

## **A-5 Drawing List**

## 5. DRAWING LIST

### *Apapa Road Substation*

DWG.No.	TITLE
AR-01-1	Apapa Road Substation Plot Plan
AR-01-2	Apapa Road Substation Plot Plan with removed material
AR-02-1	Apapa Road Substation Single Line Diagram
AR-02-2	Apapa Road Substation Single Line Diagram (Station Auxiliary System)
AR-03-1	Control Building 1 <sup>st</sup> Floor 132 kV GIS Plan
AR-03-2	Control Building Middle 1 <sup>st</sup> Floor Overhead Crane Plan
AR-03-3	Control Building 2 <sup>nd</sup> Floor 33 kV GIS Plan
AR-03-4	Control Building 3 <sup>rd</sup> Floor Control Panel Plan

### *Akanba Substation*

DWG.No.	TITLE
AK-01	Akanba Substation Plot Plan

### *Architecture*

DWG.No.	TITLE
AR-A01	Control Building Site Plan
AR-A02	Control Building Finishing Schedule
AR-A03	Control Building Basement Floor Plan
AR-A04	Control Building 1 <sup>st</sup> Floor Plan
AR-A05	Control Building Middle 1 <sup>st</sup> Floor Plan
AR-A06	Control Building Middle Floor Plan
AR-A07	Control Building 2 <sup>nd</sup> Floor Plan
AR-A08	Control Building 3 <sup>rd</sup> Floor Plan
AR-A09	Control Building Roof Plan
AR-A10	Control Building Elevation-1
AR-A11	Control Building Elevation-2
AR-A12	Control Building Section
AR-A13	Control Building Detail Section-1
AR-A14	Control Building Detail Section-2
AR-A15	Control Building Stair Plan
AR-A16	Control Building Detail Section of Stair Plan
AR-A17	Control Building Fitting Schedule

**Structure**

DWG.No.	TITLE
AR-S01	Control Building Foundation & Underground Floor Framing Plan
AR-S02	Control Building 1st Floor Framing Plan
AR-S03	Control Building Middle 1st Floor Framing Plan (1)
AR-S04	Control Building Middle 1st Floor Framing Plan (2)
AR-S05	Control Building Middle Floor Framing Plan
AR-S06	Control Building 2nd Floor Framing Plan
AR-S07	Control Building 3rd Floor Framing Plan
AR-S08	Control Building Roof Floor Framing Plan
AR-S09	Control Building Framing Elevation (1)
AR-S10	Control Building Framing Elevation (2)
AR-S11	Control Building Framing Elevation (3)
AR-S12	Control Building Foundation Girder Schedule
AR-S13	Control Building Column Schedule
AR-S14	Control Building Column Schedule (1)
AR-S15	Control Building Column Schedule (2)
AR-S16	Control Building Slab, Beam, Wall Schedule
AR-S17	Control Building Detail of Runway Girder
AR-S18	Control Building 1 Line Framing Plan

**Electrical for Architecture**

DWG.No.	TITLE
AR-E01	Control Building Distribution Plan
AR-E02	Control Building Lighting, Socket Outlet and Fire Alarm System for Basement
AR-E03	Control Building Lighting, Socket Outlet and Fire Alarm System for 1st Floor
AR-E04	Control Building Lighting for Middle 1st Floor Plan
AR-E05	Control Building Lighting, Socket Outlet and Fire Alarm System for Middle Floor
AR-E06	Control Building Lighting, Socket Outlet and Fire Alarm System for 2nd Floor
AR-E07	Control Building Lighting, Socket Outlet and Fire Alarm System for 3rd Floor
AR-E08	Control Building Lighting for Stair and EPS Plan

AR-E09	Control Building Lighting and Fire Alarm System for Stair Plan
AR-E10	Control Building Lightning Protection

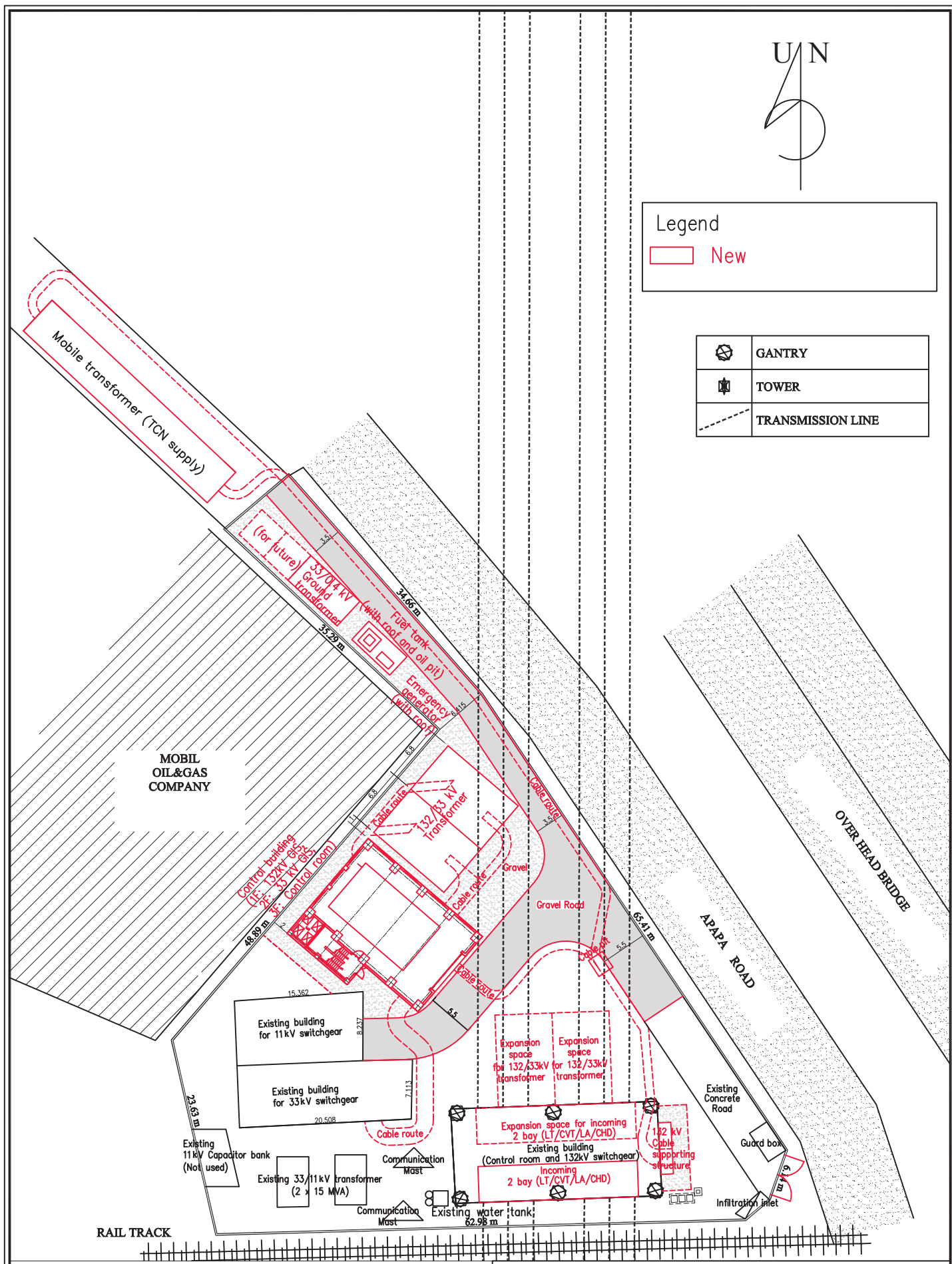
***Mechanical for Architecture***

DWG.No.	TITLE
AR-M01	Control Building Drainage System of Basement Plan
AR-M02	Control Building Drainage of Outward
AR-M03	Control Building Ventilation System of 2nd Floor
AR-M04	Control Building Air Condition and Ventilation System of 3rd Floor



Legend	
<span style="border: 1px solid red; display: inline-block; width: 20px; height: 10px;"></span>	New

