang Engineering Consultants, Co. Ltd.	AS SHOWN	04-01-2016	35
				DWG No KK-03

\*Original drawing has A3 size

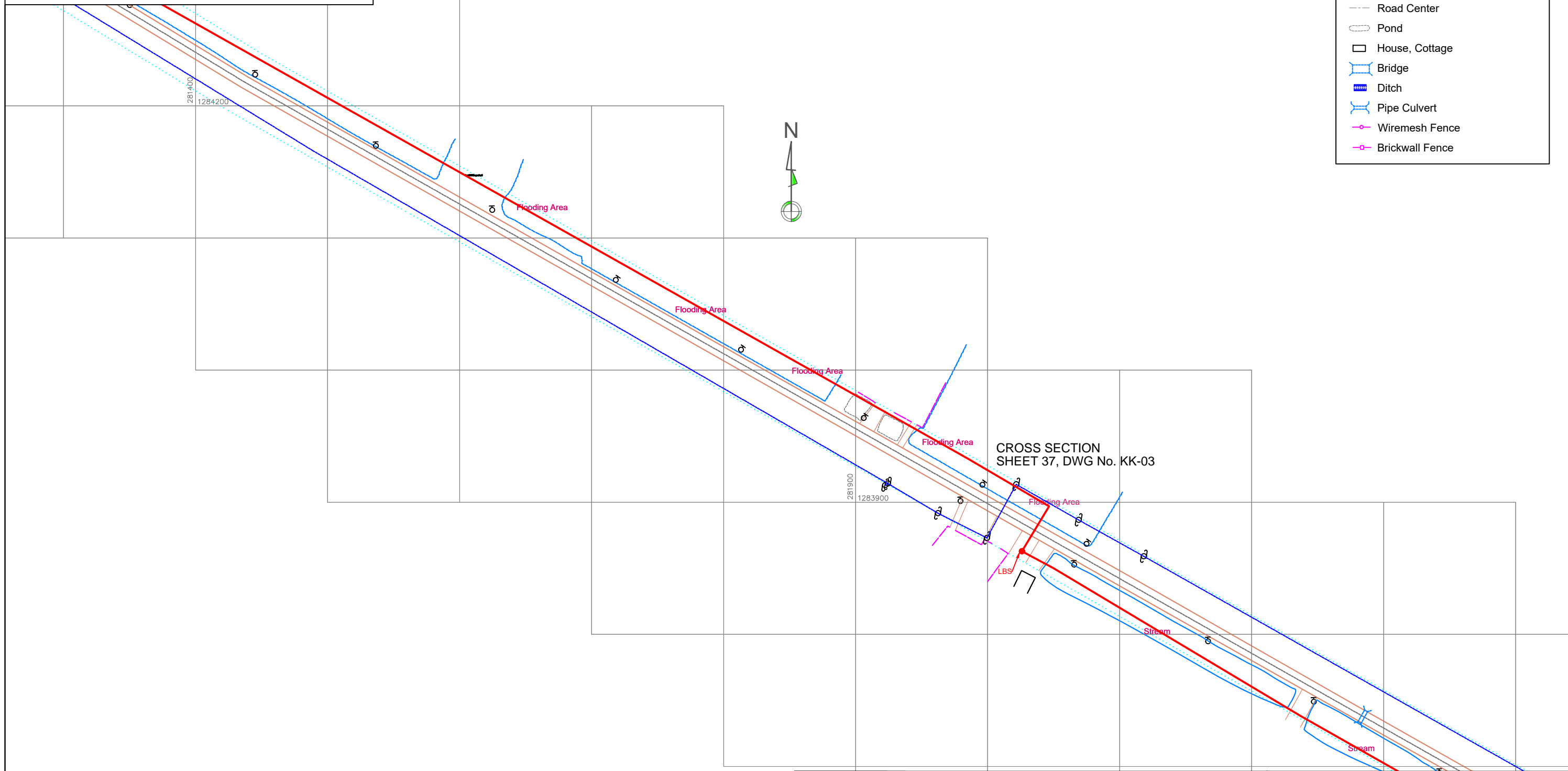
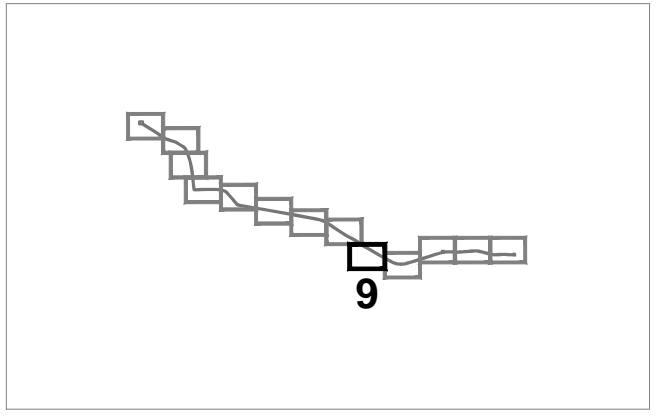


\*Original drawing has A3 size



**LEGEND:**

- 22kV Overhead Line (New)
- 22kV Underground Line (New)
- Load Breaking Switch (New)
- 22kV Overhead Line (Exist.)
- 22kV Underground Line (Exist.)
- 22kV Pole (Exist.)
- ◆ LV Pole (Exist.)
- ♀ Telecommunication Pole (Exist.)
- Road
- - - Road Center
- Pond
- House, Cottage
- Bridge
- ▬ Ditch
- Pipe Culvert
- Wiremesh Fence
- Brickwall Fence

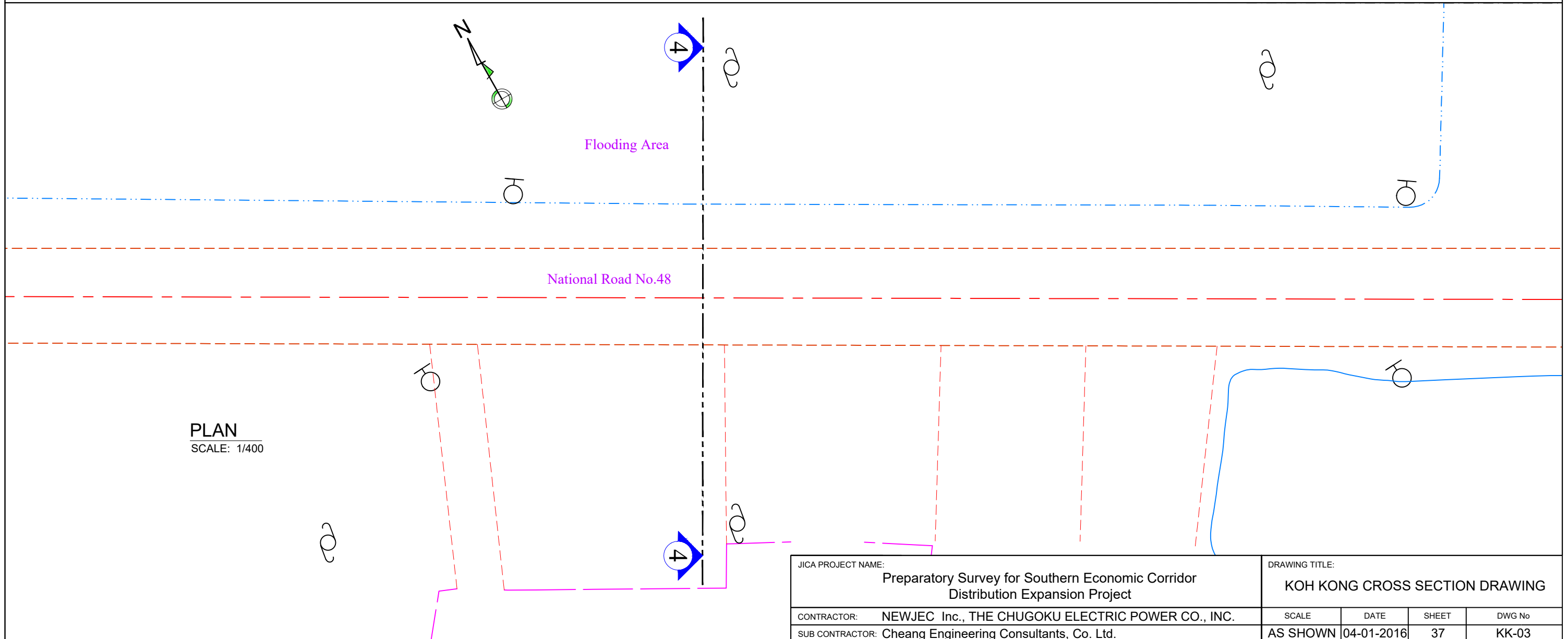
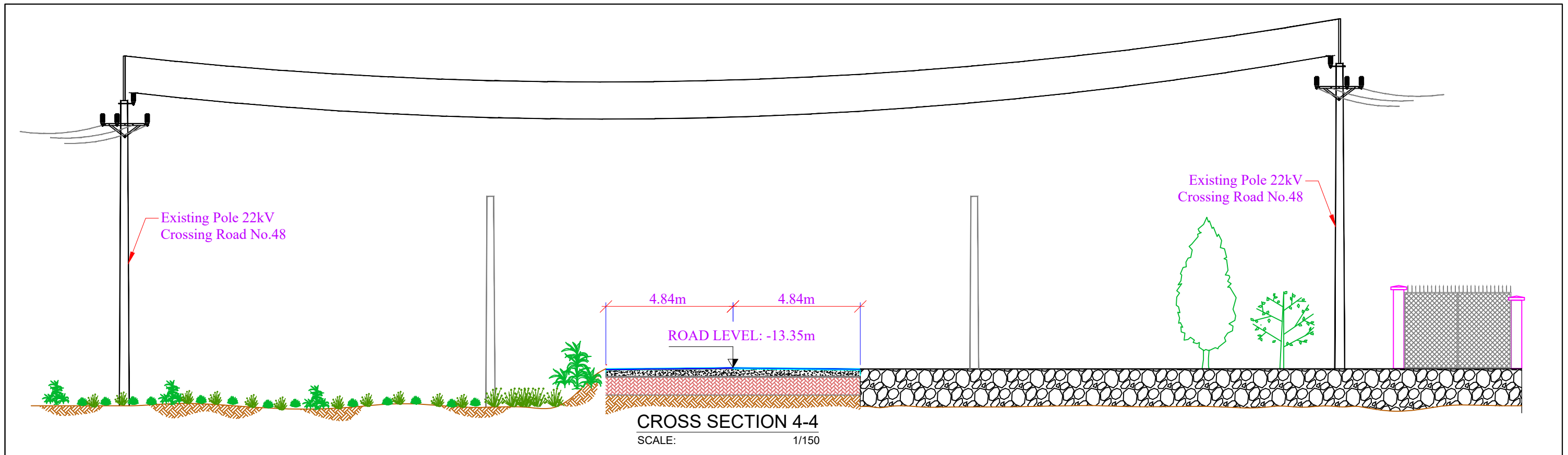


JICA PROJECT NAME:  
**Preparatory Survey for Southern Economic Corridor  
 Distribution Expansion Project**

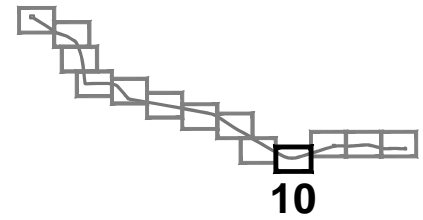
CONTRACTOR: **NEWJEC Inc.  
 THE CHUGOKU ELECTRIC POWER CO., INC.**

DRAWING TITLE: <b>KOH KONG PLANE DRAWING</b>			
SCALE	DATE	KEY PAGE	DWG No
H:1/3000	04-01-2016	09	KK-02

\*Original drawing has A3 size

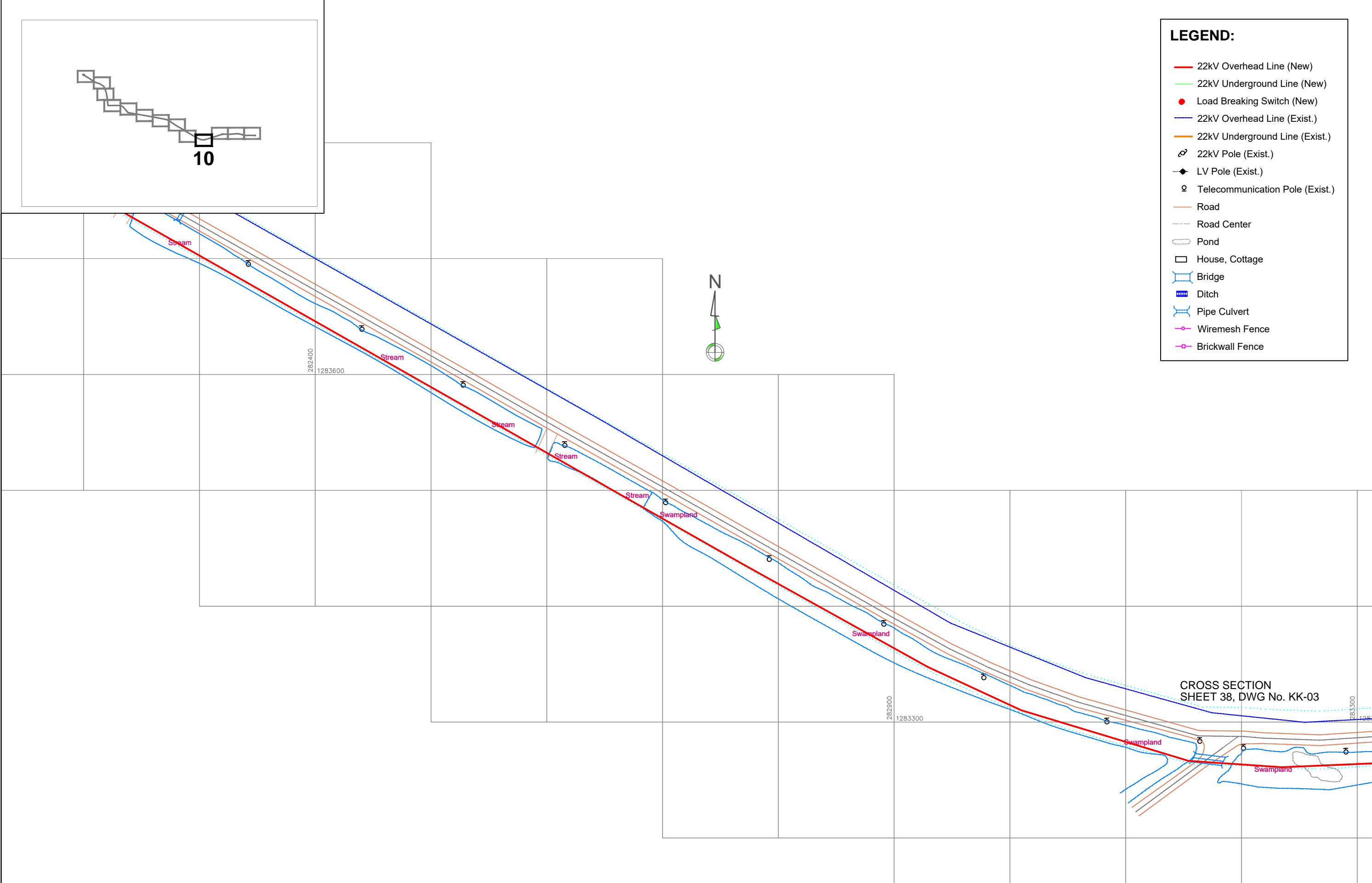


\*Original drawing has A3 size



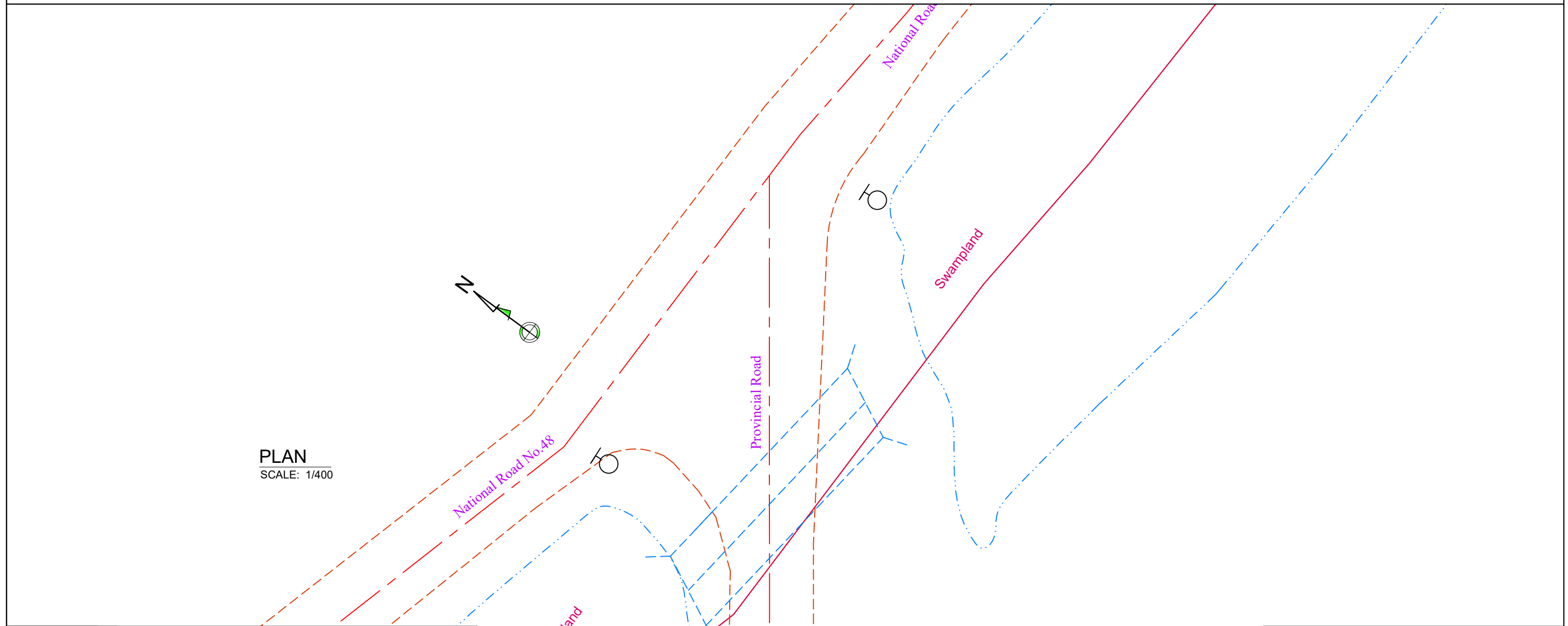
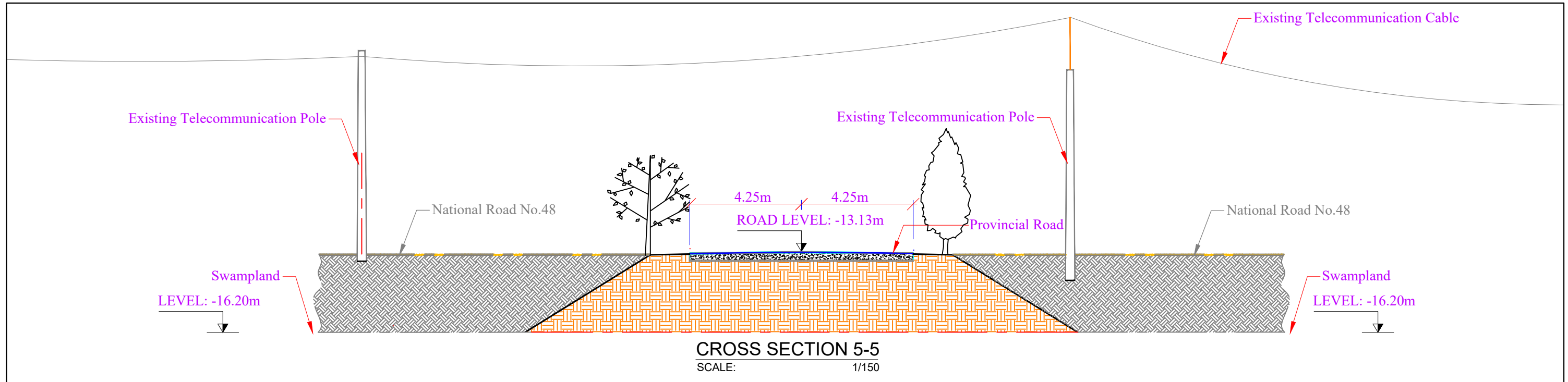
**LEGEND:**

- 22kV Overhead Line (New)
- 22kV Underground Line (New)
- Load Breaking Switch (New)
- 22kV Overhead Line (Exist.)
- 22kV Underground Line (Exist.)
- 22kV Pole (Exist.)
- ◆ LV Pole (Exist.)
- ♀ Telecommunication Pole (Exist.)
- Road
- - - Road Center
- Pond
- House, Cottage
- ▤ Bridge
- ▤▤▤ Ditch
- ⌒ Pipe Culvert
- Wiremesh Fence
- Brickwall Fence



JICA PROJECT NAME: <b>Preparatory Survey for Southern Economic Corridor          Distribution Expansion Project</b>		DRAWING TITLE: <b>KOH KONG PLANE DRAWING</b>			
CONTRACTOR: <b>NEWJEC Inc.          THE CHUGOKU ELECTRIC POWER CO., INC.</b>		SCALE: <b>H:1/3000</b>	DATE: <b>04-01-2016</b>	KEY PAGE: <b>10</b>	DWG No: <b>KK-02</b>

\*Original drawing has A3 size



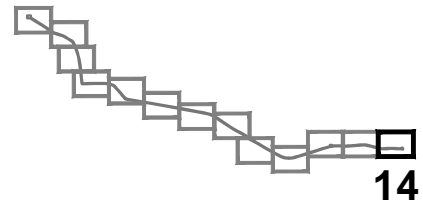
JICA PROJECT NAME:  
Preparatory Survey for Southern Economic Corridor  
Distribution Expansion Project

CONTRACTOR: NEWJEC Inc., THE CHUGOKU ELECTRIC POWER CO., INC.

SUB CONTRACTOR: Cheang Engineering Consultants, Co. Ltd.

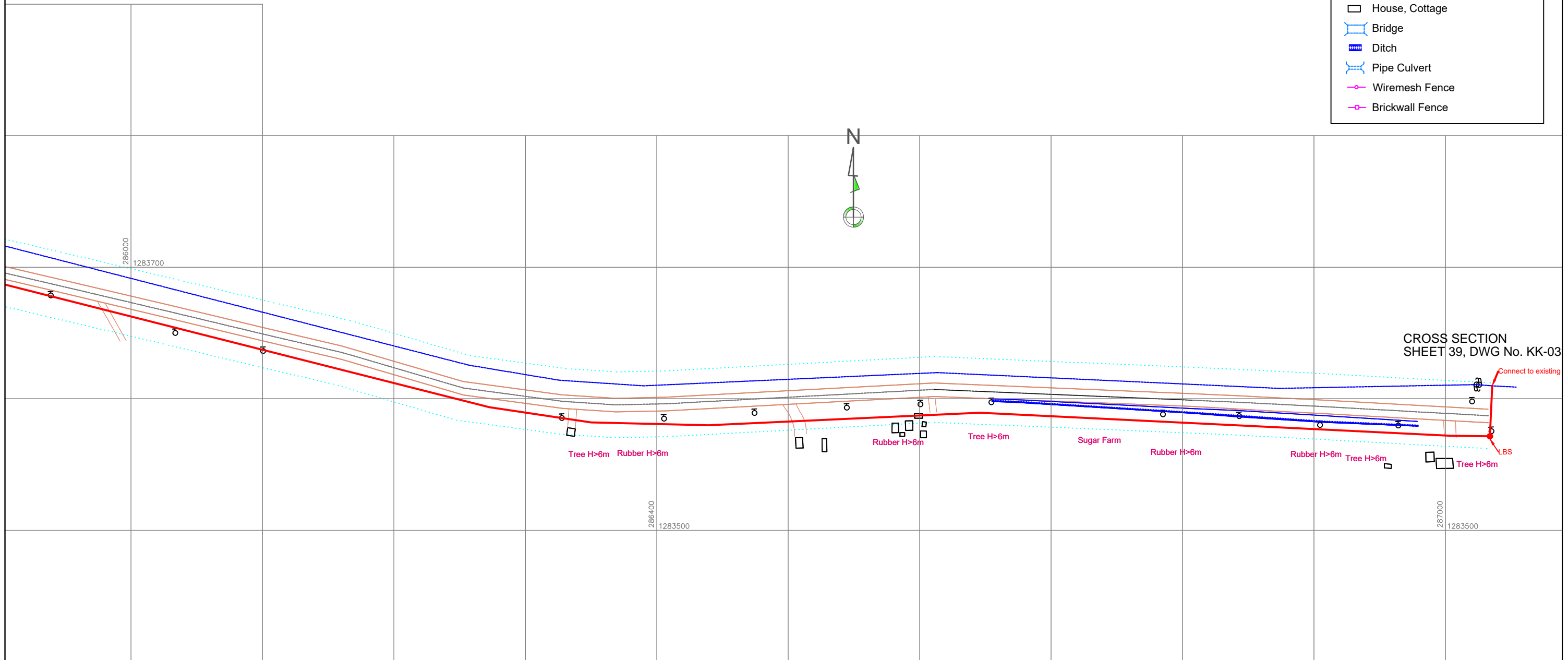
DRAWING TITLE: <b>KOH KONG CROSS SECTION DRAWING</b>			
SCALE	DATE	SHEET	DWG No
AS SHOWN	04-01-2016	38	KK-03

\*Original drawing has A3 size



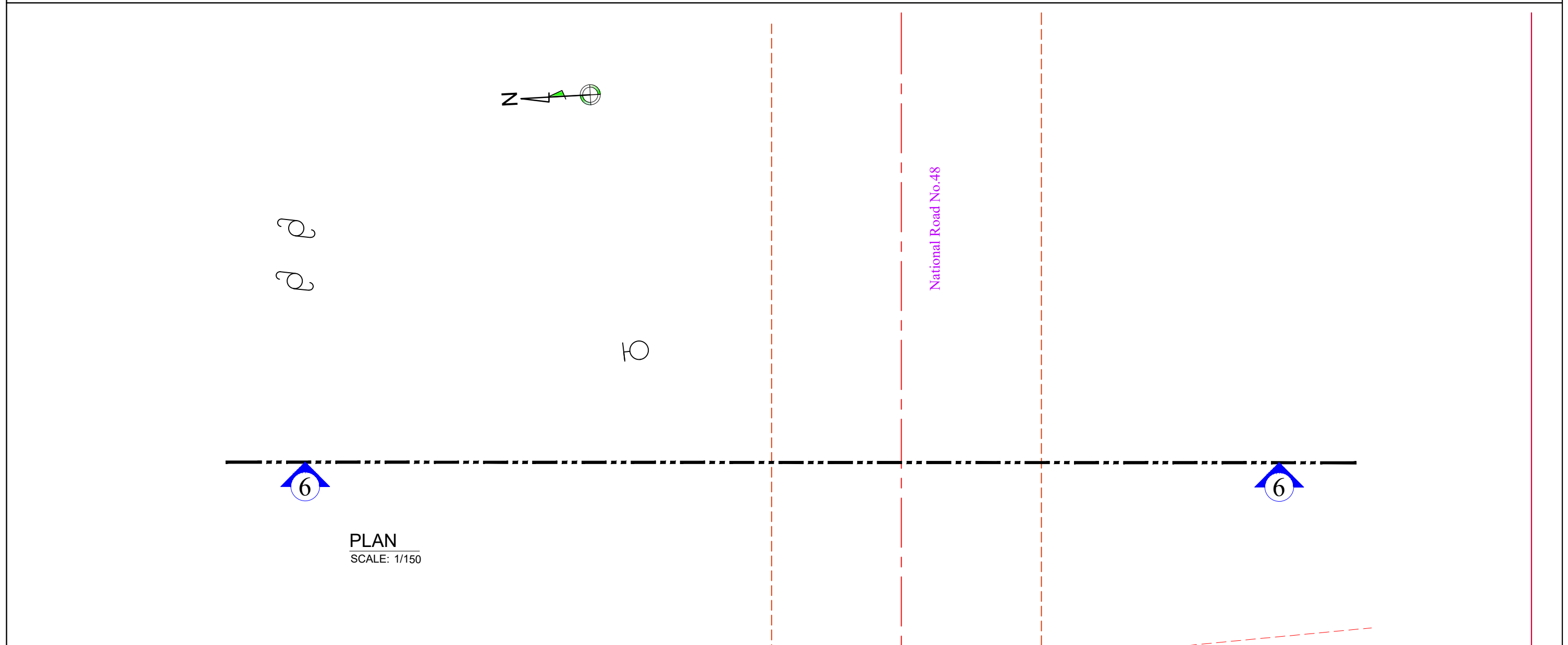
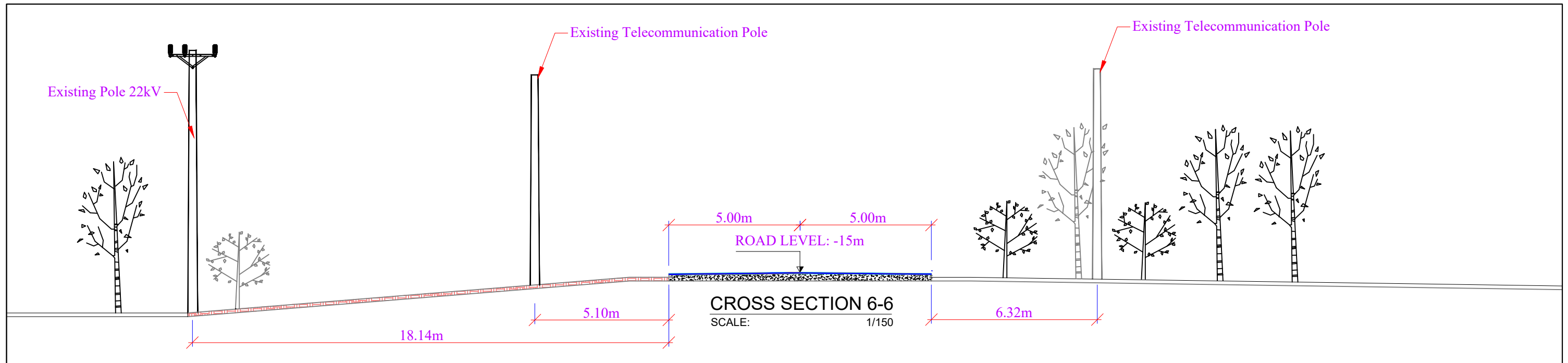
**LEGEND:**

- 22kV Overhead Line (New)
- 22kV Underground Line (New)
- Load Breaking Switch (New)
- 22kV Overhead Line (Exist.)
- 22kV Underground Line (Exist.)
- 22kV Pole (Exist.)
- ◆ LV Pole (Exist.)
- ⊕ Telecommunication Pole (Exist.)
- Road
- Road Center
- Pond
- House, Cottage
- Bridge
- Ditch
- Pipe Culvert
- Wiremesh Fence
- Brickwall Fence



JICA PROJECT NAME: <b>Preparatory Survey for Southern Economic Corridor          Distribution Expansion Project</b>		DRAWING TITLE: <b>KOH KONG PLANE DRAWING</b>			
CONTRACTOR: <b>NEWJEC Inc.          THE CHUGOKU ELECTRIC POWER CO., INC.</b>		SCALE: H:1/3000	DATE: 04-01-2016	KEY PAGE: 14	DWG No: KK-02

\*Original drawing has A3 size

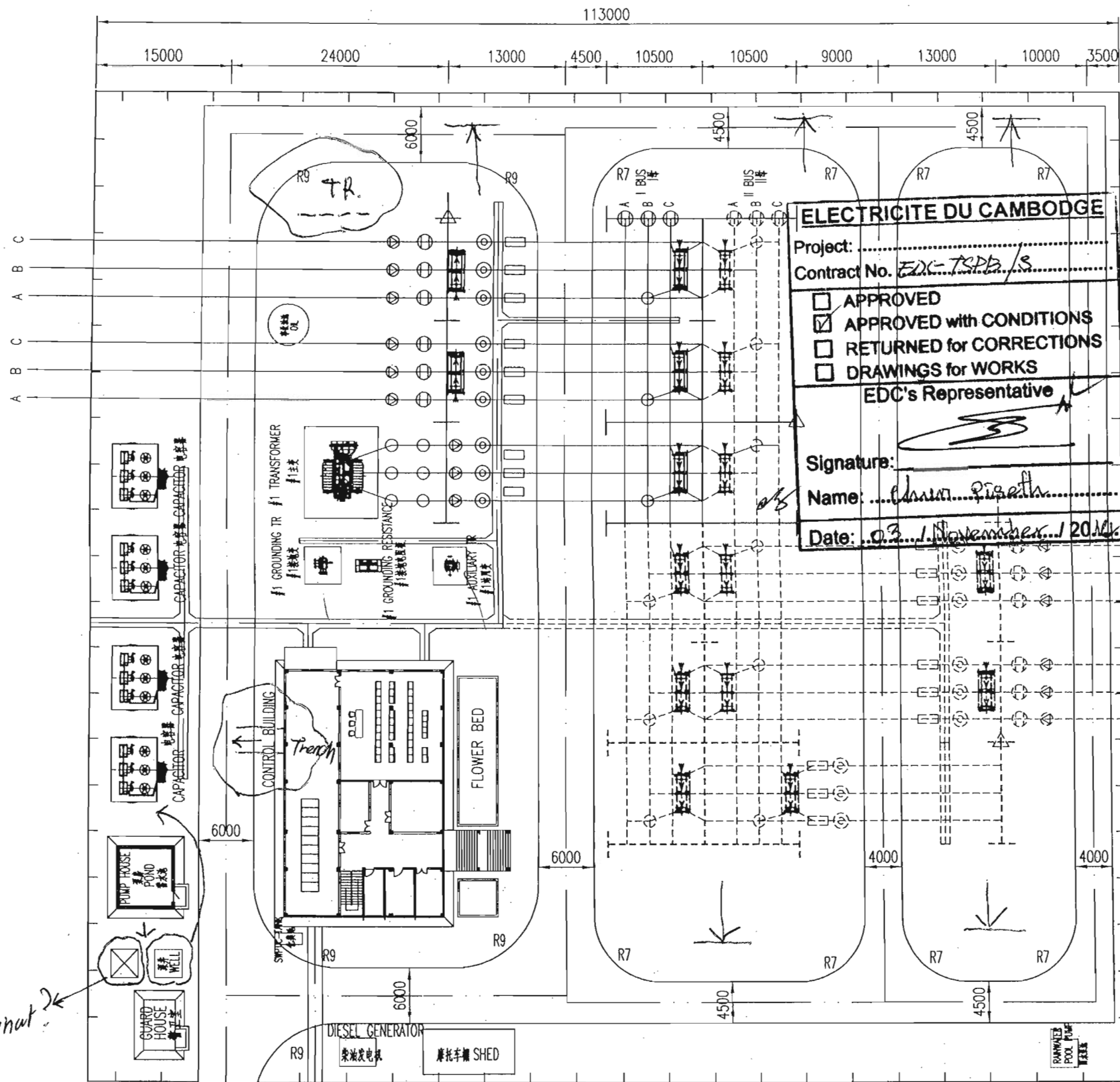


JICA PROJECT NAME: Preparatory Survey for Southern Economic Corridor Distribution Expansion Project		DRAWING TITLE: KOH KONG CROSS SECTION DRAWING		
CONTRACTOR:	NEWJEC Inc., THE CHUGOKU ELECTRIC POWER CO., INC.	SCALE	DATE	SHEET
SUB CONTRACTOR:	Cheang Engineering Consultants, Co. Ltd.	AS SHOWN	04-01-2016	39
				DWG No KK-03

\*Original drawing has A3 size

# **APPENDIX 14**

## **CHRAK MTES SUBSTATION**



**ELECTRICITE DU CAMBODGE**

Project: .....  
 Contract No. EDC-TSPB/S

APPROVED  
 APPROVED with CONDITIONS  
 RETURNED for CORRECTIONS  
 DRAWINGS for WORKS

EDC's Representative

Signature: [Signature]  
 Name: Chan Piseth  
 Date: 03/11/2014

Note:  
 1. Dashed line represents future extension.  
 2. Unit is millimeter(mm).

注:  
 1. 虚线表示远期工程。  
 2. 图中单位: 毫米。

- Legend:
- SF6 Circuit Breakers
  - ⊠ Disconnector With Double Earthing Switch
  - ⊡ Disconnector With Single Earthing Switch
  - ⊢ Disconnector Without Earthing Switch
  - ⊙ Current Transformers
  - ⊖ Capacitive Voltage Transformers
  - Surge Arrester
  - △ Lightning Rod
  - Insulator

- 图例:
- SF6 断路器
  - ⊠ 双接地隔离开关
  - ⊡ 单接地隔离开关
  - ⊢ 不接地隔离开关
  - ⊙ 电流互感器
  - ⊖ 电容式电压互感器
  - 避雷器
  - △ 避雷针
  - 支柱绝缘子

KS 2	KS 2
KS 1	KS 1
#1 TRANSFORMER	#1 TRANSFORMER
SPARE	SPARE
SPARE	SPARE
BUS COUPLE (SPARE)	BUS COUPLE (SPARE)

what?