	GANTRY
	TOWER
	TRANSMISSION LINE

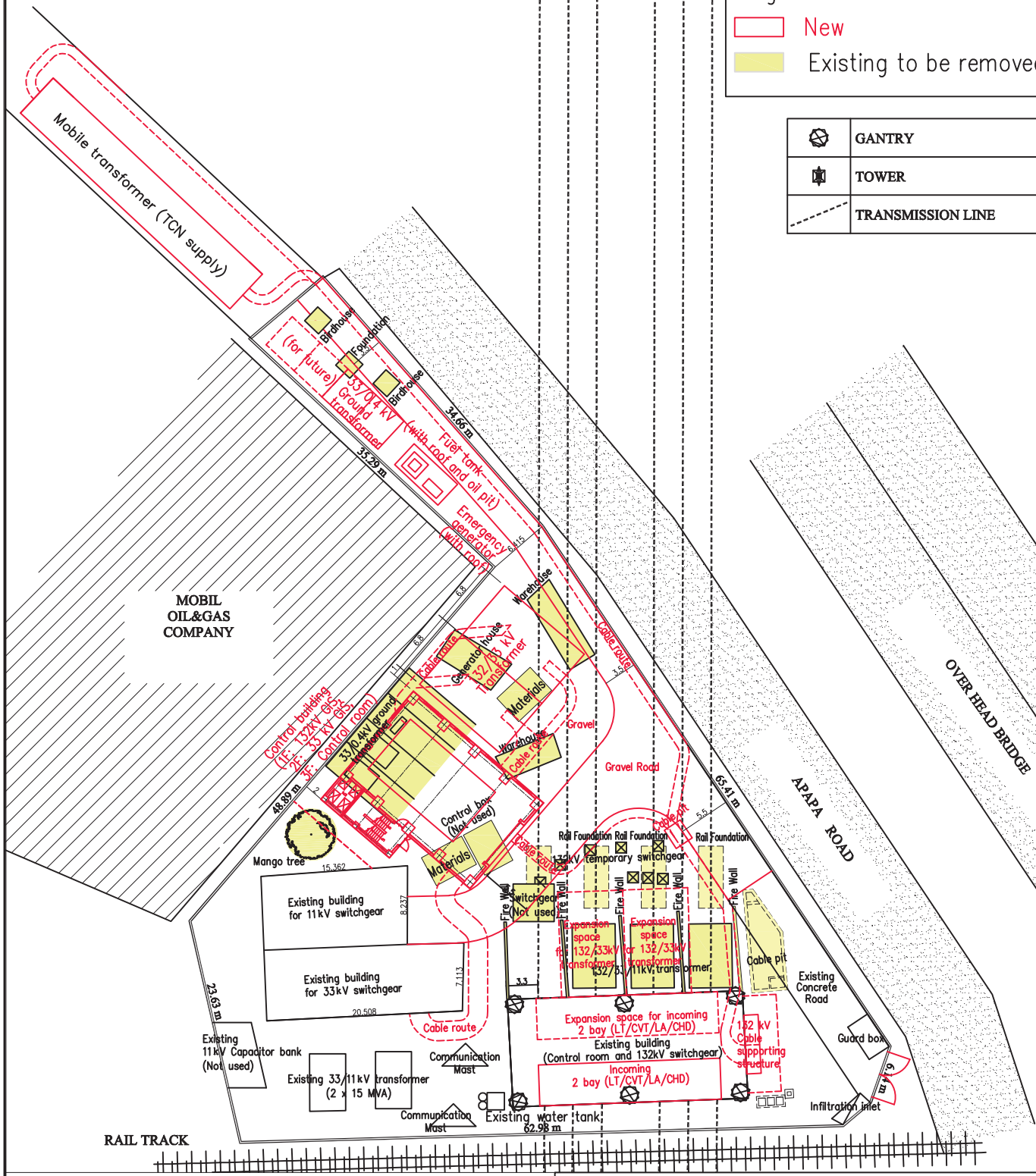


PROJECT		LOCATION		TITLE		APPROVED BY :		CHECKED BY :		DESIGNED BY :		DATE :		DRG NO :	
THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS		APAPA ROAD SUBSTATION		Apapa Road Substation Plot Plan		****		****		****		feb. 2017		AR-01-1	
						CONSULTANTS :						SCALE :		1:600 (if only A4)	
						YEO		YACHIYO ENGINEERING CO., LTD.		TOKYO, JAPAN					



Legend	
<span style="border: 1px solid red; display: inline-block; width: 20px; height: 10px;"></span>	New
<span style="background-color: yellow; display: inline-block; width: 20px; height: 10px;"></span>	Existing to be removed

	GANTRY
	TOWER
	TRANSMISSION LINE



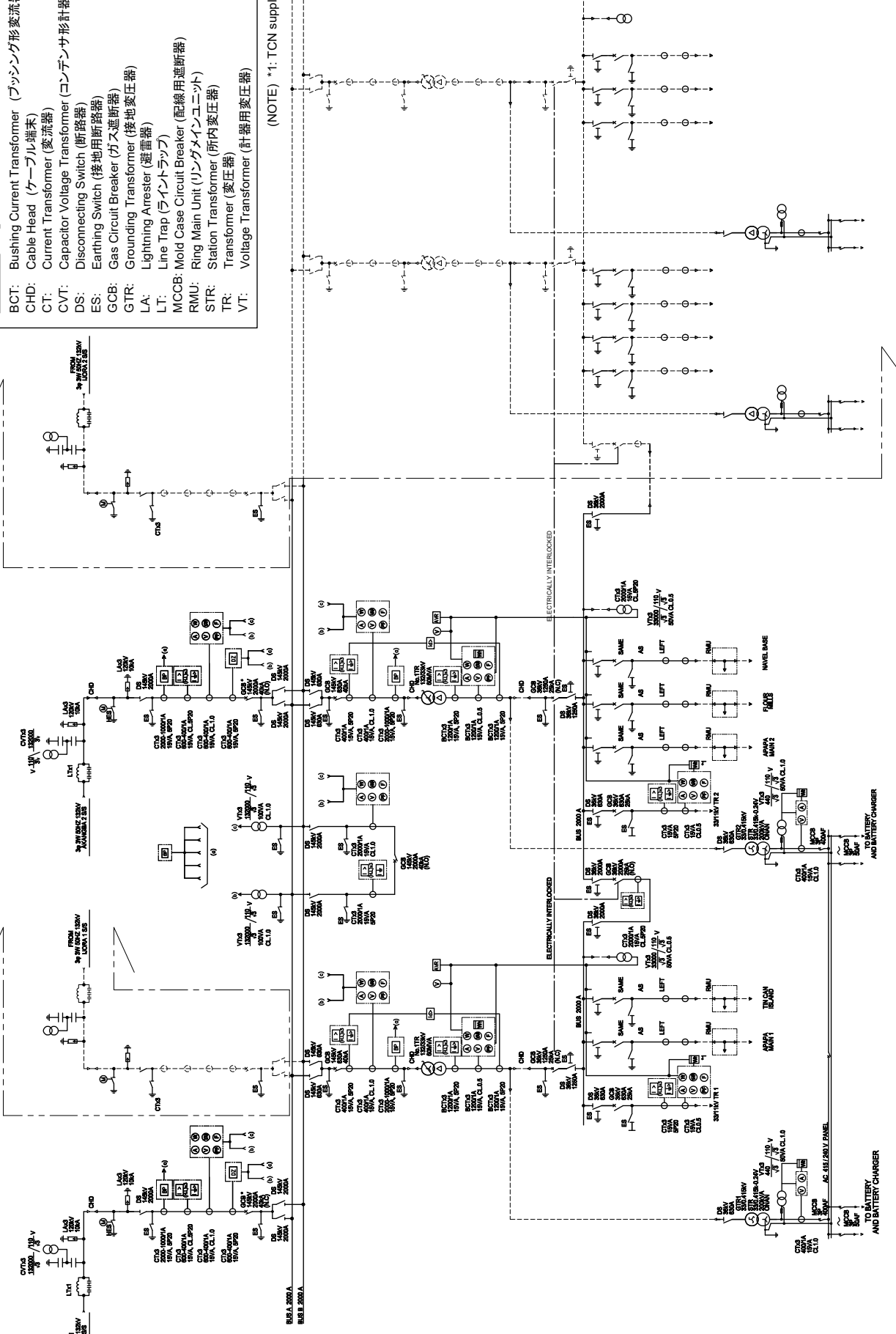
		TITLE <b>Apapa Road Substation Plot Plan with removed material</b>				
PROJECT	LOCATION	APPROVED BY :	CHECKED BY :	DESIGNED BY :	DATE :	DRG NO :
THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	APAPA ROAD SUBSTATION	****	****	****	feb. 2017	AR-01-2
		CONSULTANTS :				
					1:600 (if only A4)	

- LEGEND (凡例)**
- BCT: Bushing Current Transformer (ブッシング形変流器)
  - CHD: Cable Head (ケーブル端末)
  - CT: Current Transformer (変流器)
  - CVT: Capacitor Voltage Transformer (コンデンサ形計器用変圧器)
  - DS: Disconnecting Switch (断路器)
  - ES: Earthing Switch (接地用断路器)
  - GCB: Gas Circuit Breaker (ガス遮断器)
  - GTR: Grounding Transformer (接地変圧器)
  - LA: Lightning Arrester (避雷器)
  - LT: Line Trap (ライントラップ)
  - MCCB: Mold Case Circuit Breaker (配線用遮断器)
  - RMU: Ring Main Unit (リングメインユニット)
  - STR: Station Transformer (所内変圧器)
  - TR: Transformer (変圧器)
  - VT: Voltage Transformer (計器用変圧器)