*Yun*

FOR APPROVAL

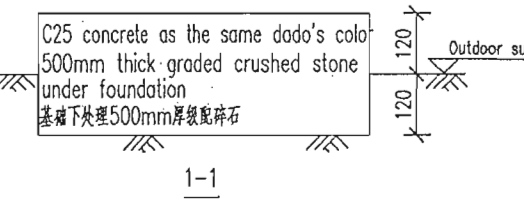
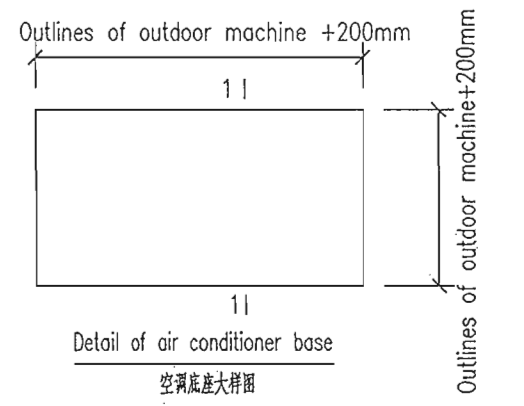
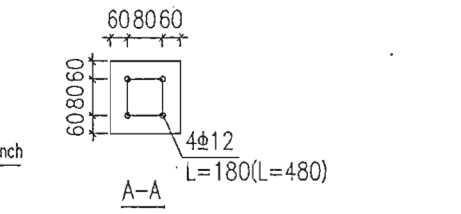
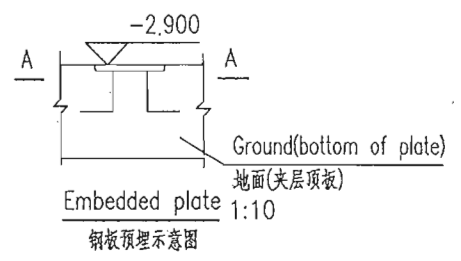
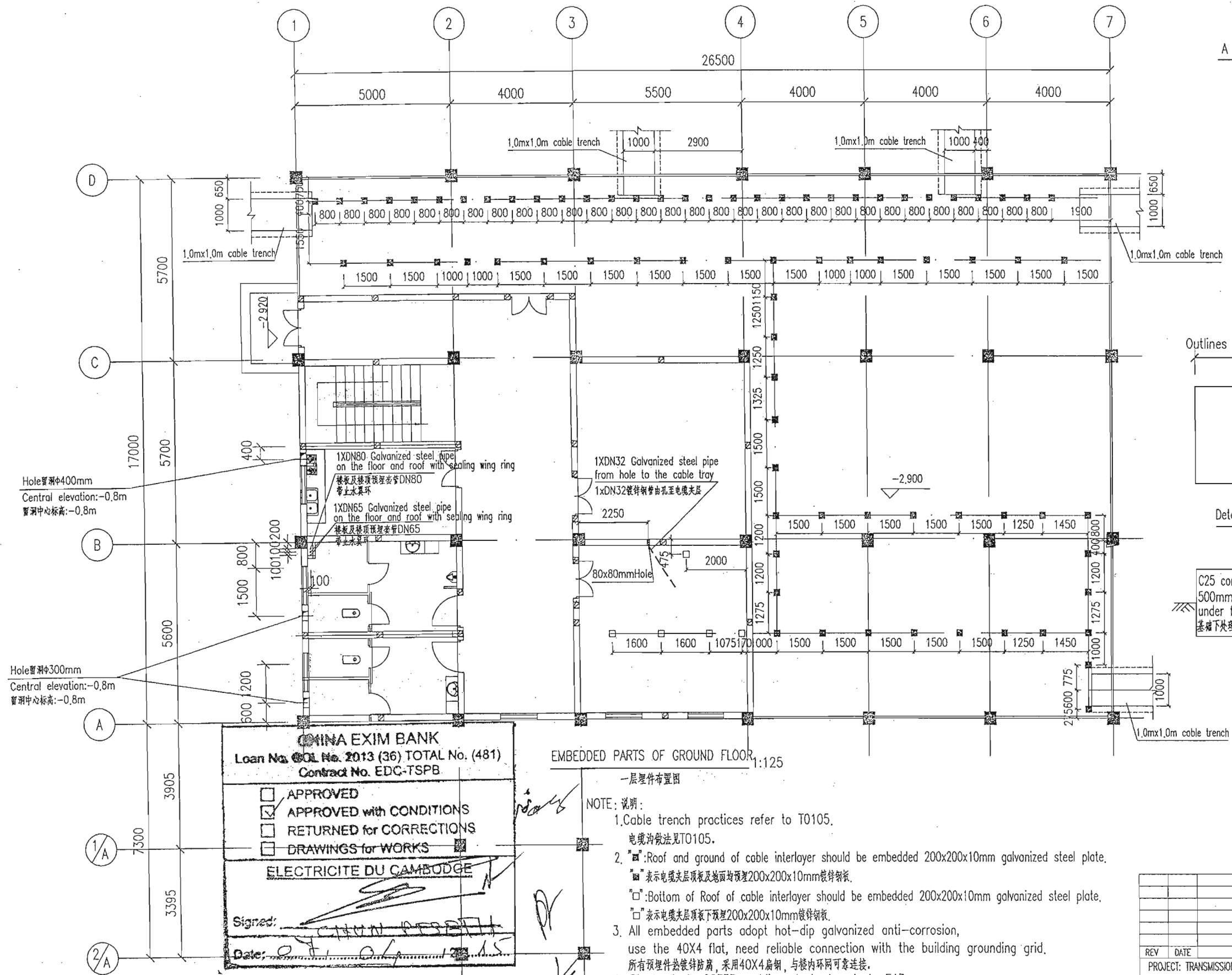
CHMC

Signature [Signature]

2014.10.16

D	2014.10.14	REVISED ACCORDING TO EDC'S COMMENT			
C	2014.07.17	REVISED ACCORDING TO EDC'S COMMENT			
B	2014.04.04	CHANGE ROAD WIDTH, REVISE THE COMPASS			
A	2013.12.20	FIRST SUBMISSION			
REV	DATE	REVISION	REVD	CHKD	RVWD
PROJECT: TRANSMISSION LINES AND SUBSTATIONS (115KV) FROM PHNOM PENH TO BAVET.					
CONTRACT NO.: EDC-TSPB					
EMPLOYER: ELECTRICITE DU CAMBODGE (EDC)					
CONTRACTOR: CHINA NATIONAL HEAVY MACHINERY CORPORATION					
CHRAK MTEER 115KV SUBSTATION PROJECT					PHASE: PRE.
CHRAK MTEER 115KV 变电站工程					初步设计
APPROVE		DESIGN	设计	ELECTRICAL GENERAL LAYOUT	
EXAMINE		DRAWN	制图	电气总平面布置图	
Spec. No.	Counter	Date	SCALE	DRAWING NO.	B05381C-D-01
CHECK		DATE		REV	D





Hole diameter 400mm  
Central elevation: -0.8m  
管洞中心标高: -0.8m

Hole diameter 300mm  
Central elevation: -0.8m  
管洞中心标高: -0.8m

**CHINA EXIM BANK**  
Loan No. 2013 (36) TOTAL No. (481)  
Contract No. EDC-TSPB

APPROVED  
 APPROVED with CONDITIONS  
 RETURNED for CORRECTIONS  
 DRAWINGS for WORKS

**ELECTRICITE DU CAMBODGE**

Signed: *[Signature]*  
Date: *[Date]*

**EMBEDDED PARTS OF GROUND FLOOR**  
一层埋件布置图

- NOTE: 说明:
- Cable trench practices refer to T0105. 电缆沟做法见T0105.
  - Roof and ground of cable interlayer should be embedded 200x200x10mm galvanized steel plate. 表示电缆夹层顶板及地面均预埋200x200x10mm镀锌钢板.  
Bottom of Roof of cable interlayer should be embedded 200x200x10mm galvanized steel plate. 表示电缆夹层顶板下预埋200x200x10mm镀锌钢板.
  - All embedded parts adopt hot-dip galvanized anti-corrosion, use the 40X4 flat, need reliable connection with the building grounding grid. 所有预埋件热镀锌防腐, 采用40X4扁钢, 与楼内环网可靠连接.
  - Steel adopts Q235B, welding electrode adopts E43. All the steel pieces are welded connection, and welding seam is 6mm. Bar adopts  $\Phi$ -HPB300,  $\Phi$ -HRB335. 钢材采用Q235B, 焊条E43, 所有铁件焊接连接, 焊缝: 6mm. 钢筋采用:  $\Phi$ -HPB300,  $\Phi$ -HRB335.

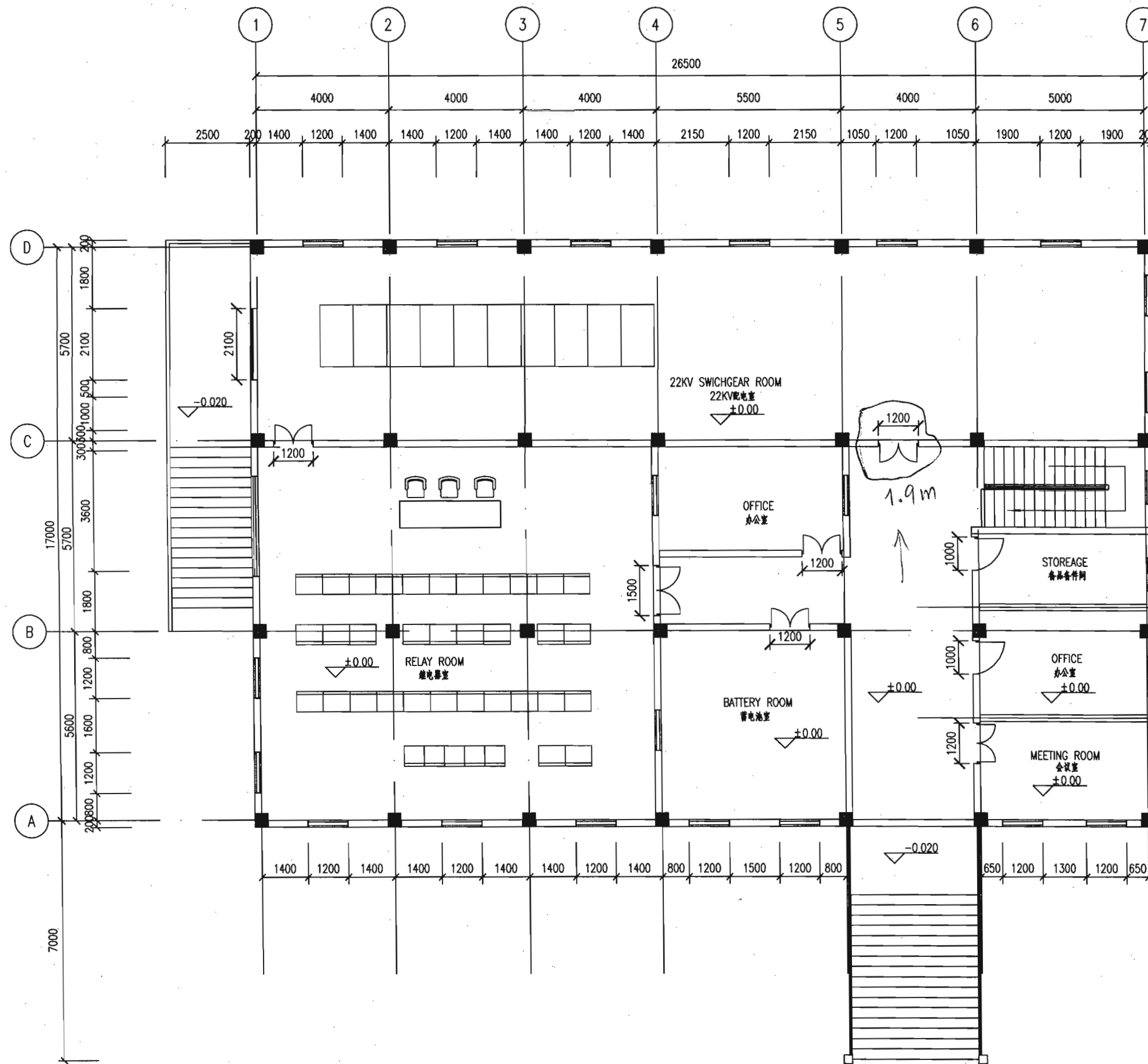
5. The position of air conditioning refer to HVAC drawings, outdoor air conditioner base refer to details. All air conditioning should be reserved -40X4 grounding flat steels. The base's position and size please cooperate with HVAC. Please carry out construction after arrival of equipment to be verified, pay attention to avoid the rain drop tube position. 空调位置, 详见暖通图纸, 室外空调底座做法详见大样图. 所有空调均在基础预留-40X4接地扁钢. 基础位置及尺寸请与暖通专业配合, 特设备到货核实无误后再施工, 注意避开雨落管的位置.

**FOR APPROVAL**

**CHMC**

Signature: *[Signature]*

REV	DATE	REVISION	REVD	CHKD	RWVD	APPRD
PROJECT: TRANSMISSION LINES AND SUBSTATIONS (115KV) FROM PHNOM PENH TO BAVET						
CONTRACT NO.: EDC-TSPB						
EMPLOYER: ELECTRICITE DU CAMBODGE (EDC)						
CONTRACTOR: CHINA NATIONAL HEAVY MACHINERY CORPORATION						
CHRAK MTEER 115KV SUBSTATION PROJECT CHRAK MTEER 115KV 变电站工程						
APPROVE	<i>[Signature]</i>	DESIGN	<i>[Signature]</i>	EMBEDDED PARTS OF GROUND FLOOR 一层埋件布置图		
EXAMINE	<i>[Signature]</i>	DRAWN	<i>[Signature]</i>			
CHECK	<i>[Signature]</i>	SCALE	<i>[Signature]</i>			
DATE	2015-01-20	DATE	2015-01-20	DRAWING NO.	B05381S-T0201-18	(REV) A



PLAN OF FIRST FLOOR

**ELECTRICITE DU CAMBODGE**

Project: .....  
 Contract No. EDC-TSPB/S

- APPROVED
- APPROVED with CONDITIONS
- RETURNED for CORRECTIONS
- DRAWINGS for WORKS

EDC's Representative

Signature: *[Signature]*

Name: Chun Piseth

Date: 19/09/2014

FOR APPROVAL

CHMC

Signature: *[Signature]*

REV	DATE	REVISION	REVD	CHKD	RVWD	APPRD

PROJECT: TRANSMISSION LINES AND SUBSTATIONS (115KV) FROM PHNOM PENH TO BAVET

CONTRACT NO.: EDC-TSPB

EMPLOYER: ELECTRICITE DU CAMBODGE (EDC)

CONTRACTOR: CHINA NATIONAL HEAVY MACHINERY CORPORATION

CHRAK MTEER 115KV SUBSTATION PROJECT

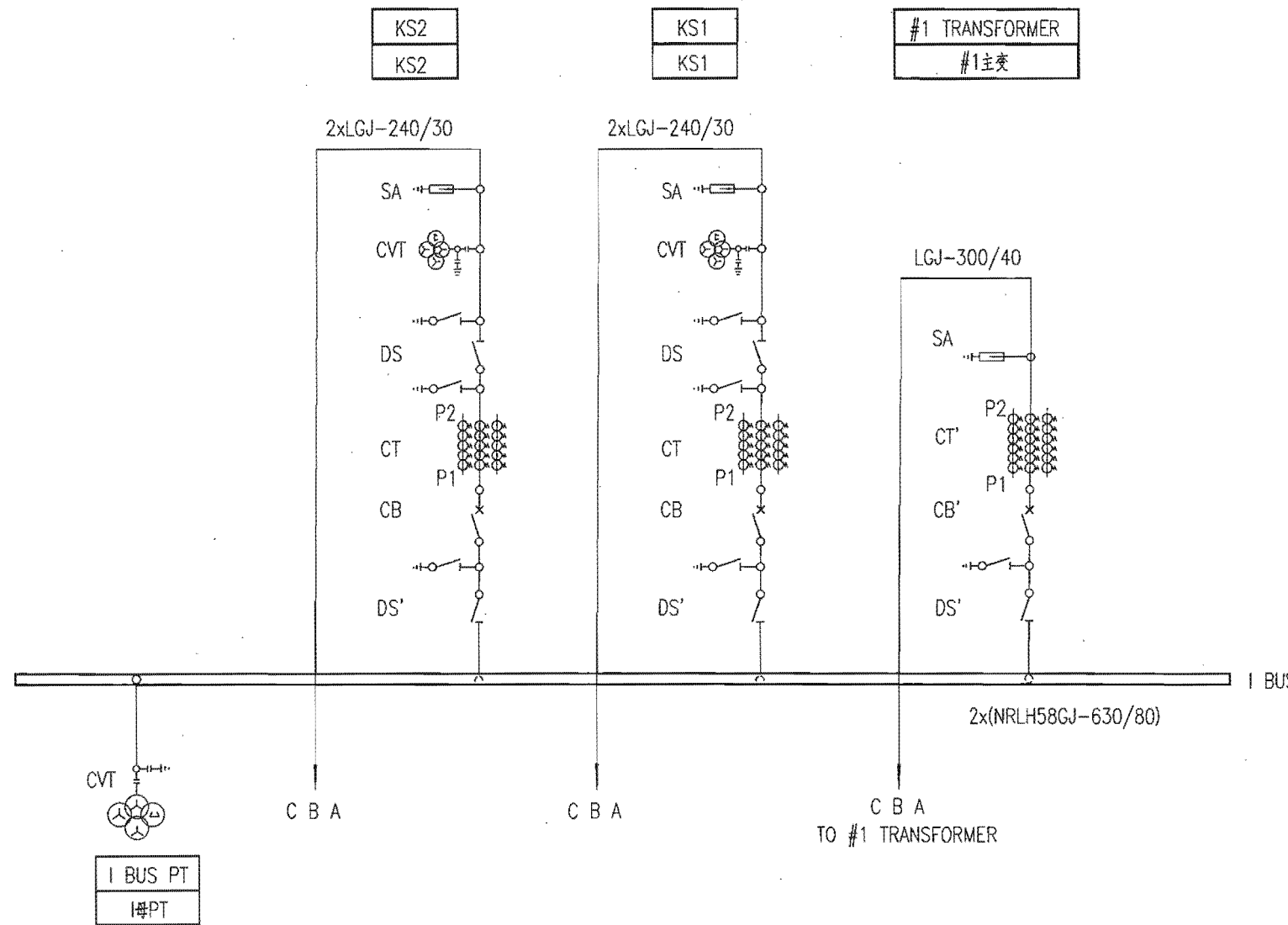
CHRAK MTEER 115KV 变电站工程

PHASE: PRE-CONSTRUCTION

CONTROL BUILDING PLAN OF FIRST FLOOR

主控楼一层平面布置图

Spec. No.	Countersigner	Date	APPROVE	DESIGN	SCALE	DATE	DRAWING NO.	REV
					1:125	2013-12-21	B05381C-T-03	A



**CHINA EXIM BANK**  
 Loan No. PBC No. 2014(17) TOTAL No. (311)  
 Contract No. EDC-2MV EXT. 2

APPROVED  
 APPROVED with CONDITIONS  
 RETURNED for CORRECTIONS  
 DRAWINGS for WORKS

**ELECTRICITE DU CAMBODGE**

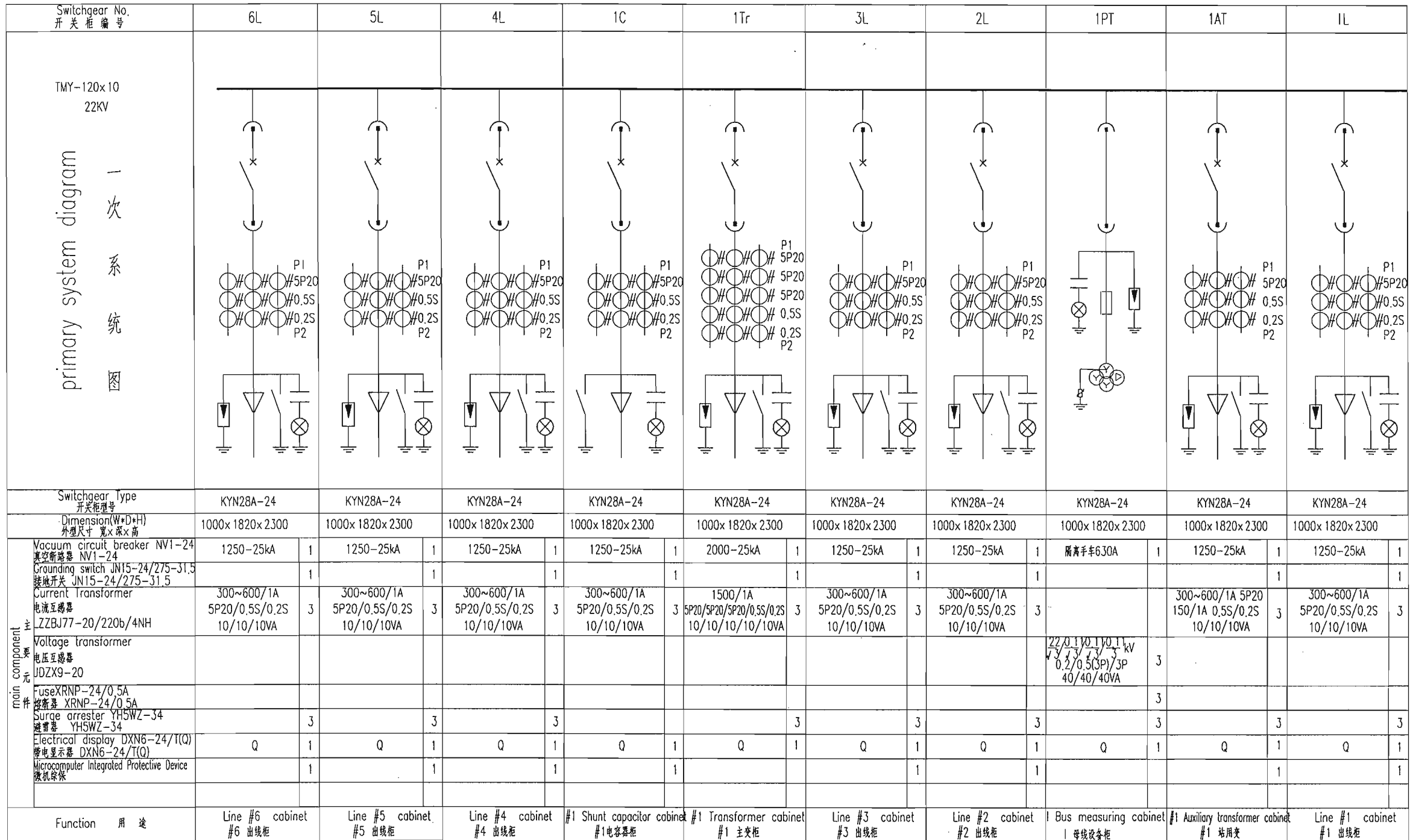
Signed: \_\_\_\_\_  
 Date: 04/10/2015

FOR APPROVAL  
 CHMC  
 孙宇程

LEGEND OF 115kV EQUIPMENT  
 115kV设备图例

MARK(图示)	DESCRIPTION(设备名称)	TYPE(型号)	SYMBLE(符号)
	Surge Arrester 避雷器	Y10W-102/266 10kA	SA
	Capacitive Voltage Transformer 电容式电压互感器	TYD <sub>3</sub> 115/√3-0.01H 0.2/0.5(3P)/3P 115/√3/0.11/√3/0.11/√3/0.11kV	CVT
	Disconnecter With Double Earthing Switch 双接地隔离开关	GW4A-126D(GW) 126kV 2000A 31.5kA	DS
	Disconnecter With Single Earthing Switch 单接地隔离开关	GW4A-126D(GW) 126kV 2000A 31.5kA	DS'
	Current Transformer 电流互感器	LVB-115W3 600~1200/1 0.5s/5P30/5P30/5P30/0.2s P1→P2	CT
	Current Transformer 电流互感器	LVB-115W3 200~400/1A 0.5s/5P30/5P30/5P30/0.2s P1→P2	CT'
	SF6 Single Phase Circuit Breaker SF6分相断路器	LW36-126F 126kV 2000A 31.5kA	CB
	SF6 Three Phase Circuit Breaker SF6三相联动断路器	LW36-126 126kV 2000A 31.5kA	CB'

REV	DATE	REVISION	REVD	CHKD	RVWD	APPRD
PROJECT: TRANSMISSION LINES AND SUBSTATIONS (115KV) FROM PHNOM PENH TO BAVET						
CONTRACT NO.: EDC-TSPB						
EMPLOYER: ELECTRICITE DU CAMBODGE (EDC)						
CONTRACTOR: CHINA NATIONAL HEAVY MACHINERY CORPORATION						
CHRAK MTEER 115KV SUBSTATION PROJECT CHRAK MTEER 115KV 变电站工程						PHASE-DETAIL 施工图设计
APPROVE		DESIGN	王永亮	ELECTRIC SINGLE LINE OF 115KV SWITCHYARD		
EXAMINE		DRAWN	孙宇程	115KV配电装置电气主接线		
CHECK		DATE	2015-04-20	DRAWING NO.	B05381S-00301-02	REV A



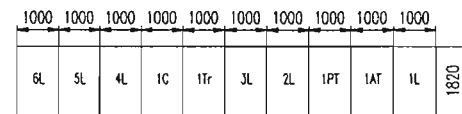
CHINA EXIM BANK  
Loan No. GCL No. 2013 (36) TOTAL No. (481)  
Contract No. EDC-TSPB

APPROVED  
 APPROVED with CONDITIONS  
 RETURNED for CORRECTIONS  
 DRAWINGS for WORKS

ELECTRICITE DU CAMBODGE

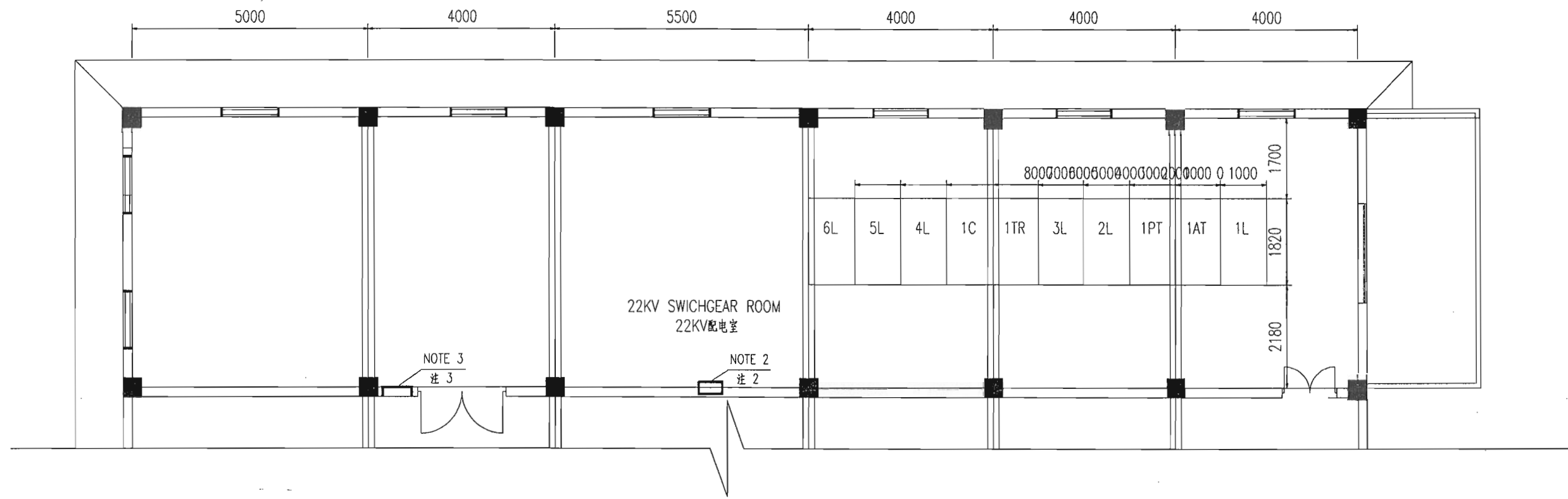
Signed: \_\_\_\_\_  
Date: 26.12.2016

FOR APPROVAL  
CHMC  
Signature: \_\_\_\_\_  
15 DEC 2015



Front  
柜前

REV	DATE	REVISION	REVD	CHKD	RWVD	APPRO
PROJECT: TRANSMISSION LINES AND SUBSTATIONS (115KV) FROM PHNOM PENH TO BAVET						
CONTRACT NO.: EDC-TSPB						
EMPLOYER: ELECTRICITE DU CAMBODGE (EDC)						
CONTRACTOR: CHINA NATIONAL HEAVY MACHINERY CORPORATION						
KAMPONG SOENG 115KV SUBSTATION PROJECT KAMPONG SOENG 115KV 变电站工程						PHASE-DETAIL 施工图设计
APPROVE	DESIGN	SINGLE LINE OF 22KV SWITCHGEAR 22kV配电装置接线图				
EXAMINE	DRAWN					
CHECK	SCALE					
Spec. No.	Countersigner	Date	CHECK	DATE	DRAWING NO.	REV A



- NOTE:
1. Unit is millimeter(mm).
  2. Maintenance box.
  3. Fan manual control box(one control eight)

- 注:
1. 图中单位: 毫米.
  2. 检修电源箱
  3. 风机手动控制箱(一控八)

FOR APPROVAL

CHMC

Signature *[Signature]*

15 DEC 2015

NO. 序号	CODE 名称	DESCRIPTION 全称	SPECIFICATION 型号及规范	UNIT 单位	QTY 数量	REMARK 备注
1	1Tr	Transformer Cabinet 主变进线柜	KYN28-24 24kV 2000A	SET 面	1	25kA(4s) 63kA
2	1L~6L	Outlet Cabinet 出线柜	KYN28-24 24kV 1250A	SET 面	6	25kA(4s) 63kA
3	1C	Capacitor Cabinet 电容器柜	KYN28-24 24kV 1250A	SET 面	1	25kA(4s) 63kA
4	1PT	Measuring Cabinet 母线设备柜	KYN28-24 24kV 630A	SET 面	1	25kA(4s) 63kA
5	1AT	Auxiliary Transformer Cabinet 站用变柜	KYN28-24 24kV 1250A	SET 面	1	25kA(4s) 63kA

**CHINA EXIM BANK**  
Loan No. GCL No. 2013 (36) TOTAL No. (481)  
Contract No. EDC-TSPB

APPROVED  
 APPROVED with CONDITIONS  
 RETURNED for CORRECTIONS  
 DRAWINGS for WORKS

**ELECTRICITE DU CAMBODGE**

Signed: \_\_\_\_\_

Date: 26.12.15 / 2015

REV	DATE	REVISION	REVD	CHKD	RYWD	APPRD

PROJECT: TRANSMISSION LINES AND SUBSTATIONS (115KV) FROM PHNOM PENH TO BAVET  
CONTRACT NO.: EDC-TSPB  
EMPLOYER: ELECTRICITE DU CAMBODGE (EDC)  
CONTRACTOR: CHINA NATIONAL HEAVY MACHINERY CORPORATION

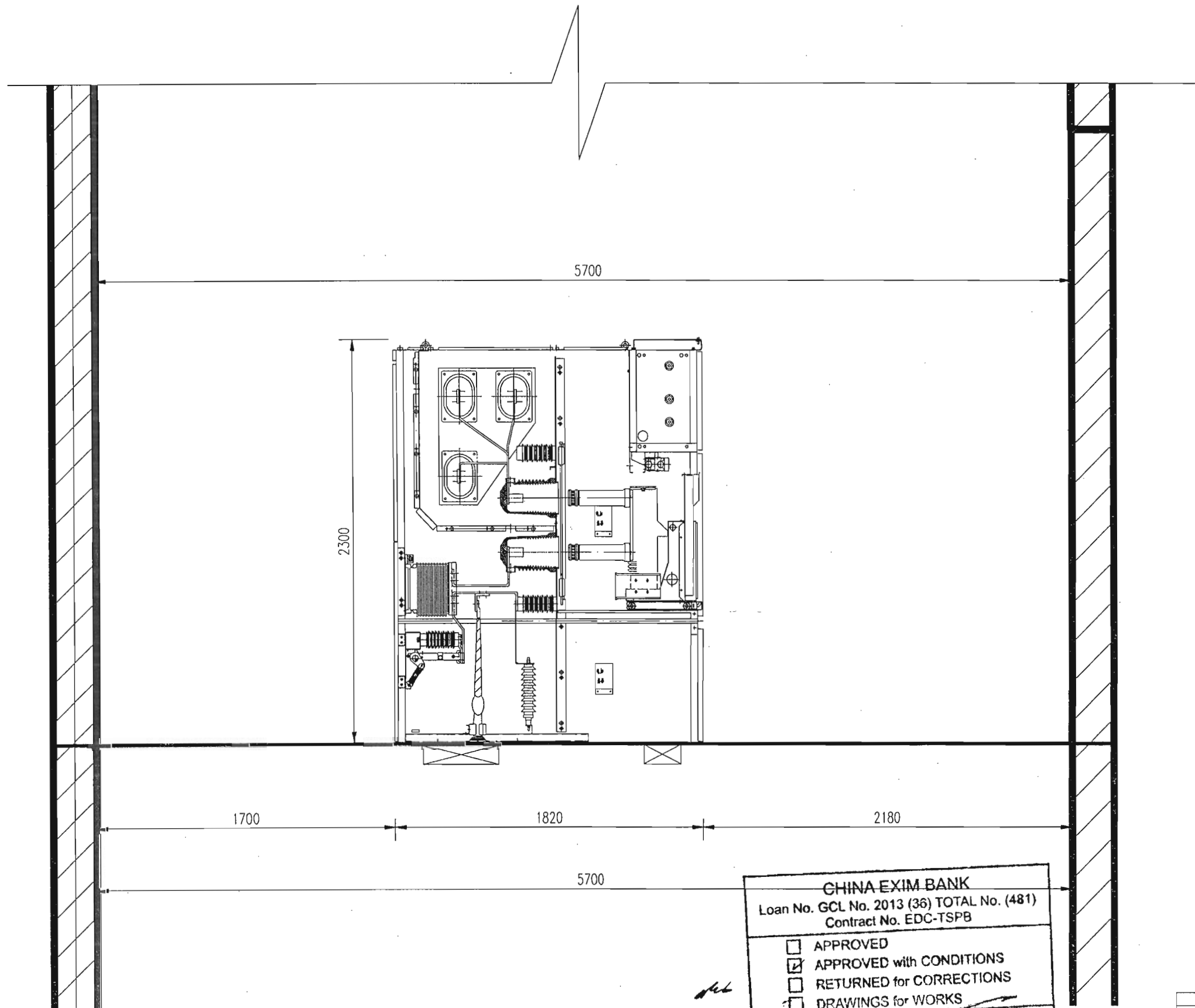
KAMPONG SOENG 115KV SUBSTATION PROJECT  
KAMPONG SOENG 115KV 变电站工程

APPROVE	<i>[Signature]</i>	DESIGN	<i>[Signature]</i>
EXAMINE	<i>[Signature]</i>	DRAWN	<i>[Signature]</i>
CHECK	<i>[Signature]</i>	SCALE	<i>[Signature]</i>

LAYOUT OF 22KV SWITCHGEAR  
22KV 配电装置平面布置图

Spec. No. \_\_\_\_\_ Counlersigner \_\_\_\_\_ Date \_\_\_\_\_

DATE: 2015-11-29 DRAWING NO. B05381S-00501-03 [REV] A



CHINA EXIM BANK  
 Loan No. GCL No. 2013 (36) TOTAL No. (481)  
 Contract No. EDC-TSPB

APPROVED  
 APPROVED with CONDITIONS  
 RETURNED for CORRECTIONS  
 DRAWINGS for WORKS

ELECTRICITE DU CAMBODGE

Signed: \_\_\_\_\_  
 Date: 26.12.2015

FOR APPROVAL  
 CHMC  
 Signature: *[Handwritten Signature]*  
 15 DEC 2015

REV	DATE	REVISION	REVD	CHKD	RVWD	APPRD
PROJECT: TRANSMISSION LINES AND SUBSTATIONS (115KV) FROM PHNOM PENH TO BAVET						
CONTRACT NO.: EDC-TSPB						
EMPLOYER: ELECTRICITE DU CAMBODGE (EDC)						
CONTRACTOR: CHINA NATIONAL HEAVY MACHINERY CORPORATION						
CHRAK MTES 115KV SUBSTATION PROJECT CHRAK MTES 115KV 变电站工程						PHASE: DETAIL 施工图设计
APPROVE	王亮	DESIGN	王亮	THE SECTION OF 22KV SWITCHGEAR 22KV 配电装置断面图		
EXAMINE	王亮	DRAWN	王亮	SCALE		
CHECK	王亮	DATE	2015-11-29	DRAWING NO.	B053815-00501-04	REV A

Spec. No. Countersigner Date

# **APPENDIX 15**

## **EDC SVAY RIENG SWITCHING STATION**

**LEGEND :**

**CONCRETE POLE TYPE**

- 12-S 12M TYPE-S POLE
- 12-A 12M TYPE-A POLE
- 12-T 12M TYPE-T POLE
- 14-S 14M TYPE-S POLE
- 14-A 14M TYPE-A POLE
- 14-T 14M TYPE-T POLE
- 9-S 9M TYPE-S POLE
- 9-A 9M TYPE-A POLE
- 9-T 9M TYPE-T POLE
- 9-EXT 9M TYPE POLE (EXISTING)
- EARTHING