FUTURE

FUTURE

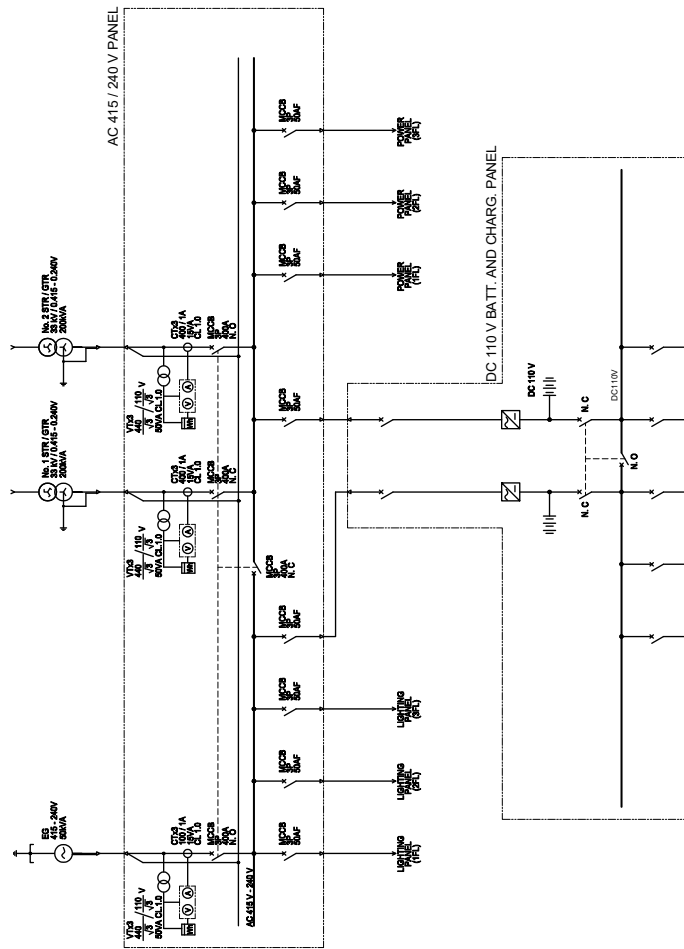
(NOTE) \*: TCN supply Wh Meters.



PROJECT	LOCATION	TITLE	APPROVED BY:	CHECKED BY:	DESIGNED BY:	DATE:	DRG NO:
THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	APAPA ROAD SUBSTATION	Apapa Road Substation Single Line Diagram アパパロード変電所単線結線図					AR-02-1
			CONSULTANTS:		SCALE:		
			YEC		YACHYO ENGINEERING CO., LTD. TOKYO, JAPAN (if only A3)		

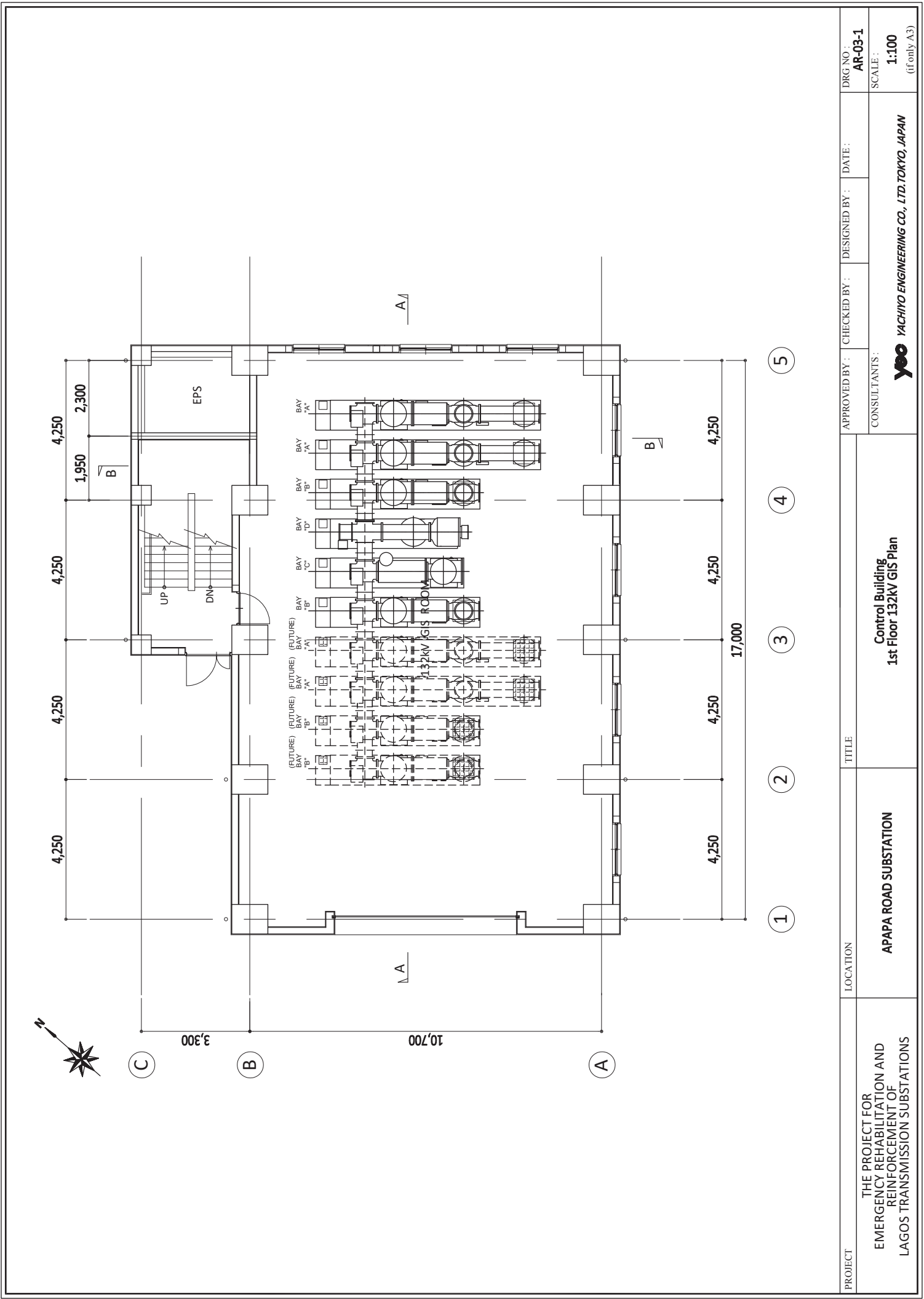
**LEGEND (凡例)**

- AC: Alternative Current (交流)
- B/D: Distribution Board (分電盤)
- DC: Direct Current (直流)
- EG: Emergency Generator (非常用発電機)
- GTR: Grounding Transformer (接地変圧器)
- MCCB: Mold Case Circuit Breaker (配線用遮断器)
- NC: Normal Close (常時閉)
- NO: Normal Open (常時開)
- STR: Station Transformer (所内変圧器)