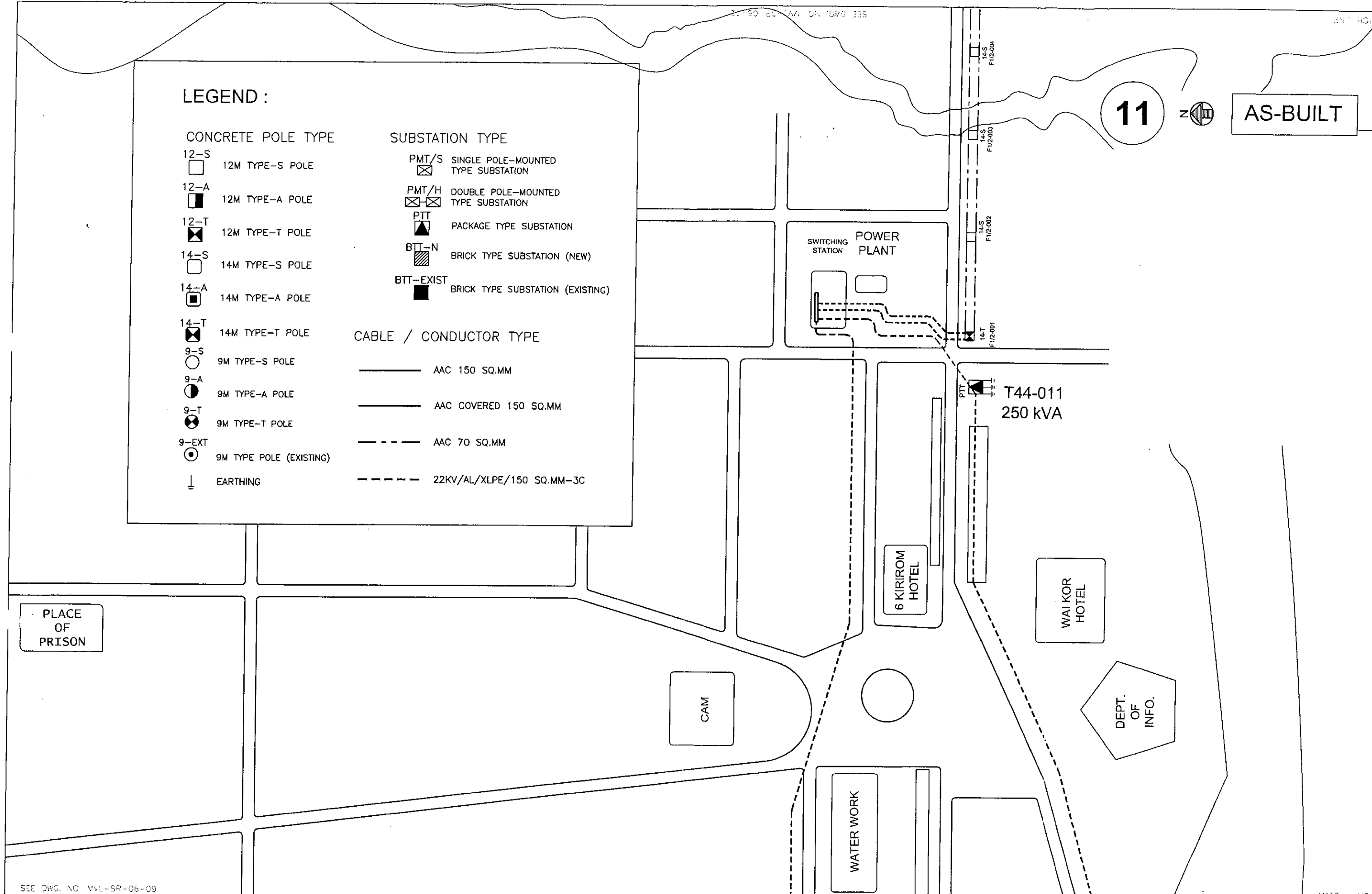
**SUBSTATION TYPE**

- PMT/S SINGLE POLE-MOUNTED TYPE SUBSTATION
- PMT/H DOUBLE POLE-MOUNTED TYPE SUBSTATION
- PTT PACKAGE TYPE SUBSTATION
- BTT-N BRICK TYPE SUBSTATION (NEW)
- BTT-EXIST BRICK TYPE SUBSTATION (EXISTING)

**CABLE / CONDUCTOR TYPE**

- AAC 150 SQ.MM
- AAC COVERED 150 SQ.MM
- AAC 70 SQ.MM
- 22KV/AL/XLPE/150 SQ.MM-3C

**11** **AS-BUILT**



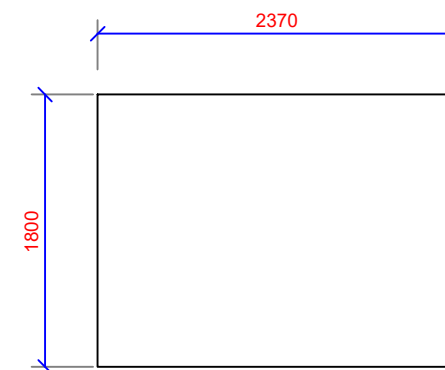
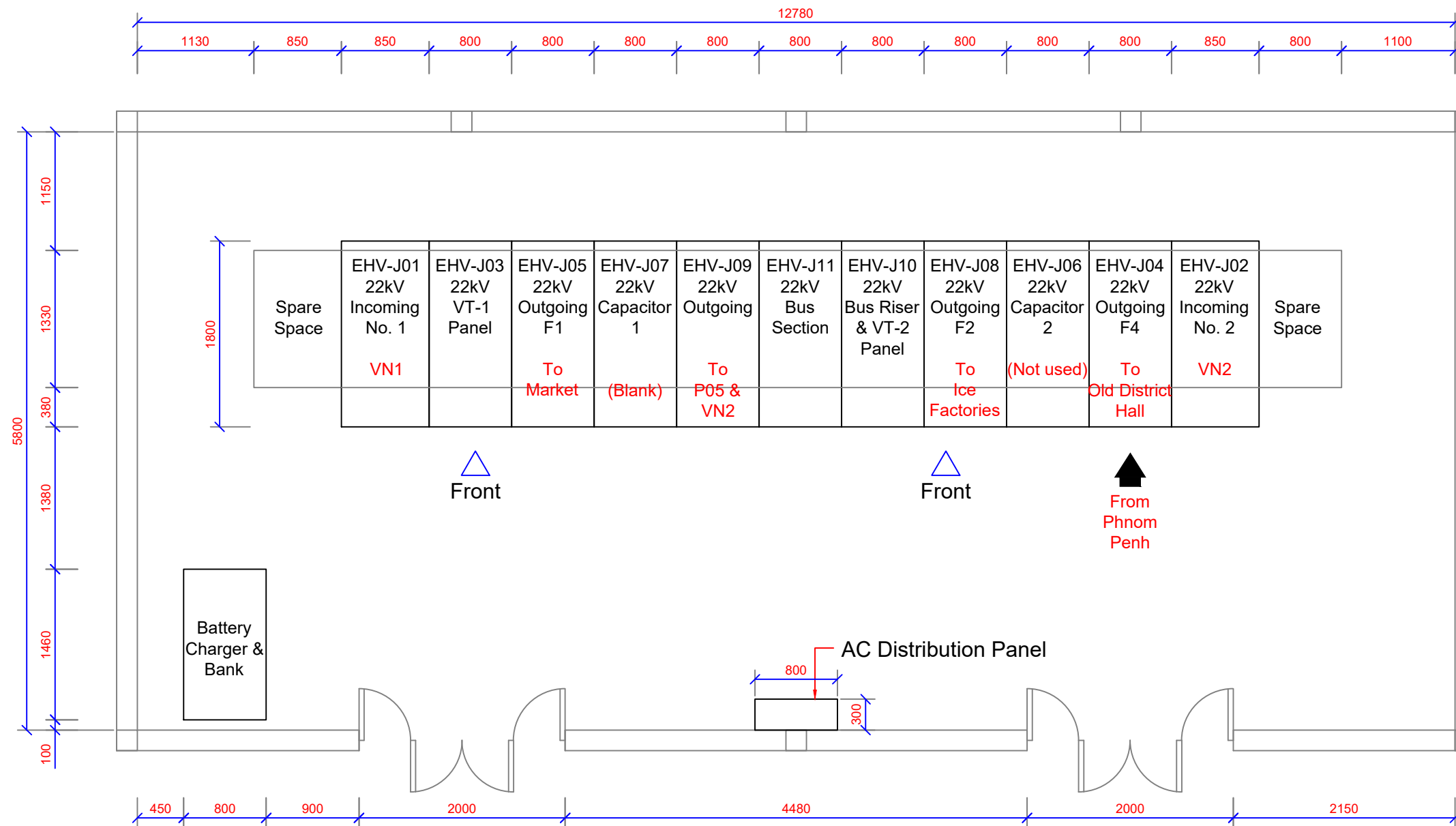
SEE DWG. NO. MVL-SR-06-09

<table border="1"> <tr> <th>NO.</th> <th>REVISION</th> <th>DATE</th> </tr> <tr> <td>1</td> <td>REV-1</td> <td>09/20/04</td> </tr> <tr> <td>2</td> <td>APPROVED FOR CONSTRUCTION</td> <td>10/28/04</td> </tr> <tr> <td>3</td> <td>AS BUILT</td> <td>08/13/06</td> </tr> </table>	NO.	REVISION	DATE	1	REV-1	09/20/04	2	APPROVED FOR CONSTRUCTION	10/28/04	3	AS BUILT	08/13/06	PROJECT OWNER: <b>ELECTRICITE DU CAMBODGE (EDC)</b> STREET 19, WATT PHNOM DAUN PENH DISTRICT PHNOM PENH, KINGDOM OF CAMBODIA	SIZE A1    A3 1:2000		CONTRACTOR : <b>HYUNDAI CONSORTIUM</b> HYUNDAI 41 TOWER, 917-9, MOK-DONG, YANGCHEON-GU, SEOUL, 158-723 KOREA	DESIGNED BY : ALEX C. CANDIANO CHECKED BY : BEN S. LABRADOR JR. APPROVED BY : JOON HUR DRAWN BY : R. MARTINEZ/C. PANGAORON	DRAWING TITLE : <b>MV NETWORK ROUTE PLAN</b>	PROJECT SITE: <b>SVAY RIENG</b> DRAWING No. MVL-SR-06	SHEET No. 11/58
	NO.	REVISION	DATE																	
	1	REV-1	09/20/04																	
2	APPROVED FOR CONSTRUCTION	10/28/04																		
3	AS BUILT	08/13/06																		
PROVINCIAL POWER SUPPLY PROJECT ADB LOAN NO. 1794-CAM (SF) AND AFD GRANT PACKAGE R2: POWER DISTRIBUTION WORKS CONTRACT NO.: 2003-ADB-EDC-R2																				
SEE DWG. NO. MVL-SR-06-10																				

SEE DWG. NO. MVL-SR-06-10

MATCH LINE





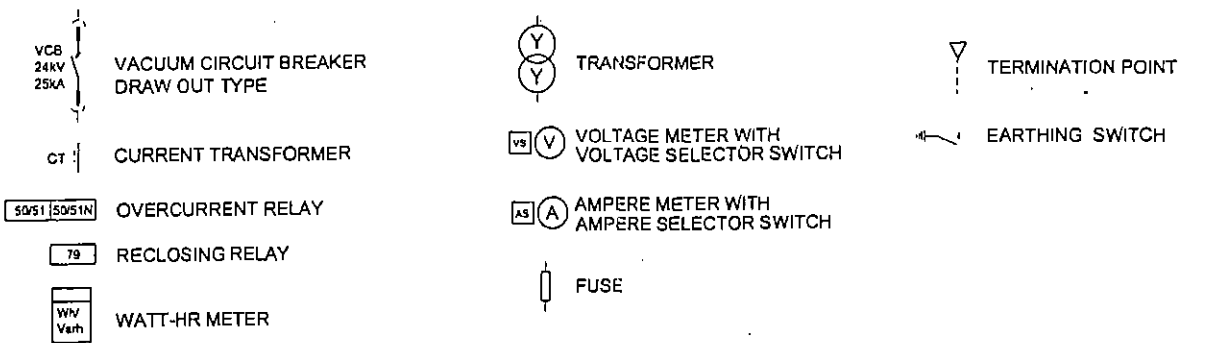
Note:  
 (1) All dimensions are in millimeter.  
 (2) 22kV Cubicles are of LG.

**22 kV METALCLAD SWITCHGEAR ROOM  
 (OUTLINED DIMENSION)  
 EDC SVAY RIENG**

JICA PROJECT NAME: Preparatory Survey for Southern Economic Corridor Distribution Expansion Project		DRAWING TITLE: BAVET (Svay Rieng Province) EDC 22kV Switchgear Room		
CONTRACTOR:	NEWJEC Inc., THE CHUGOKU ELECTRIC POWER CO., INC.	SCALE	DATE	KEY PAGE
SUB CONTRACTOR:	Cheang Engineering Consultants, Co. Ltd.	1/50	08/12/2015	
				DWG No PP-03

# SWITCHING STATION SUBSTATION ONE LINE DIAGRAM

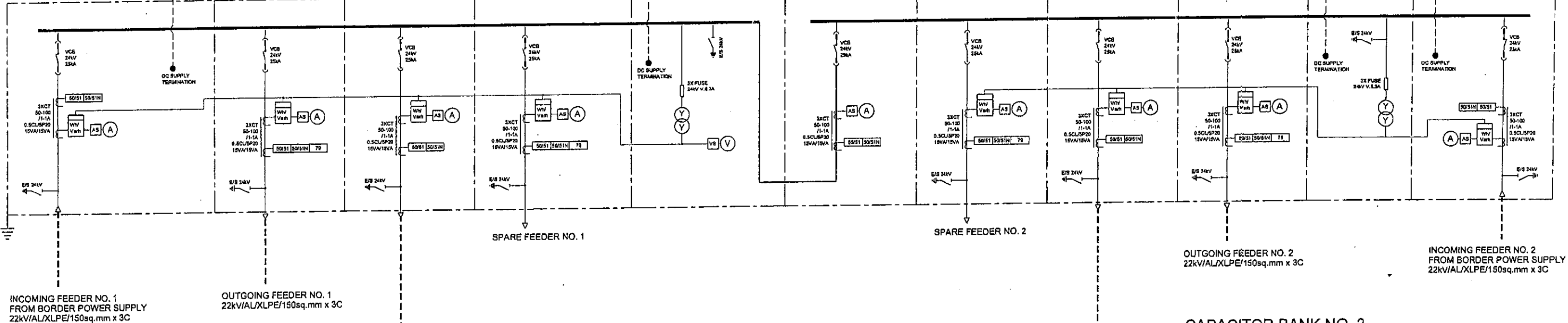
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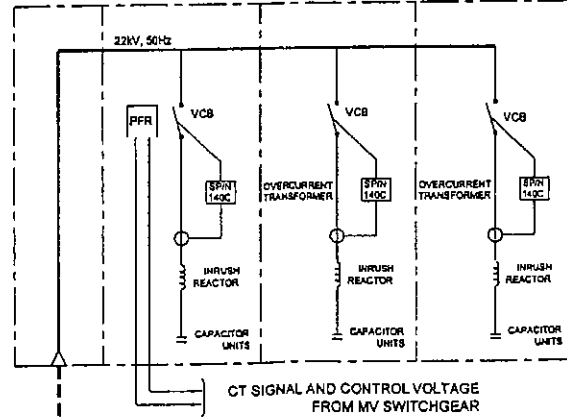
CONTINUE DRAWING NO. SR-CV-01-02, SHEET NO. 19/21