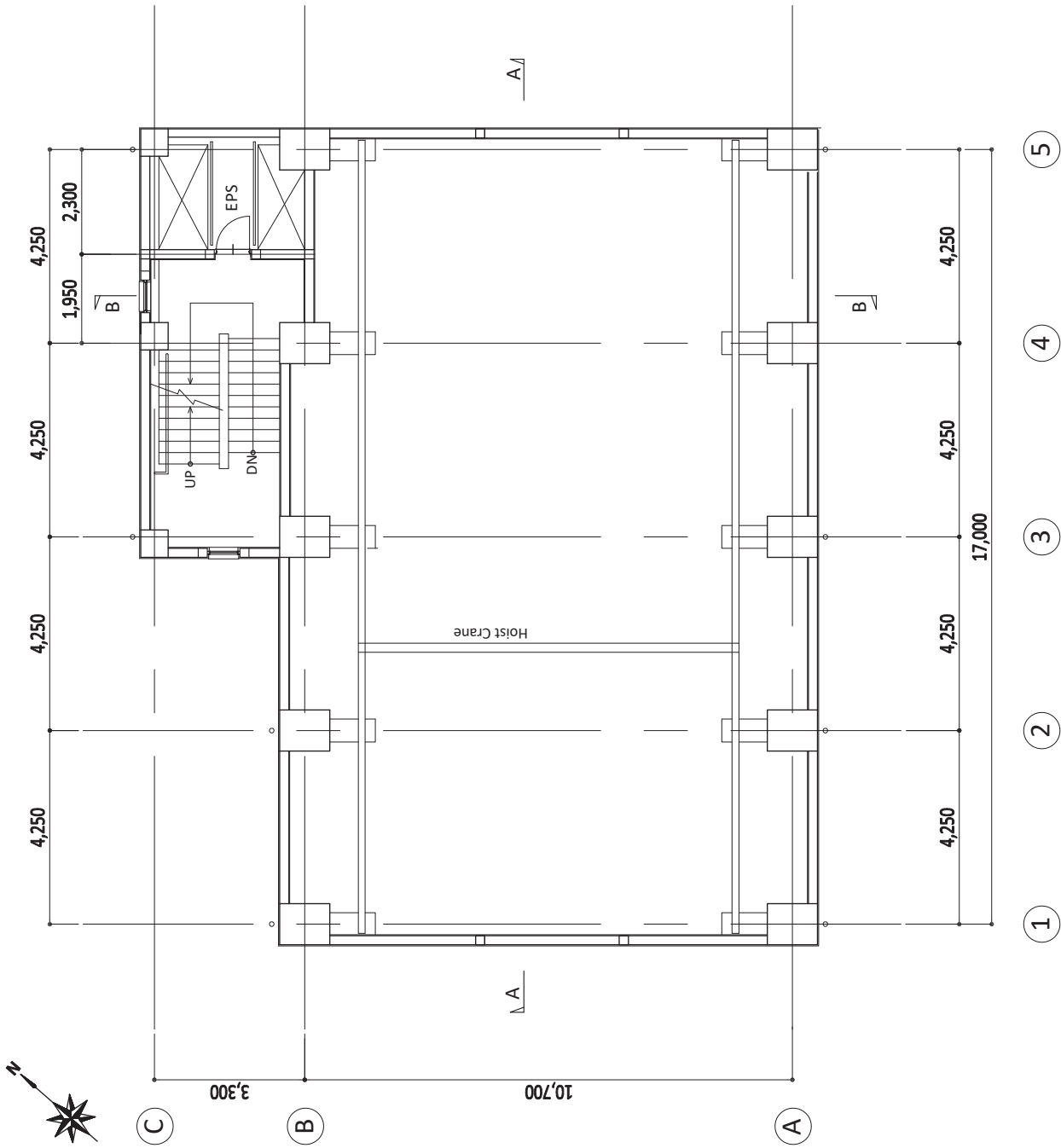


<p>PROJECT</p> <p>THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS</p>	<p>LOCATION</p> <p>APAPA ROAD SUBSTATION</p>	<p>TITLE</p> <p>Apapa Road Substation Single Line Diagram (Station Auxiliary System) アパパロード変電所 単線結線図 (所内)</p>	<p>APPROVED BY :</p>	<p>CHECKED BY :</p>	<p>DESIGNED BY :</p>	<p>DATE :</p>	<p>DRG NO.:</p> <p>AR-02-2</p>
<p>CONSULTANTS :</p> <p><b>yec</b> YACHIYO ENGINEERING CO., LTD. TOKYO, JAPAN</p>							<p>SCALE :</p> <p>(if only A3)</p>