2C x 5.5mm<sup>2</sup> CABLE per VCB in 90mm dia. PVC

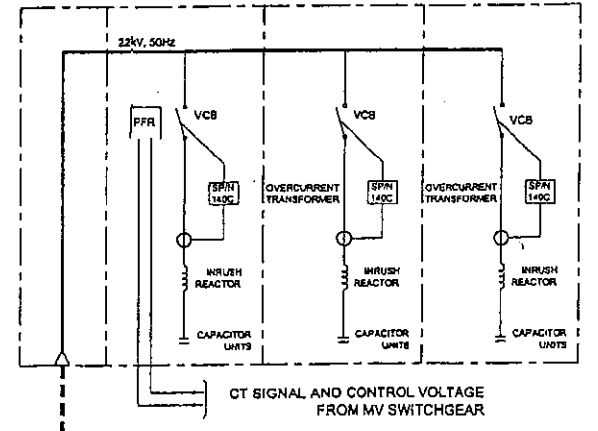
### 22kV -MV SWITCHGEAR



### CAPACITOR BANK NO. 1



### CAPACITOR BANK NO. 2

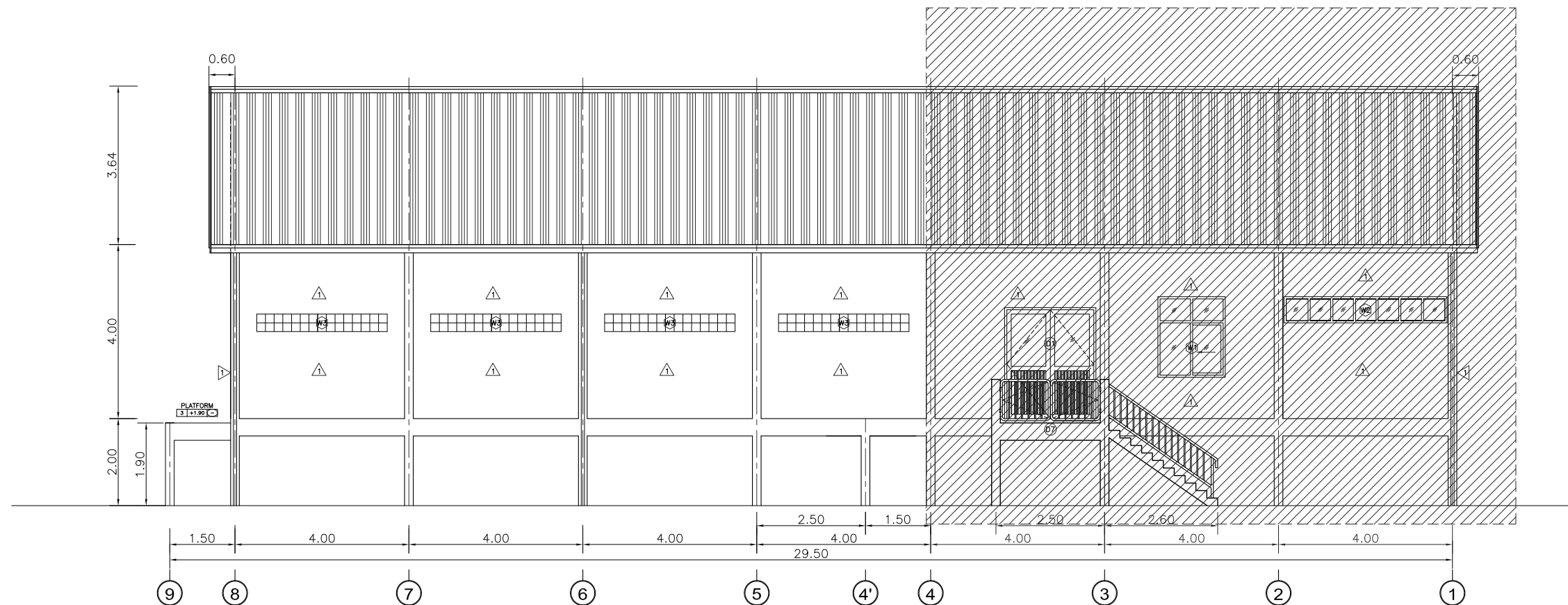


**AS-BUILT**

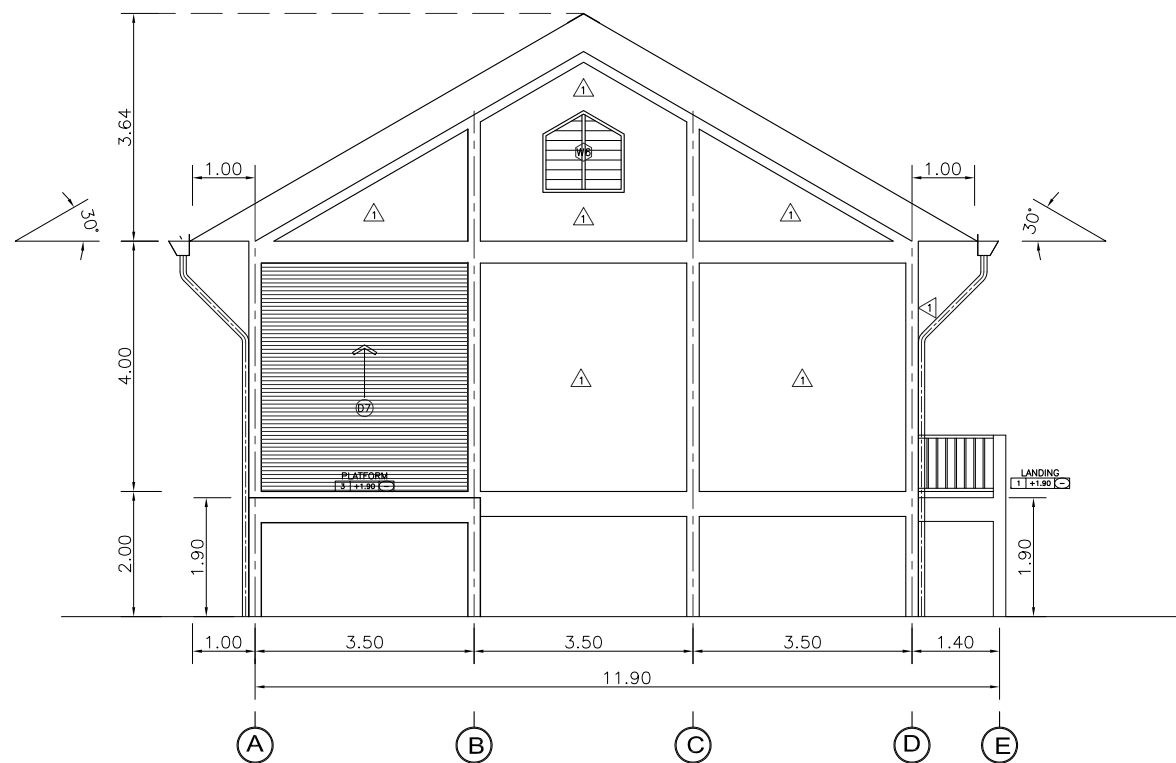
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>NO.</th> <th>REVISION</th> <th>DATE</th> </tr> <tr> <td>1</td> <td>FIRST ISSUE</td> <td>MAY04'08</td> </tr> <tr> <td>2</td> <td>SECOND ISSUE</td> <td>FEB02'08</td> </tr> <tr> <td>3</td> <td>FOR CONSTRUCTION</td> <td>FEB24'08</td> </tr> <tr> <td>4</td> <td>AS BUILT</td> <td>AUG15'08</td> </tr> </table>	NO.	REVISION	DATE	1	FIRST ISSUE	MAY04'08	2	SECOND ISSUE	FEB02'08	3	FOR CONSTRUCTION	FEB24'08	4	AS BUILT	AUG15'08	<p>PROJECT OWNER: <b>ELECTRICITE DU CAMBODGE (EDC)</b>  STREET 19, WATT PHNOM OUN PENH DISTRICT PHNOM PENH, KINGDOM OF CAMBODIA</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>SIZE</th> </tr> <tr> <td>A1 A3</td> </tr> <tr> <td>NTS NTS</td> </tr> </table>	SIZE	A1 A3	NTS NTS	<p>PROVINCIAL POWER SUPPLY PROJECT ADB LOAN NO. 1794-CAM (SF) AND AFD GRANT PACKAGE R2: POWER DISTRIBUTION WORKS CONTRACT NO.: 2003-ADB-EDC-R2</p>	<p>CONTRACTOR : <b>HYUNDAI CONSORTIUM</b>  HYUNDAI 41 TOWER, 917-9, MOX-DONG, YANGCHEON-GU, SEOUL, 158-723 KOREA</p>	<p>DESIGNED BY : ALEX C. CANDANO CHECKED BY : BEN S. LABRADOR JR. APPROVED BY : JOON HUR DRAWN BY : ALEX C. CANDANO</p>	<p>DRAWING TITLE : <b>ONE LINE DIAGRAM SWITCHING STATION SUBSTATION</b></p>	<p>PROJECT SITE: <b>SVAY RIENG</b>  DRAWING No. SR-CV-01</p>	<p>SHEET No. 18/21</p>
NO.	REVISION	DATE																								
1	FIRST ISSUE	MAY04'08																								
2	SECOND ISSUE	FEB02'08																								
3	FOR CONSTRUCTION	FEB24'08																								
4	AS BUILT	AUG15'08																								
SIZE																										
A1 A3																										
NTS NTS																										

# **APPENDIX 16**

## **IE SUBSTATION**



ELEVATION 4  
SCALE 1:125




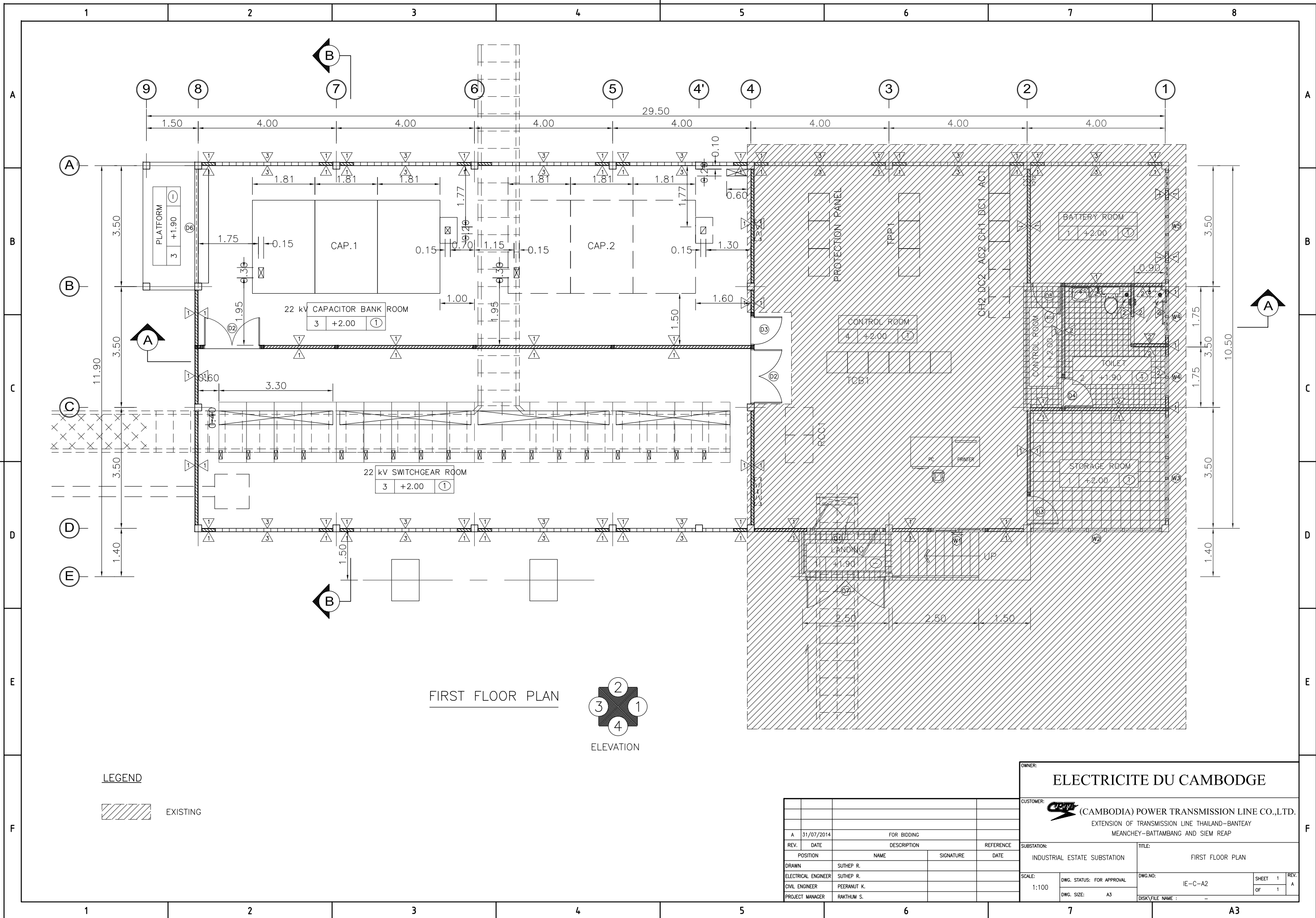
ELEVATION 3  
SCALE 1:125

LEGEND

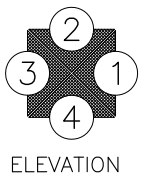
 EXISTING

REV.	DATE	DESCRIPTION	REFERENCE
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OWNER: <b>ELECTRICITE DU CAMBODGE</b>			
CUSTOMER:  (CAMBODIA) POWER TRANSMISSION LINE CO.,LTD. EXTENSION OF TRANSMISSION LINE THAILAND-BANTEAY MEANCHHEY-BATTAMBANG AND SIEM REAP			
SUBSTATION: INDUSTRIAL ESTATE SUBSTATION		TITLE: ELEVATION 3,4	
SCALE: 1:125	DWG. STATUS: FOR APPROVAL	DWG. NO: IE-C-A5	SHEET 1 OF 1 REV. A
	DWG. SIZE: A3	DISK/FILE NAME: -	



FIRST FLOOR PLAN



ELEVATION

LEGEND

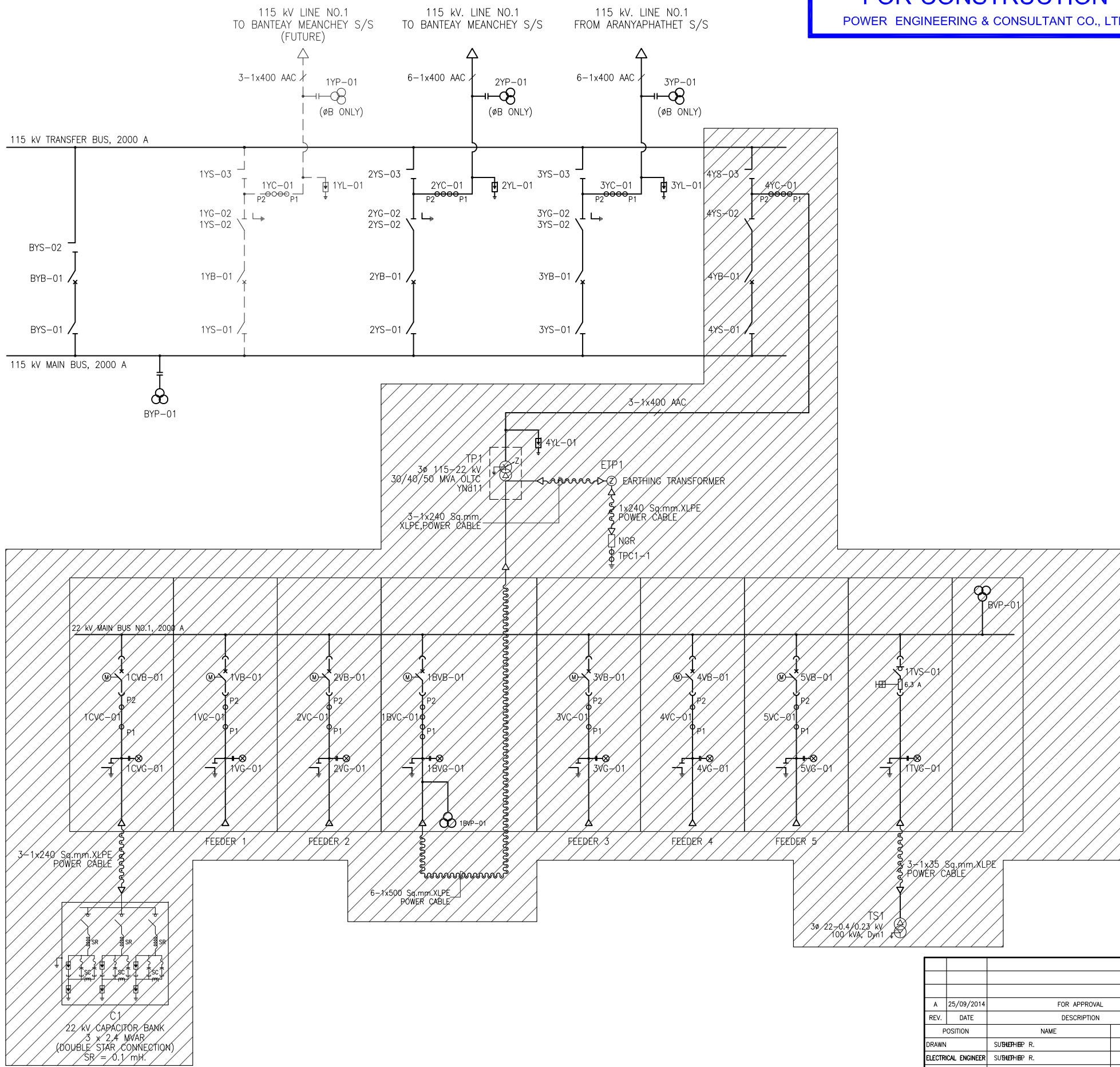
EXISTING

OWNER: ELECTRICITE DU CAMBODGE CUSTOMER:  (CAMBODIA) POWER TRANSMISSION LINE CO.,LTD. EXTENSION OF TRANSMISSION LINE THAILAND-BANTEAY MEANCHHEY-BATTAMBANG AND SIEM REAP			
SUBSTATION: INDUSTRIAL ESTATE SUBSTATION	TITLE: FIRST FLOOR PLAN		
SCALE: 1:100	DWG. STATUS: FOR APPROVAL DWG. SIZE: A3		
DWG. NO.: IE-C-A2 SHEET 1 OF 1 REV. A	DISK FILE NAME: -		

REV.	DATE	DESCRIPTION	REFERENCE
A	31/07/2014	FOR BIDDING	

POSITION	NAME	SIGNATURE	DATE
DRAWN	SUTHEP R.		
ELECTRICAL ENGINEER	SUTHEP R.		
CIVIL ENGINEER	PEERANUT K.		
PROJECT MANAGER	RAKTHUM S.		

**FOR CONSTRUCTION**  
POWER ENGINEERING & CONSULTANT CO., LTD.



SYMBOL	DESCRIPTION
	CIRCUIT BREAKER
	DISCONNECTING SWITCH WITHOUT GROUNDING SWITCH (NORMAL CLOSE, NORMAL OPEN)
	DISCONNECTING SWITCH WITH GROUNDING SWITCH
	CURRENT TRANSFORMER
	CAPACITOR VOLTAGE TRANSFORMER
	LIGHTNING ARRESTER
	3 $\phi$ TRANSFORMER WITH ON-LOAD TAP CHANGER
	NEUTRAL EARTHING TRANSFORMER
	UNDERGROUND CABLE
	DRAW OUT TYPE VACUUM CIRCUIT BREAKER
	DRAW OUT TYPE LOAD BREAK SWITCH WITH FUSE
	SERVICE TRANSFORMER
	VOLTAGE TRANSFORMER
	WITHDRAWABLE VOLTAGE TRANSFORMER WITH FUSE
	CABLE TERMINATION
	SHUNT CAPACITOR
	SERIES REACTOR
	CURRENT TRANSFORMER
	NEUTRAL GROUNDING RESISTOR
	VACUUM CIRCUIT BREAKER 24 kV., 630 A.
	22 kV. INDICATION LAMP
	FUTURE

**LEGEND**

	SCOPE OF THIS PROJECT
	EXISTING
	FUTURE

**ELECTRICITE DU CAMBODGE**

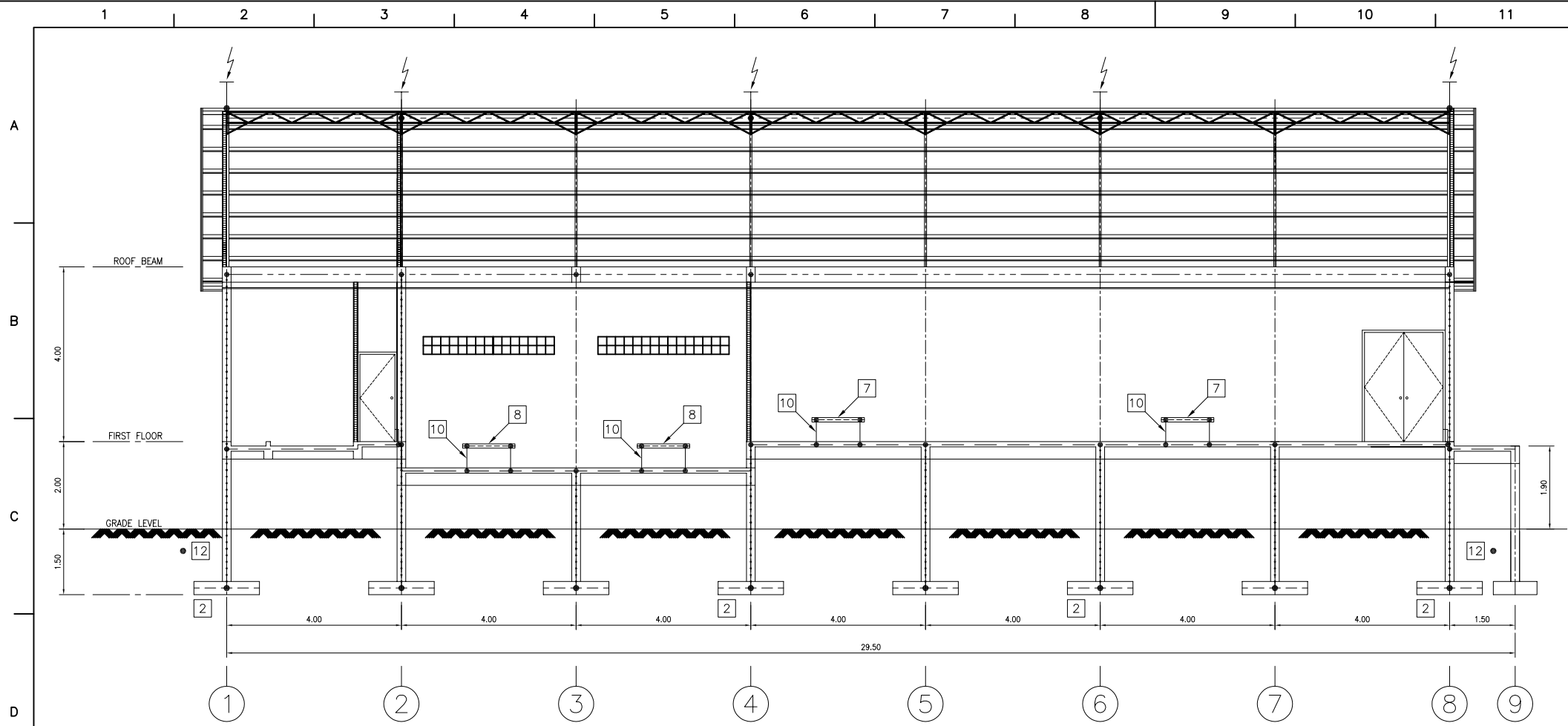
(CAMBODIA) POWER TRANSMISSION LINE CO.,LTD.  
EXTENSION OF TRANSMISSION LINE THAILAND-BANTEAY MEANCHHEY-BATTAMBANG AND SIEM REAP