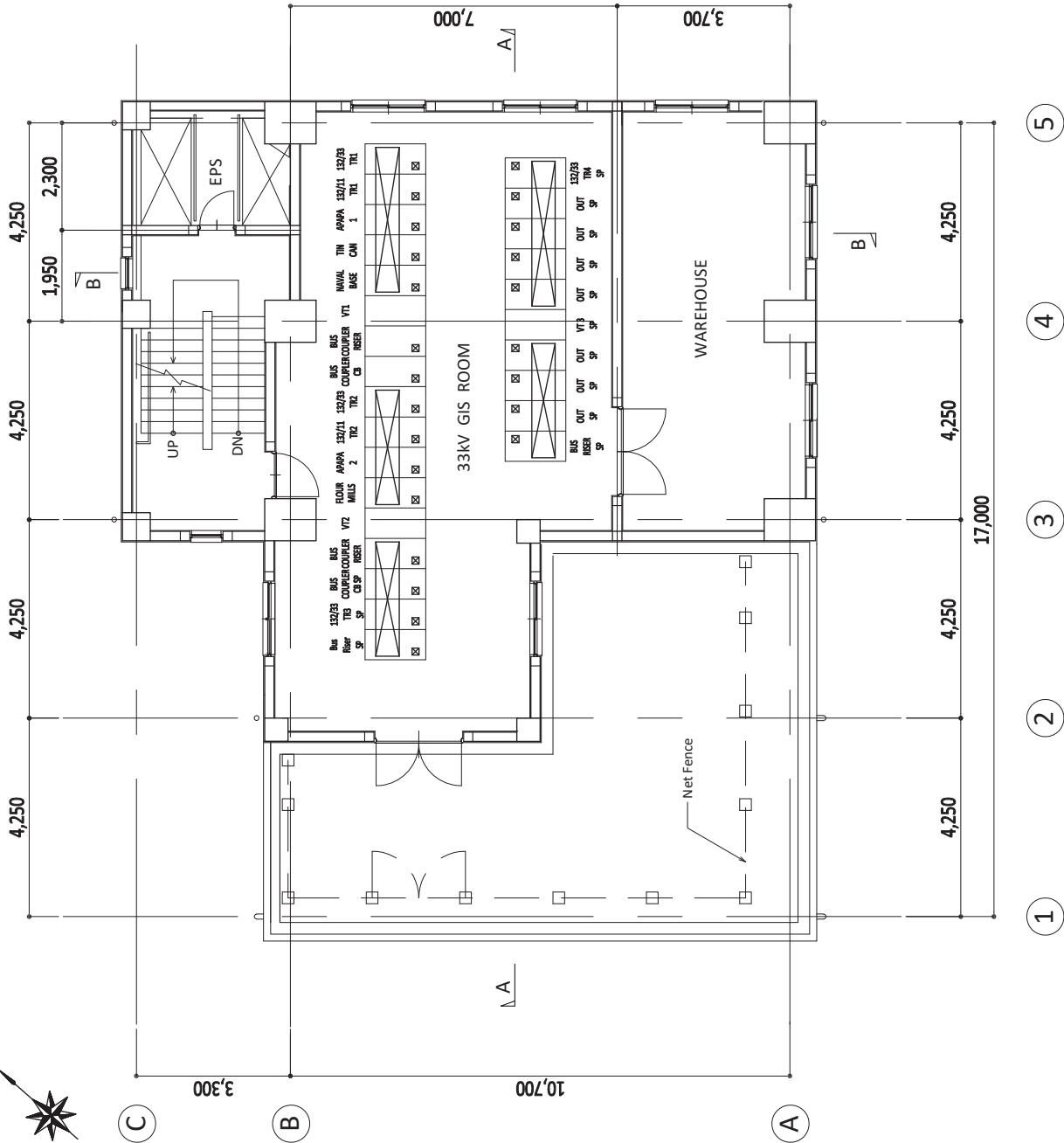





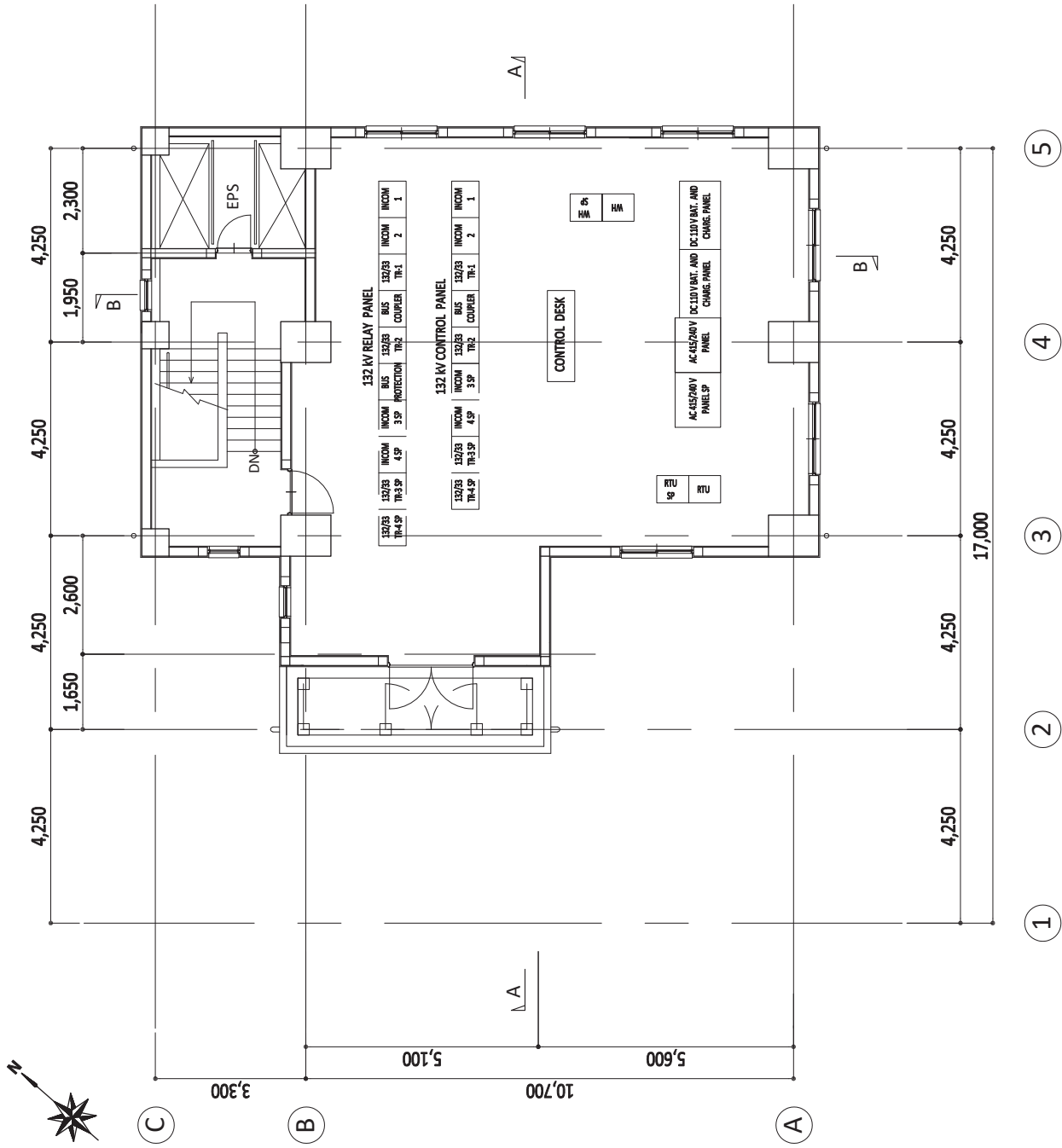
PROJECT	LOCATION	TITLE
THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	APAPA ROAD SUBSTATION	Control Building 1st Floor 132KV GIS Plan
APPROVED BY :	CHECKED BY :	DESIGNED BY :
DATE :	DATE :	DATE :
DRG NO : <b>AR-03-1</b>	SCALE : <b>1:100</b> (f only A3)	CONSULTANTS : <b>yoo YACHIYO ENGINEERING CO., LTD. TOKYO, JAPAN</b>



PROJECT THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	LOCATION APAPA ROAD SUBSTATION	TITLE Control Building Middle 1st Floor Overhead Crane Plan	APPROVED BY : CHECKED BY : DESIGNED BY : DATE : CONSULTANTS : <b>yoo</b> YACHIYO ENGINEERING CO., LTD. TOKYO, JAPAN	DRG NO : <b>AR-03-2</b> SCALE : <b>1:100</b> (f only A3)
--	-----------------------------------	---	--	--

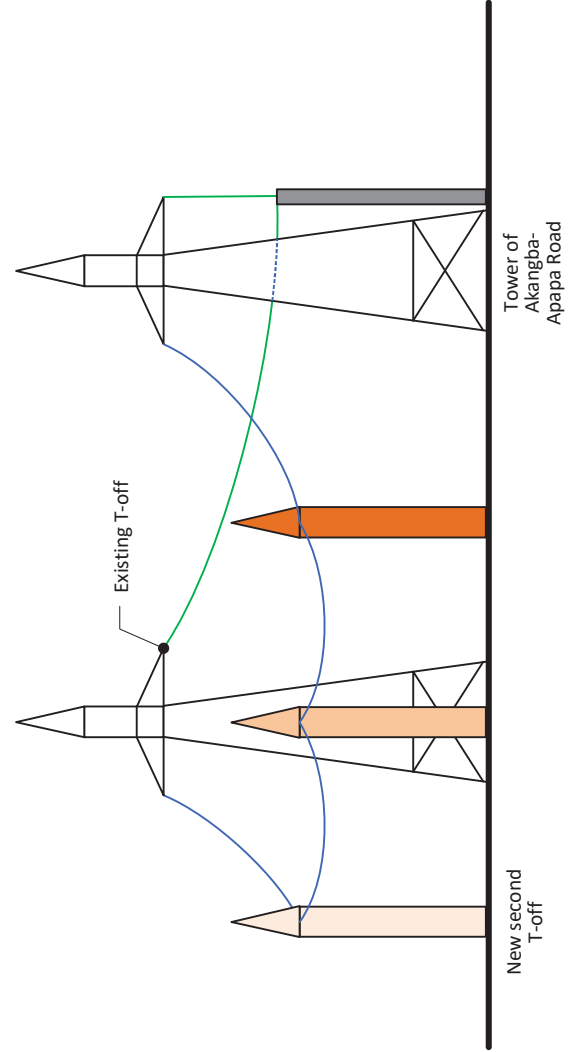
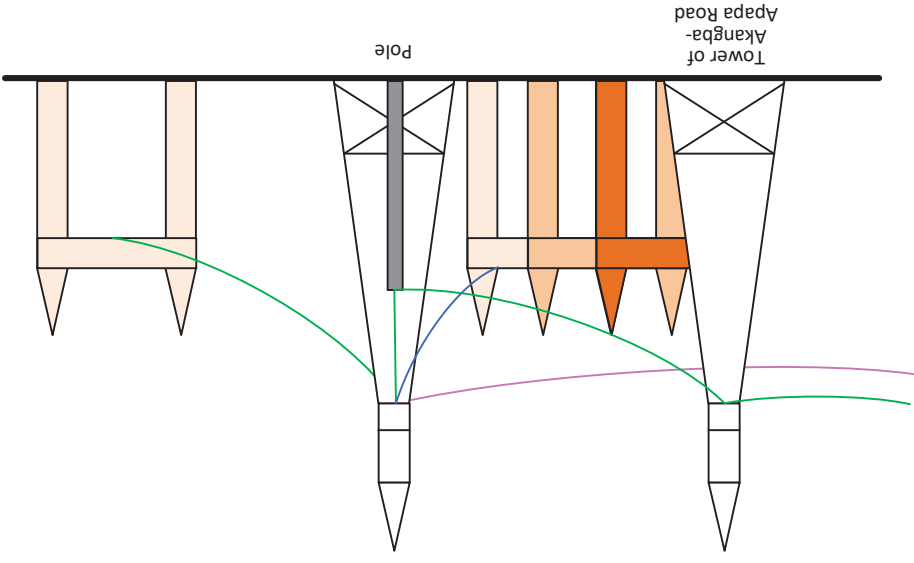
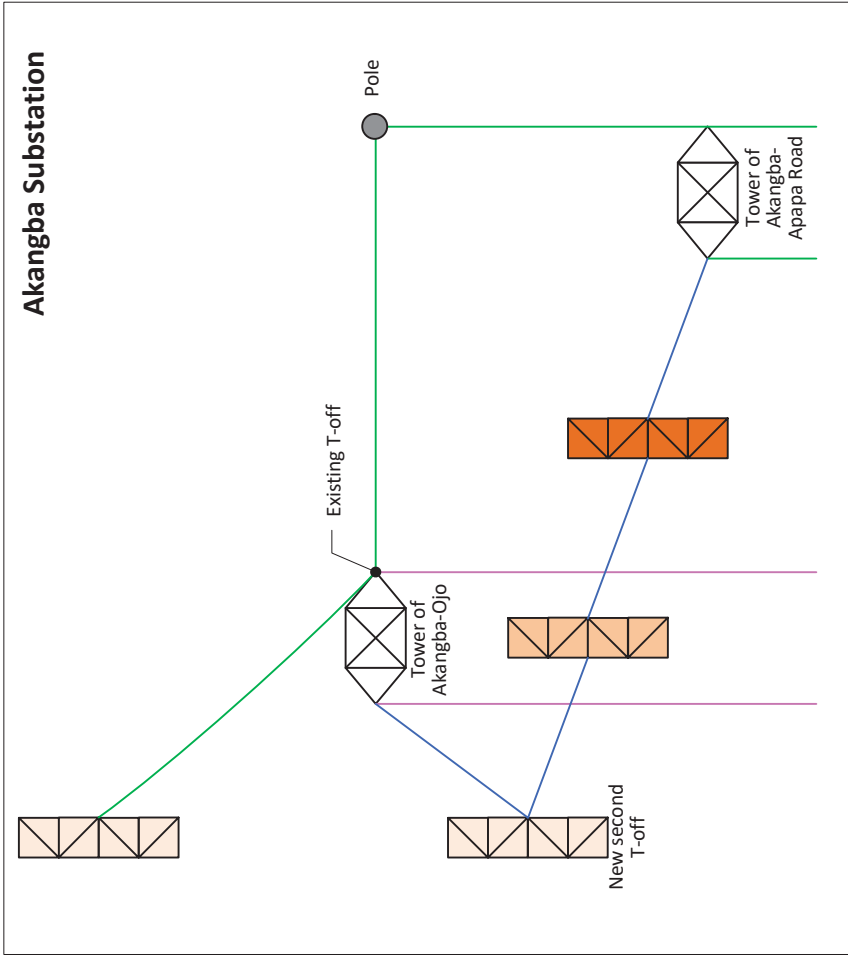





PROJECT THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	LOCATION APAPA ROAD SUBSTATION	TITLE Control Building 2nd Floor 33kV GIS Plan	APPROVED BY : CHECKED BY : DESIGNED BY : DATE : DRG NO : AR-03-3 SCALE : 1:100 (f only A3) CONSULTANTS :  YACHIO ENGINEERING CO., LTD. TOKYO, JAPAN
--	-----------------------------------	--	--

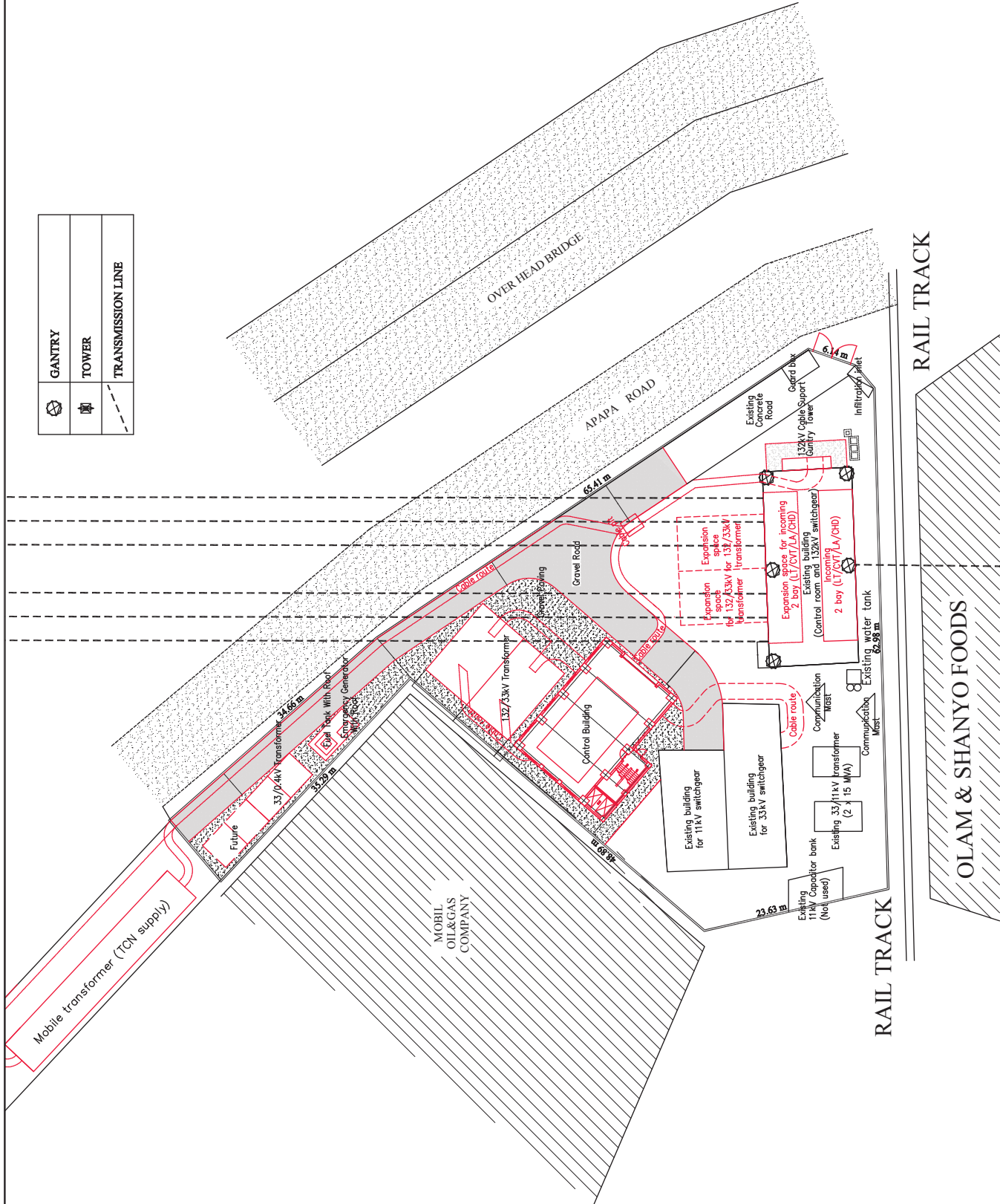


<b>PROJECT</b> THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	<b>LOCATION</b> APAPA ROAD SUBSTATION	<b>TITLE</b> Control Building 3rd Floor Control Panel Plan	<b>APPROVED BY :</b> <b>CHECKED BY :</b> <b>DESIGNED BY :</b> <b>DATE :</b>	<b>DRG NO. :</b> <b>AR-03-4</b> <b>SCALE :</b> <b>1:100</b> (f only A3)
---	--	--	--	---

# Akangba Substation



	GANTRY
	TOWER
	TRANSMISSION LINE



PROJECT THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	LOCATION APAPA ROAD SUBSTATION	TITLE CONTROL BUILDING SITE PLAN	APPROVED BY: K. FUJII	CHECKED BY: K. ODA	DESIGNED BY: T. KURUMADA	DATE:	DRG NO.: AR-A01
	CONSULTANTS:  YACHIYO ENGINEERING CO., LTD. TOKYO, JAPAN						SCALE: 1:100 (if only A3)

EXTERIOR FINISHING SCHEDULE

LOCATION	SPECIFICATION
ROOF	CONCRETE STEEL TROWEL ON PROTECTION CONCRETE WITH WELDED WIRE MESH ASPHALT MEMBRANE WATER PROOFING
WALL	PAINT FINISH (A.E.P) ON 150mm THK CONCRETE BLOCK WITH MORTAR STEEL TROWEL 25mm THK
COLUMN	FINISH (A.E.P) ON MORTAR STEEL TOROWEL 25mm THK.
BEAM	FINISH (A.E.P) ON MORTAR STEEL TOROWEL 25mm THK.
ROOF DRAIN	CASTIRON φ 100mm
DOWNSPOUT	PVC PIPE φ 100
NET FENCE	H=1100

INTERIOR FINISHING SCHEDULE

ROOM NAME	FLOOR	BASEBOARD	WALL	CEILING	REMARKS
BF 132kV GIS CABLE ROOM	ADDITIONAL CONCRETE H=200 STEEL TROWEL FINISH WITH SLOPE 1/200	—	EXPOSED CONCRETE	EXPOSED CONCRETE	SUMP PIT, DRAINAGE ROOM NAME PLATE
1F 132kV GIS ROOM	DUSTPROOF PAINT ON CONCRETE STEEL TROWEL	MORTAR STEEL TROWEL H=100 ON 200mm THICKNESS CONCRETE BLOCK	PAINT FINISH(E.P) ON MORTAR STEEL TROWEL 20mm THK ON 200mm THICKNESS CONCRETE BLOCK	PAINT FINISH(A.E.P) ON EXPOSED CONCRETE	HOIST CRANE 5ton FIRE EXTINGUISHER 2 SET ROOM NAME PLATE
MF 33kV GIS CABLE ROOM	CONCRETE STEEL TROWEL FINISH	DITTO	DITTO	EXPOSED CONCRETE	ROOM NAME PLATE
2F 33kV GIS ROOM	DUSTPROOF PAINT ON CONCRETE STEEL TROWEL	DITTO	DITTO	PAINT FINISH(A.E.P) ON EXPOSED CONCRETE	FIRE EXTINGUISHER 1 SET ROOM NAME PLATE
2F WERAHOUSE	DITTO	DITTO	DITTO	DITTO	FIRE EXTINGUISHER 1 SET ROOM NAME PLATE
3F CONTROL ROOM	FREE ACCESS FLOOR H=500 ANTISTATIC VINYL TAILE FINISH	VINYL TAILE H=60	DITTO	COSMETIC GYPSAM BOARD 9.5mm THK. WITH ALUMINUM SUSPENDED FRAME	FIRE EXTINGUISHER 2 SET ROOM NAME PLATE
STAIRCASE	MORTAR STEEL TROWEL FINISH STEP & RISE : MORTAR STEEL TROWEL	MORTAR STEEL TROWEL H=100 ON 200mm THICKNESS CONCRETE BLOCK	PAINT FINISH(A.E.P) ON MORTAR STEEL TROWEL 20mm THK ON 200mm THICKNESS CONCRETE BLOCK	PAINT FINISH(A.E.P) ON EXPOSED CONCRETE	NON SLIP : STAINLESS W=35
E.P.S	CONCRETE STEEL TROWEL	—	EXPOSED CONCRETE BLOCK	EXPOSED CONCRETE	STEEL HANDRAIL H=1100 ROOM NAME PLATE