OWNER:			
CUSTOMER:			
INDUSTRIAL ESTATE SUBSTATION	SINGLE LINE DIAGRAM		
SCALE:	DWG. STATUS: FOR APPROVAL	DWG. NO: IE-E-S1	SHEET 2 OF 2
REV. DATE DESCRIPTION REFERENCE	DISK\FILE NAME :		

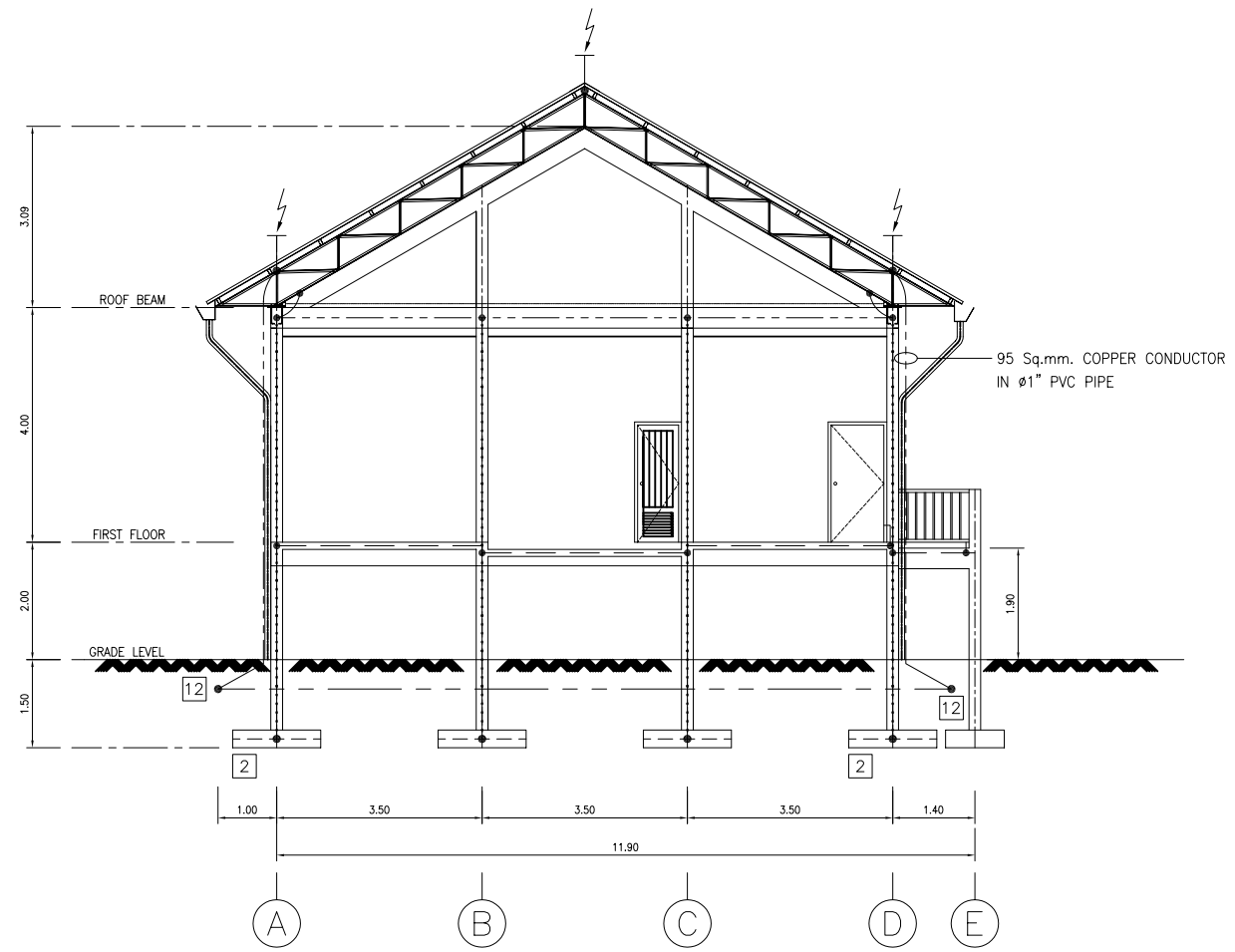
REV.	DATE	DESCRIPTION	REFERENCE
A	25/09/2014	FOR APPROVAL	
DRAWN	SUBHIEP R.	SIGNATURE	DATE 31/07/2014
ELECTRICAL ENGINEER	SUBHIEP R.	<i>S. Subhiep</i>	31/07/2014
CIVIL ENGINEER	PEERANUT K.	<i>P. Peeranut</i>	
PROJECT MANAGER	RAKTHUM S.	<i>R. Rakthum</i>	

# **APPENDIX 17**

## **BANTEAY MEANCHEY SUBSTATION**



SECTION A-A  
SCALE 1:100



SECTION B-B  
SCALE 1:100

LEGEND	DESCRIPTION	MINIMUM CROSS SECTION MATERIAL	PLOTTING
1	SWITCHYARD GROUND GRID EMBEDDED IN THE SOIL AT 0.50 m. DEPT	1x95 Sq.mm. COPPER CONDUCTOR	-----
2	FOUNDATION EARTH ELECTRODE LAID ON EDGE AT LEAST 5 cm. ABOVE FOUNDATION BOTTOM EDGE AND JOINED EVERY 2.00 m. WITH THE ARMOURING OF CONCRETE BY RACKING	32 mm. x 4 mm. STEEL STRIP HOT DIP GALVANIZED	-----
3	POTENTIAL GRADING EARTHING CONDUCTOR LAID ON EDGE THE ARMOURING OF CONCRETE BY THE TOP EDGE OF UNFINISHED FLOOR TO BE CONNECTED WITH THE ARMOURING BY RACKING IN AN INTERVAL OF ABOUT 1.00 m.		-----
4	RISEING LEADS IN THE BUILDING PILLARS FOUNDATION → GROUND FLOOR, FIRST FLOOR, ROOF	32 mm. x 4 mm. STEEL STRIP HOT DIP GALVANIZED OR 95 Sq.mm. COPPER CONDUCTOR	-----
5	LEADS FOR THE PURPOSE OF FORMING A FARADAY CAGE (EMC-PROVISION FOR LIGHTNING STRIKES)		-----
6	RISEING LEADS IN THE PILLARS FOUNDATION → GROUND FLOOR, FIRST FLOOR, ROOF	30 mm. x 4 mm. x 1.2 m. COPPER BAR	-----
7	MAIN EARTHING CONDUCTOR FOR 22kV SWITCHGEAR AND CAPACITOR BANK		-----
8	MAIN EARTHING CONDUCTOR FOR EQUIPMENT IN CONTROL ROOM AND GROUND FLOOR	1x95 Sq.mm. COPPER CONDUCTOR	-----
9	CONNECTING LEAD 12 → 1		-----
10	CONNECTING LEAD 7 . 8 → 3	32 mm. x 4 mm. STEEL STRIP HOT DIP GALVANIZED	-----
11	GROUND ROD		-----
12	POTENTIAL GRADIENT RING AROUND BUILDING EMBEDDED IN THE SOIL AT 0.50 m. DEPT AND 1.00 m. OUTSIDE THE WALL	1x95 Sq.mm. COPPER CONDUCTOR	-----
13	CONNECTING LEAD 7 → 12 BUILDING ENTRY BY MAINS OF Ø 1 1/2" PVC PIPE	1x95 Sq.mm. COPPER CONDUCTOR	-----
14	AIR ROD FOR LIGHTNING PROTECTION SYSTEM	COPPER-CLAD STEEL Ø 5/8" x 1.00 m. LONG	-----
15	CONNECTED TO METAL STRUCTURE, SUCH AS RAILS, DOORS, WINDOWS, ROLLING SHUTTER	32 mm. x 4 mm. STEEL STRIP HOT DIP GALVANIZED	-----

NOTES

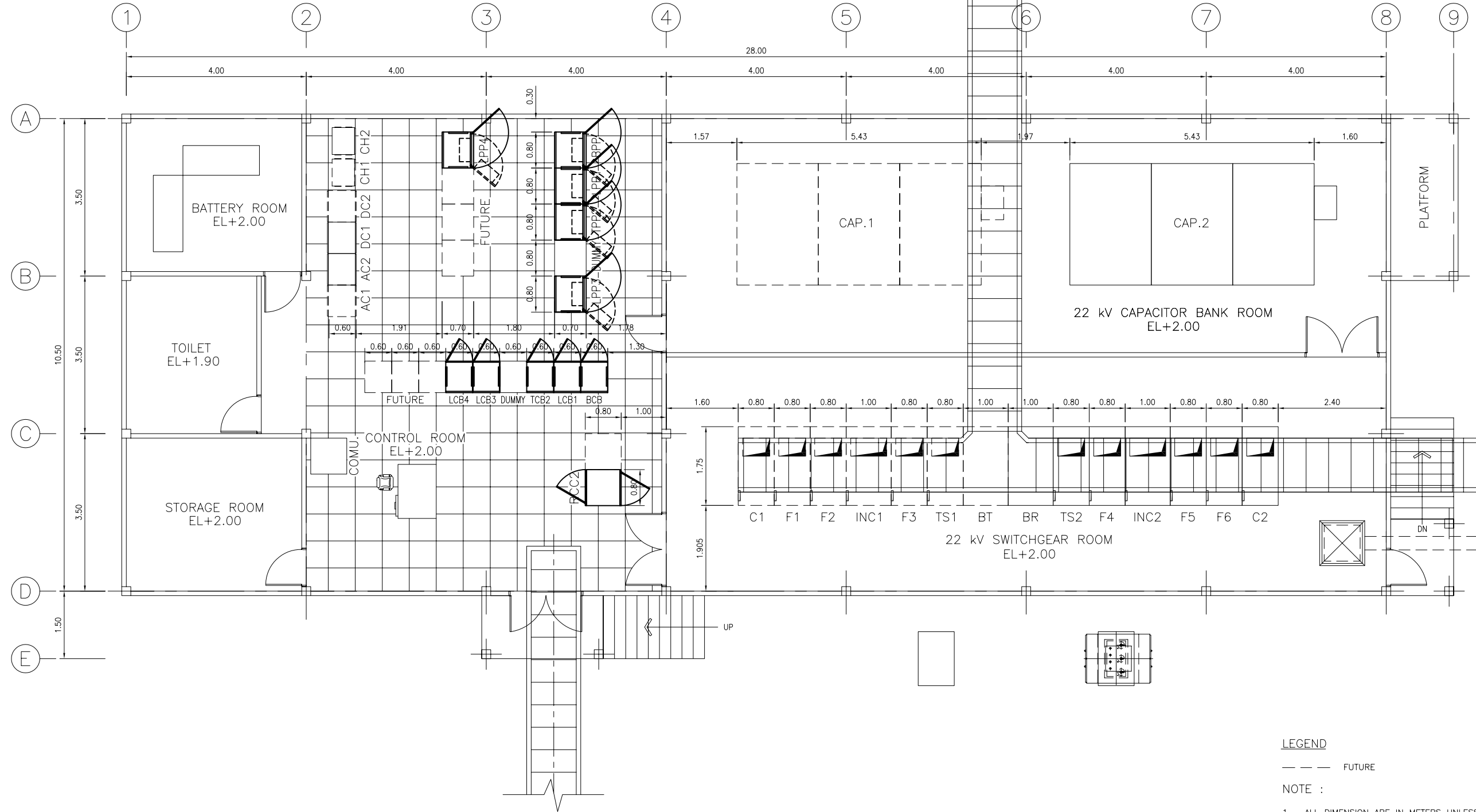
- ALL DIMENSIONS ARE IN METERS, EXCEPT AS NOTED.
- THE EARTHING SYSTEM IS DESIGNED ACC. TO DIN VDE 0141 AND ANSI/IEEE Std. 80-2000
- THE EARTHING GRIDS ARE NOT MEASURED BUT REPRESENTED TRUE TO SCALE, THEY HAVE TO BE INSTALLED CORRESPONDINGLY
- THE LAYING OF EARTHING CONDUCTORS IS TO BE DETERMINED ON SITE ACCORDING TO ARCHITECTURAL AND TECHNICAL CIRCUMSTANCES
- ALL CROSSING LEADS WITHIN THE EARTHING GRID HAVE TO BE CONNECTED CONDUCTIVELY
- ALL EARTHING CONNECTIONS WITHIN THE CONCRETE SHALL BE CONFIRMED BY THE WELD PROCESS
- FLAT STEEL 32 mm. x 4 mm. IN CONCRETE FOR THE PURPOSE OF EARTHING IS TO BE JOINED WITH THE ARMOURING BY RACKING IN AN INTERVAL OF ABOUT 1.00 m.
- INTERCONNECTIONS OF EARTHING CONDUCTORS AND MAIN EARTHING BARS HAVE TO BE CARRIED OUT BY MEANS OF WELDING, SCREW OR CLAMPS FOR CONNECTIONS AND TERMINATIONS BY SCREWS, 2 SCREWS WITH AT LEAST M8 OR 1 SCREW WITH AT LEAST M10 HAVE TO BE USED
- THE LUGS LEAVING THE WALL RESPECTIVE TO THE FLOOR LEVEL SHOULD BE OF SUFFICIENT LENGTH (APPROXIMATELY 1.50 m.)
- OVERHEAD GROUND WIRE OF ALL TRANSMISSION LINES SHALL BE CONNECTED TO SUBSTATION MAIN GROUND GRID
- POTENTIAL GRADIENT RING AROUND BUILDING SHALL BE AT LEAST 95 Sq.mm. COPPER ROPE EMBEDDED IN SOIL AT 0.50 m. DEPT AND SHALL BE CONNECTED TO SWITCHYARD GROUND GRID AND THE MAIN EARTHING CONDUCTOR ON GROUND FLOOR
- BUILDING LIGHTNING PROTECTION SYSTEM SHALL BE CONNECTED TO POTENTIAL GRADIENT RING
- LADDER OR CABLE RACK ON GROUND FLOOR SHALL BE CONNECTED TO MAIN EARTHING CONDUCTOR EVERY 10.00 m.
- GROUNDING SYSTEM OF CABLE TRAY IN CABLE TRENCH OUTSIDE BUILDING SHALL BE CONNECTED TO MAIN EARTHING CONDUCTOR
- SWITCHGEAR EARTHING BUS SHALL BE CONNECTED TO THE SUBSTATION EARTHING SYSTEM AT LEAST AT BOTH ENDS AND IN THE MIDDLE
- ALL CONNECTION SHALL BE EXOTHERMIC WELDED

REFERENCE DRAWING

SWITCHYARD EARTHING SYSTEM.....DWG.No.BM-E-S4-1 SH.1 OF 1

<table border="1"> <tr> <td>2</td> <td>2/10/2006</td> <td>FOR CONSTRUCTION</td> <td></td> </tr> <tr> <td>1</td> <td>9/06/2006</td> <td>MODIFICATION AS PER THE OPTIL'S CONSULTS COMMENT</td> <td></td> </tr> </table>				2	2/10/2006	FOR CONSTRUCTION		1	9/06/2006	MODIFICATION AS PER THE OPTIL'S CONSULTS COMMENT		<p>OWNER: <b>ELECTRICITE DU CAMBODGE</b></p> <p>CUSTOMER: <b>(CAMBODIA) POWER TRANSMISSION LINE CO.,LTD.</b></p> <p>CONTRACTOR: <b>PES INTERNATIONAL CO.,LTD.</b></p>																			
2	2/10/2006	FOR CONSTRUCTION																													
1	9/06/2006	MODIFICATION AS PER THE OPTIL'S CONSULTS COMMENT																													
<table border="1"> <thead> <tr> <th>REV.</th> <th>DATE</th> <th>DESCRIPTION</th> <th>REFERENCE</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>				REV.	DATE	DESCRIPTION	REFERENCE					<p>SUBSTATION: <b>BANTEAY MEANCHEY SUBSTATION</b></p> <p>TITLE: <b>CONTROL BUILDING EARTHING SYSTEM</b></p>																			
REV.	DATE	DESCRIPTION	REFERENCE																												
<table border="1"> <thead> <tr> <th>POSITION</th> <th>NAME</th> <th>SIGNATURE</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td>DRAWN</td> <td>SUPALUK J.</td> <td></td> <td>5/01/2006</td> </tr> <tr> <td>ELECTRICAL ENGINEER</td> <td>PAYUNSAK S.</td> <td></td> <td>5/01/2006</td> </tr> <tr> <td>ELECTRICAL ENGINEER</td> <td>PRAPON D.</td> <td></td> <td>10/01/2006</td> </tr> <tr> <td>PROJECT ENGINEER</td> <td>NARIN E.</td> <td></td> <td>13/01/2006</td> </tr> <tr> <td>PROJECT MANAGER</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>				POSITION	NAME	SIGNATURE	DATE	DRAWN	SUPALUK J.		5/01/2006	ELECTRICAL ENGINEER	PAYUNSAK S.		5/01/2006	ELECTRICAL ENGINEER	PRAPON D.		10/01/2006	PROJECT ENGINEER	NARIN E.		13/01/2006	PROJECT MANAGER				<p>SCALE: 1 : 100</p> <p>DWG. STATUS: FOR CONSTRUCTION</p> <p>DWG. NO: PES/BM-E-S4-3</p> <p>DWG. SIZE: A2</p> <p>DISK/FILE NAME: BMS433C</p> <p>SHEET 3 OF 5</p> <p>REV. 2</p>			
POSITION	NAME	SIGNATURE	DATE																												
DRAWN	SUPALUK J.		5/01/2006																												
ELECTRICAL ENGINEER	PAYUNSAK S.		5/01/2006																												
ELECTRICAL ENGINEER	PRAPON D.		10/01/2006																												
PROJECT ENGINEER	NARIN E.		13/01/2006																												
PROJECT MANAGER																															





CONTROL BUILDING EQUIPMENT LAYOUT  
SCALE 1:75

**LEGEND**  
 --- FUTURE  
**NOTE :**  
 1. ALL DIMENSION ARE IN METERS UNLESS OTHERWISE NOTED.

REV.	DATE	DESCRIPTION	REFERENCE
2	2/10/2006	FOR CONSTRUCTION	
1	9/06/2006	MODIFICATION AS PER THE CPTL'S CONSULTS COMMENT	

POSITION	NAME	SIGNATURE	DATE
DRAWN	SUPALLUK J.		5/01/2006
ELECTRICAL ENGINEER	PAYUNSAK S.		5/01/2006
ELECTRICAL ENGINEER	PRAPON D.		10/01/2006
PROJECT ENGINEER	NARIN E.		13/01/2006
PROJECT MANAGER			

OWNER:  
**ELECTRICITE DU CAMBODGE**

CUSTOMER:  
 (CAMBODIA) POWER TRANSMISSION LINE CO.,LTD.