PROJECT

THE PROJECT FOR  
EMERGENCY REHABILITATION AND  
REINFORCEMENT OF  
LAGOS TRANSMISSION SUBSTATIONS

LOCATION

APAPA ROAD SUBSTATION

TITLE

CONTROL BUILDING  
FINISHING SCHEDULE

APPROVED BY :  
K. FUJII

CHECKED BY :  
K. ODA

DESIGNED BY :  
T. KURUMADA

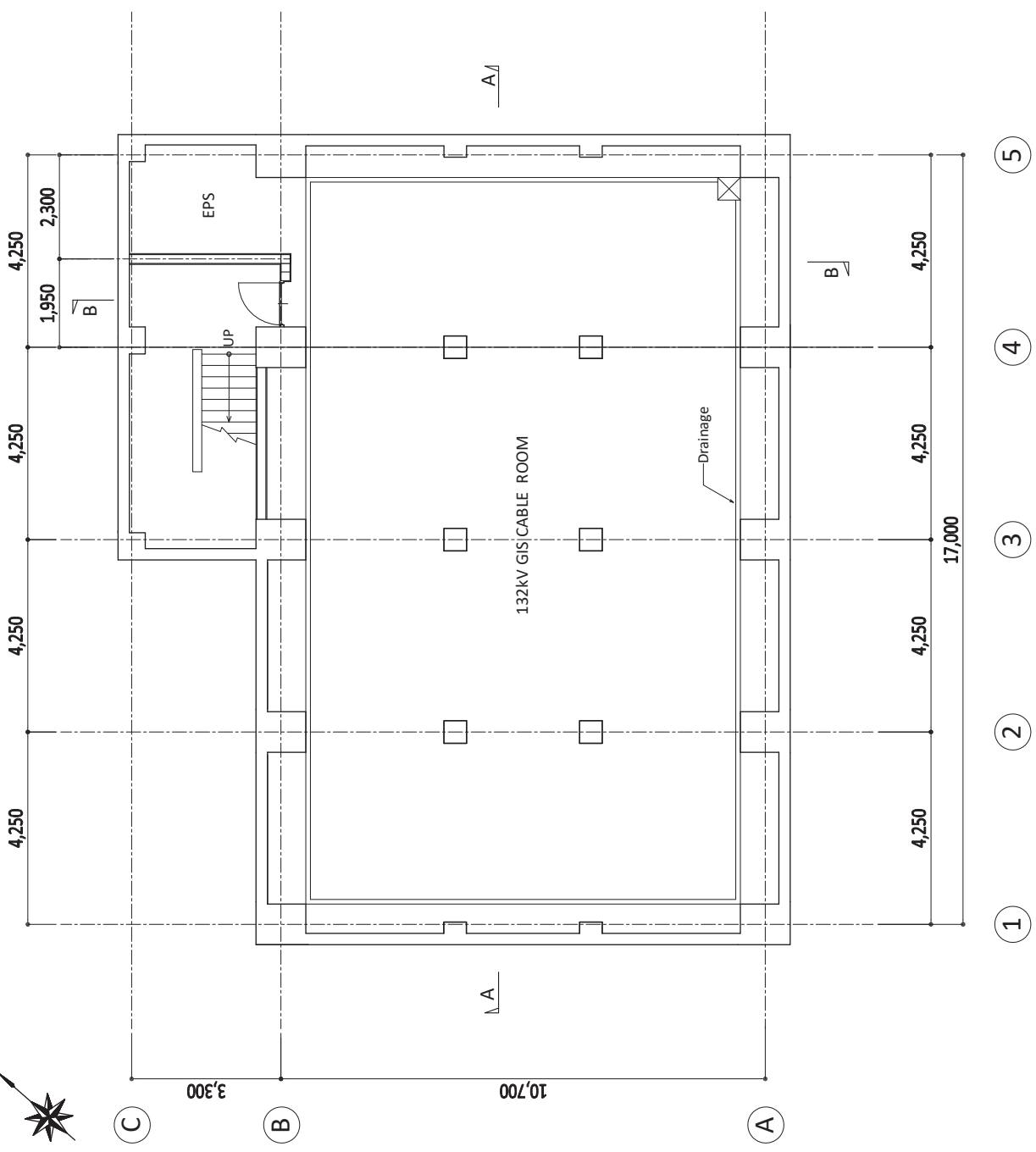
DATE :

DRG NO :  
AR-A02

SCALE :

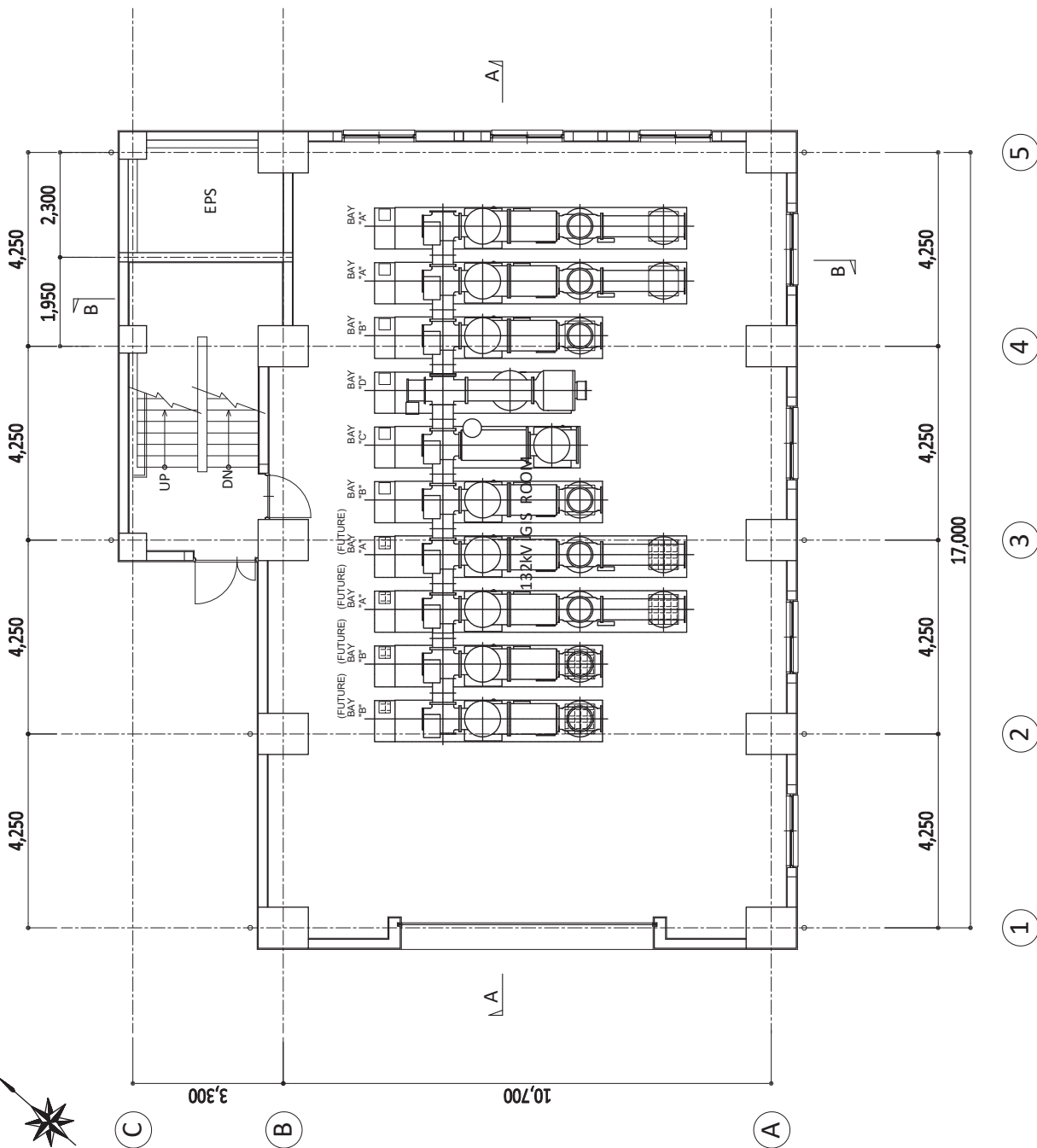
---  
(if only A3)