CONTRACTOR:  
 PES INTERNATIONAL CO.,LTD.

SUBSTATION:  
 BANTEAY MEANCHEY SUBSTATION

TITLE:  
 CONTROL BUILDING EQUIPMENT LAYOUT

SCALE:  
 1 : 75

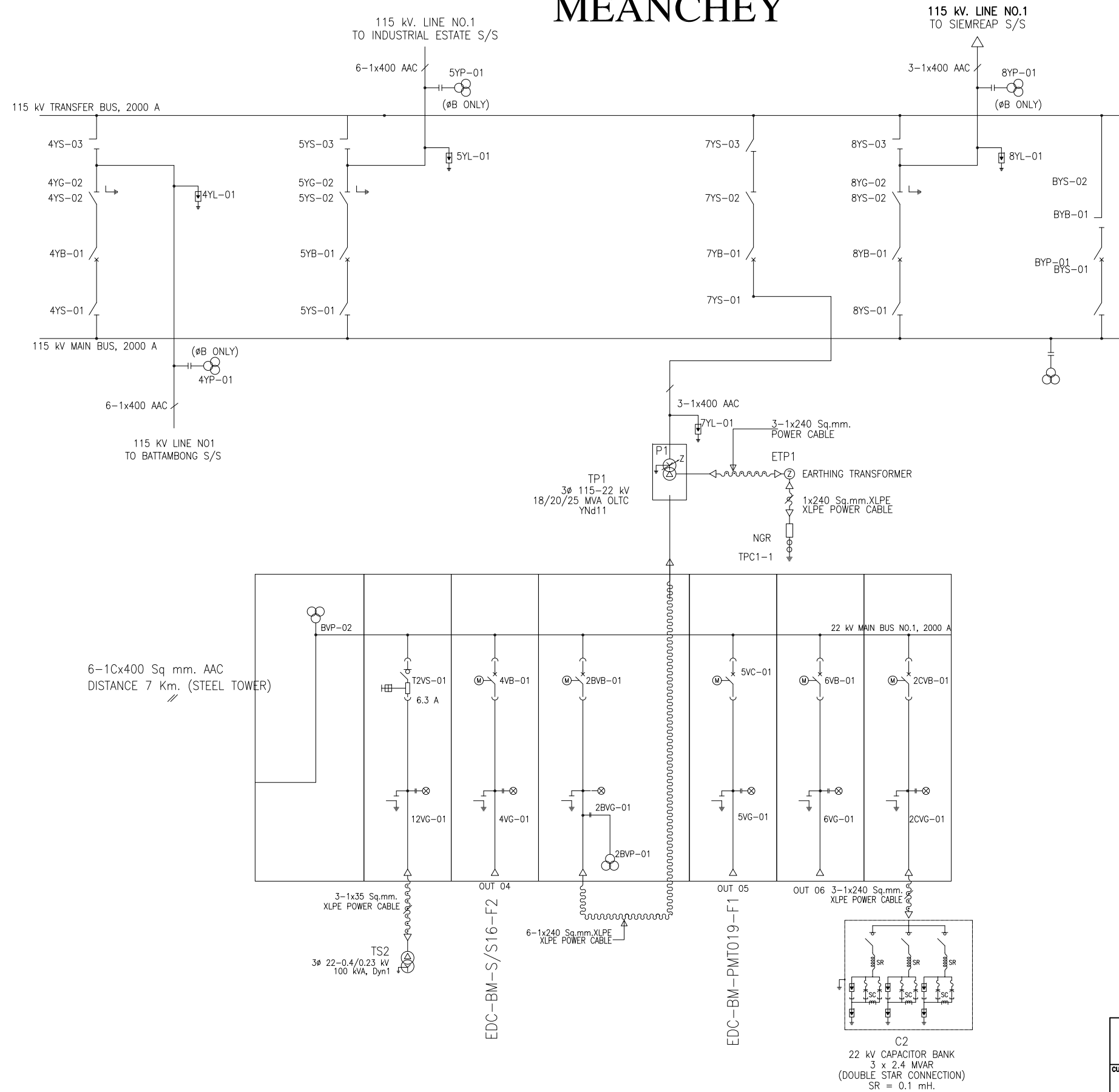
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 DWG. SIZE: A2

DWG.NO:  
 PES/BM-E-SB-1

DISK/FILE NAME :  
 BMS811C

SHEET	1	REV.	2
OF	2		

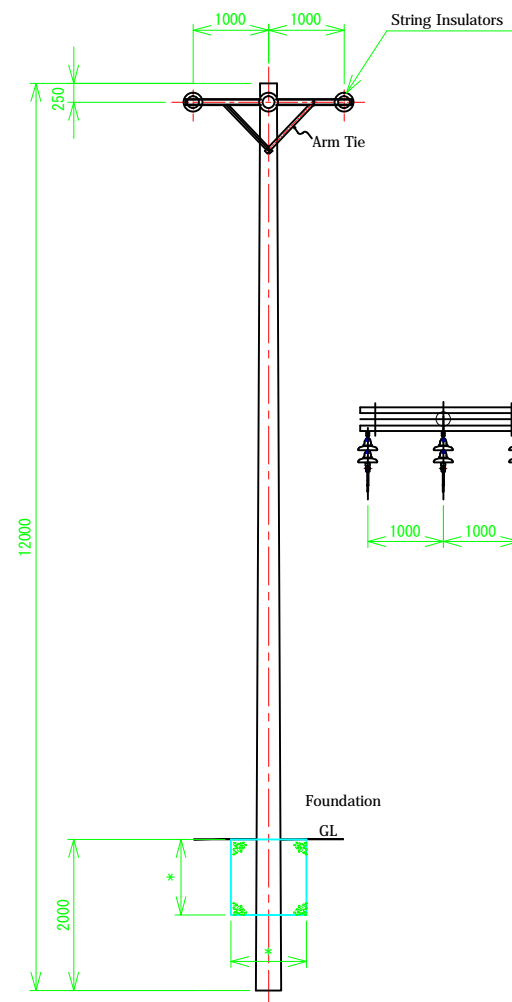
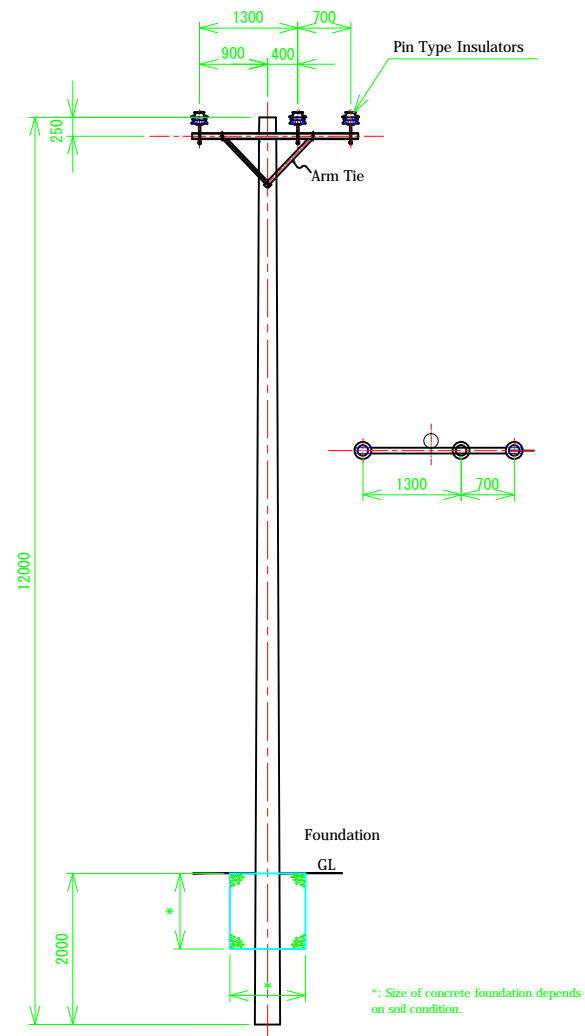
# BANTEAY MEANCHEY



<b>ELECTRICITE DU CAMBODGE</b>			
CUSTOMER:  (CAMBODIA) POWER TRANSMISSION LINE CO.,LTD.			
DRAWING BY:	CHECKED BY:	VERIFIED BY:	APPROVED BY:
SUBSTATION: BANTEAY MEANCHEY SUBSTATION		TITLE: OVERALL SINGLE LINE DIAGRAM	

# **APPENDIX 18**

## **MV POLE ARRANGEMENT**

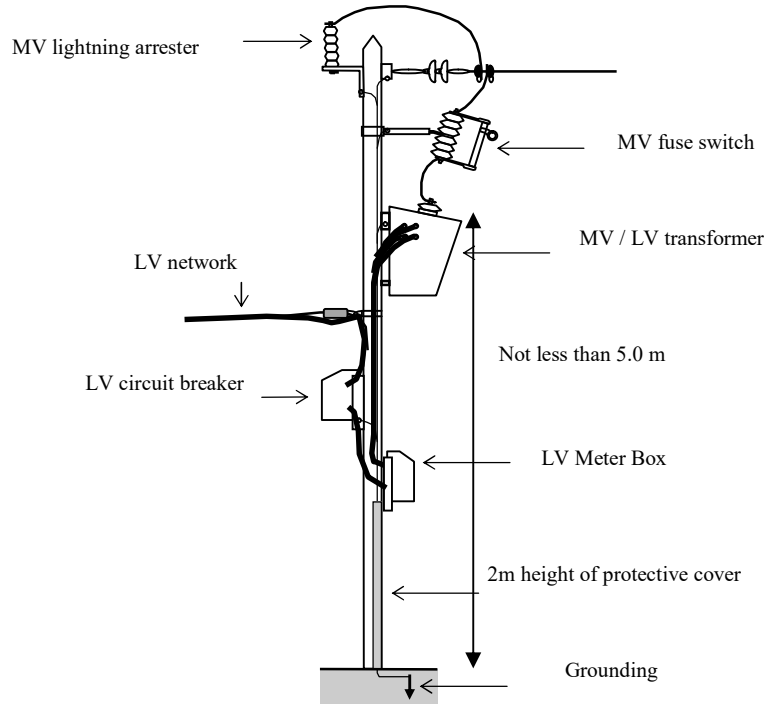


JAPAN INTERNATIONAL COOPERATION AGENCY
THE PREPARATORY SURVEY FOR SOUTHERN ECONOMIC CORRIDOR DISTRIBUTION EXPANSION PROJECT
DWG. No.
Medium Voltage Overhead Three Phase
NEWJEC INC. THE CHUGOKU ELECTRIC POWER CO., INC.

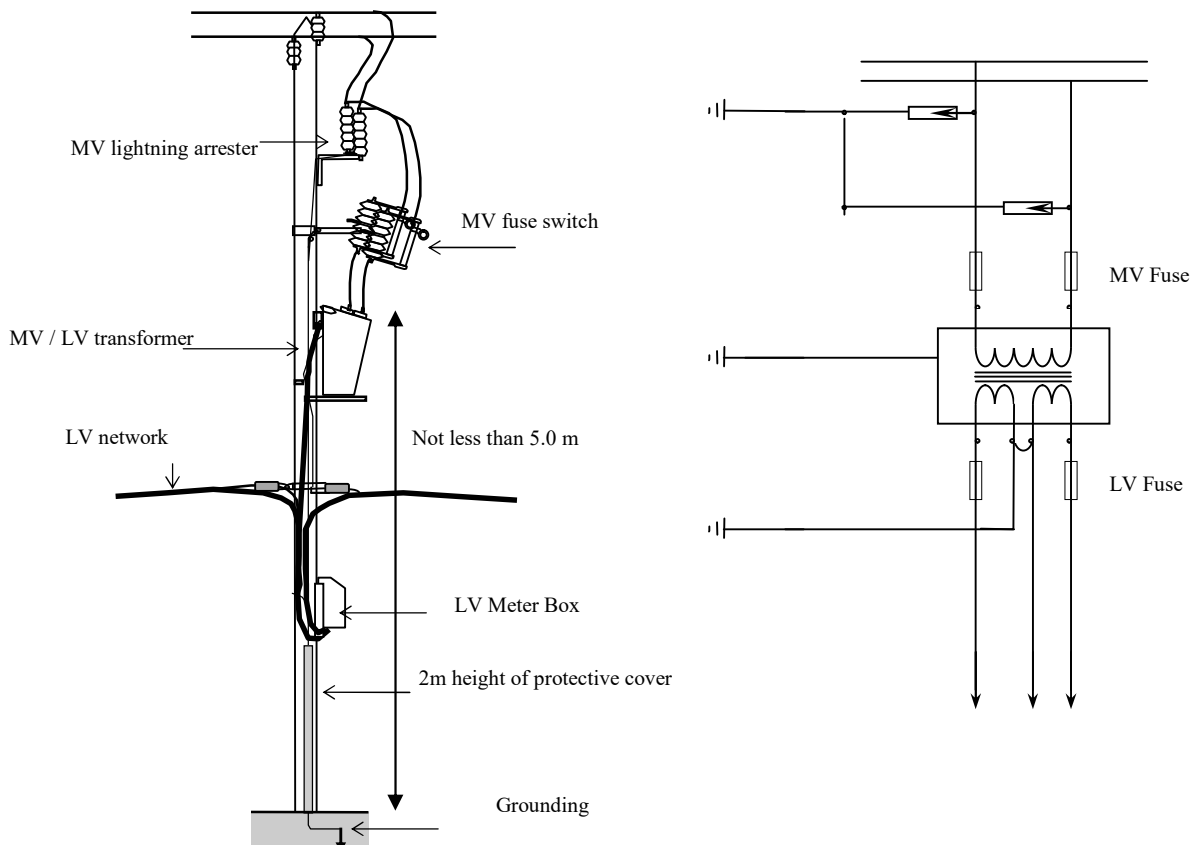
**II - 25 to 160 kVA pole mounted substation**

**1) Presentation :**

- **For three phase transformer, whose capacity from 50 KVA to 160 KVA**



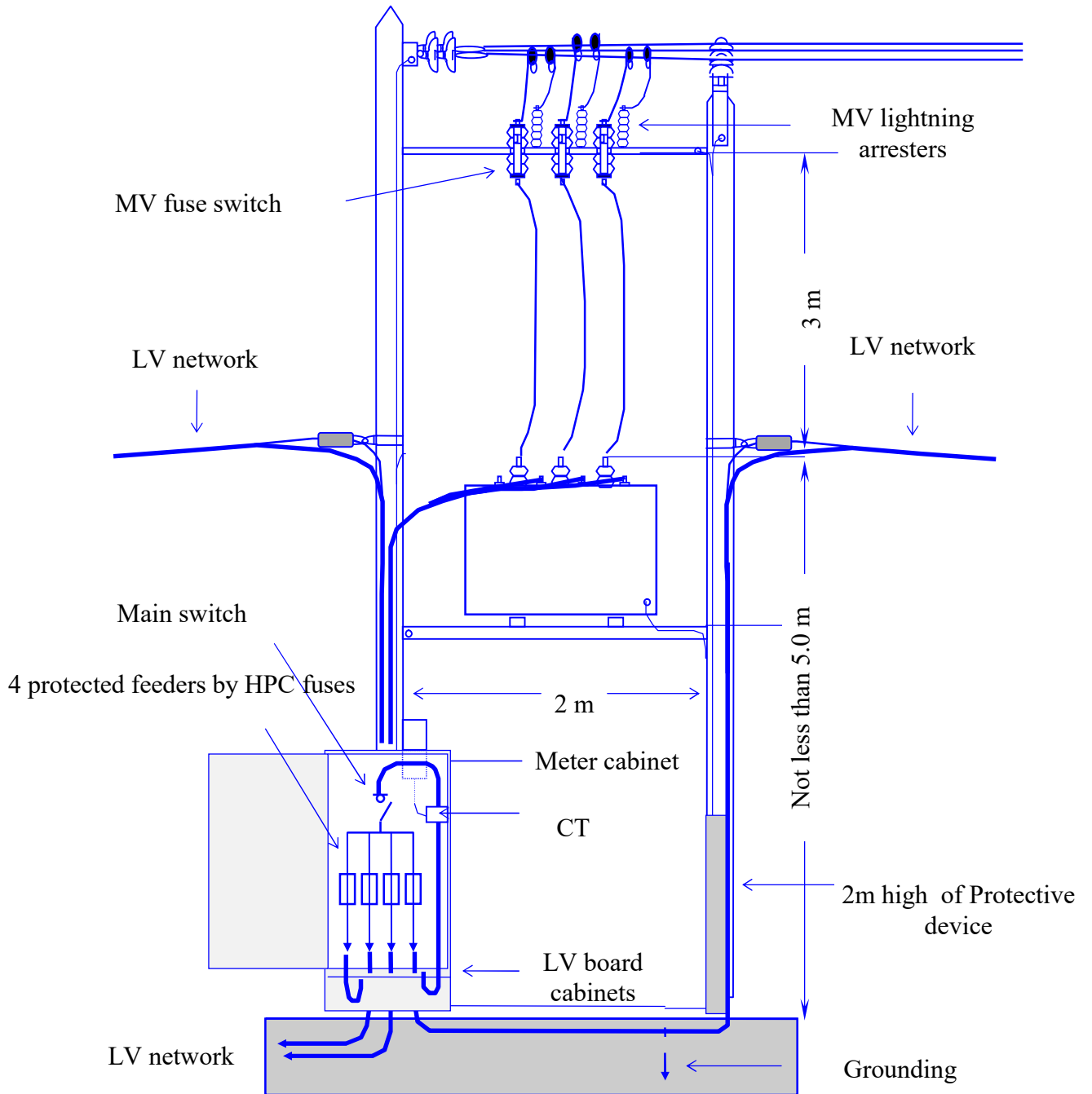
- **For single phase transformer, whose capacity from 25 KVA to 50 KVA**



**Figure : pole mounted substation on single pole**

**III - 200 to 400 kVA pole mounted substation**

**1) Presentation :**



**Figure III-1: pole mounted substation on double poles**