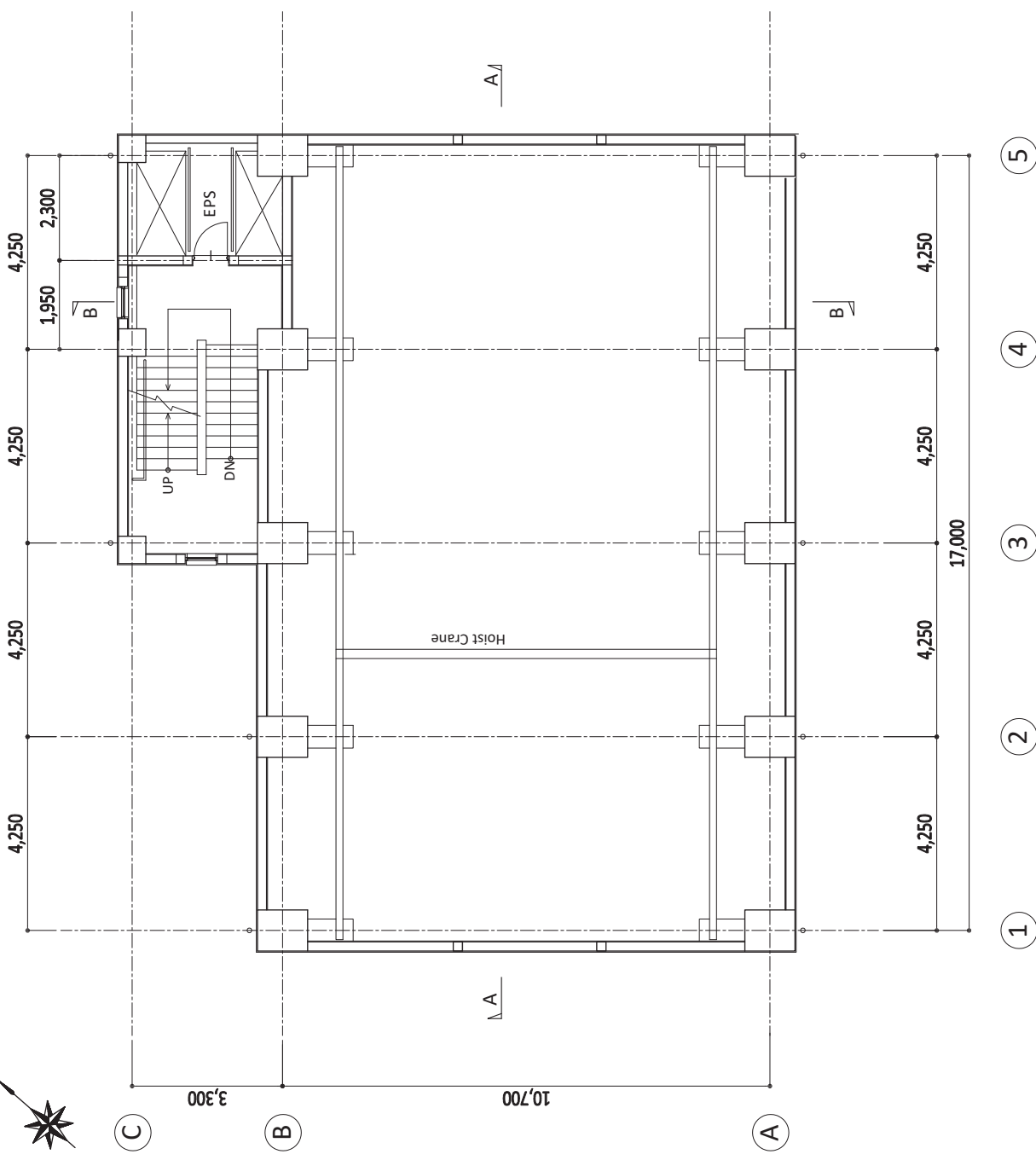
 **YACHIYO ENGINEERING CO., LTD. TOKYO, JAPAN**



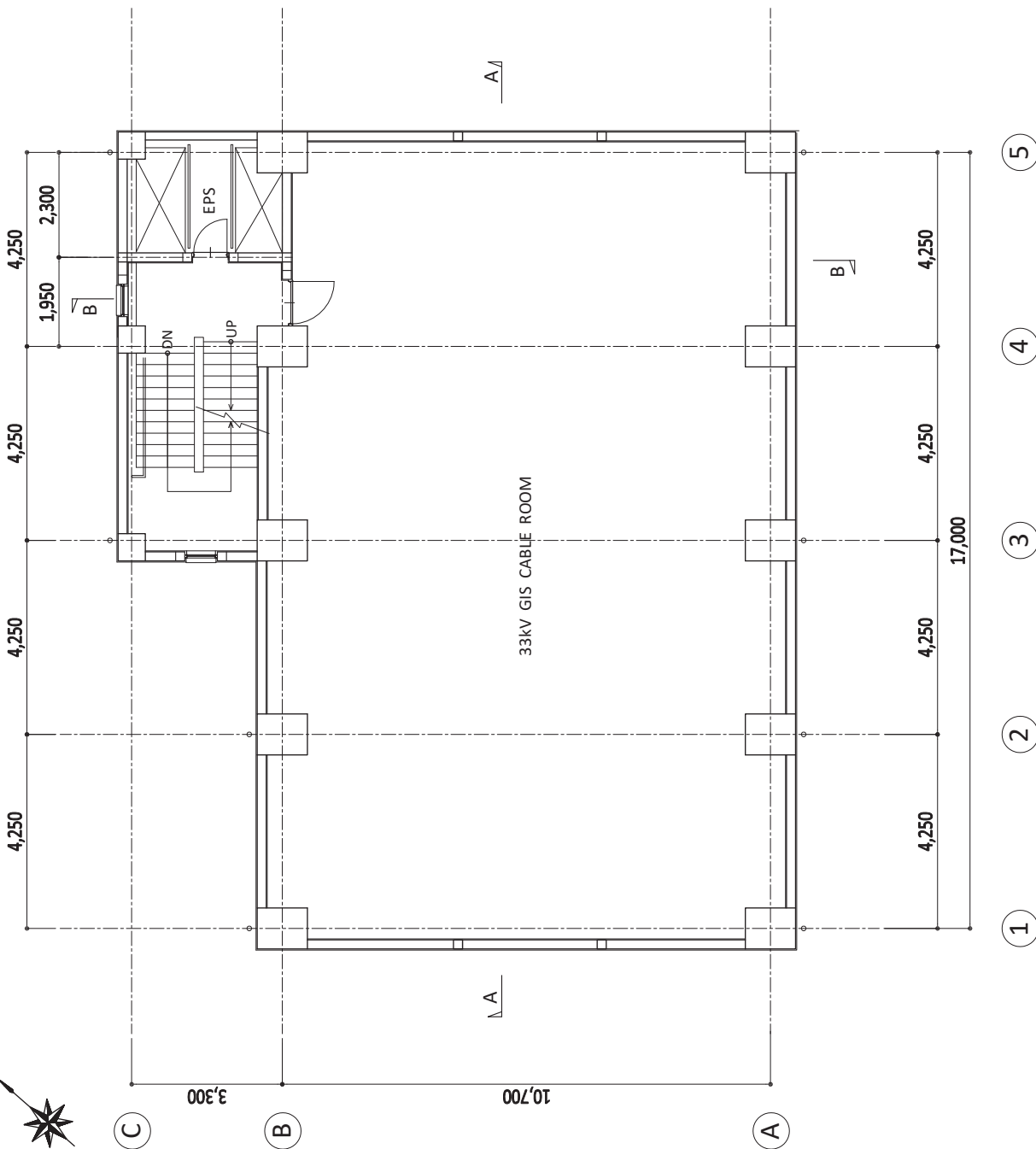
PROJECT	LOCATION	TITLE	APPROVED BY : K. FUJII	CHECKED BY : K. ODA	DESIGNED BY : T. KURUMADA	DATE :	DRG NO : AR-A03
THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	APAPA ROAD SUBSTATION	CONTROL BUILDING BASEMENT FLOOR PLAN	CONSULTANTS :		 <b>YACHIYO ENGINEERING CO., LTD. TOKYO, JAPAN</b>	SCALE : 1:100 (if only A3)	



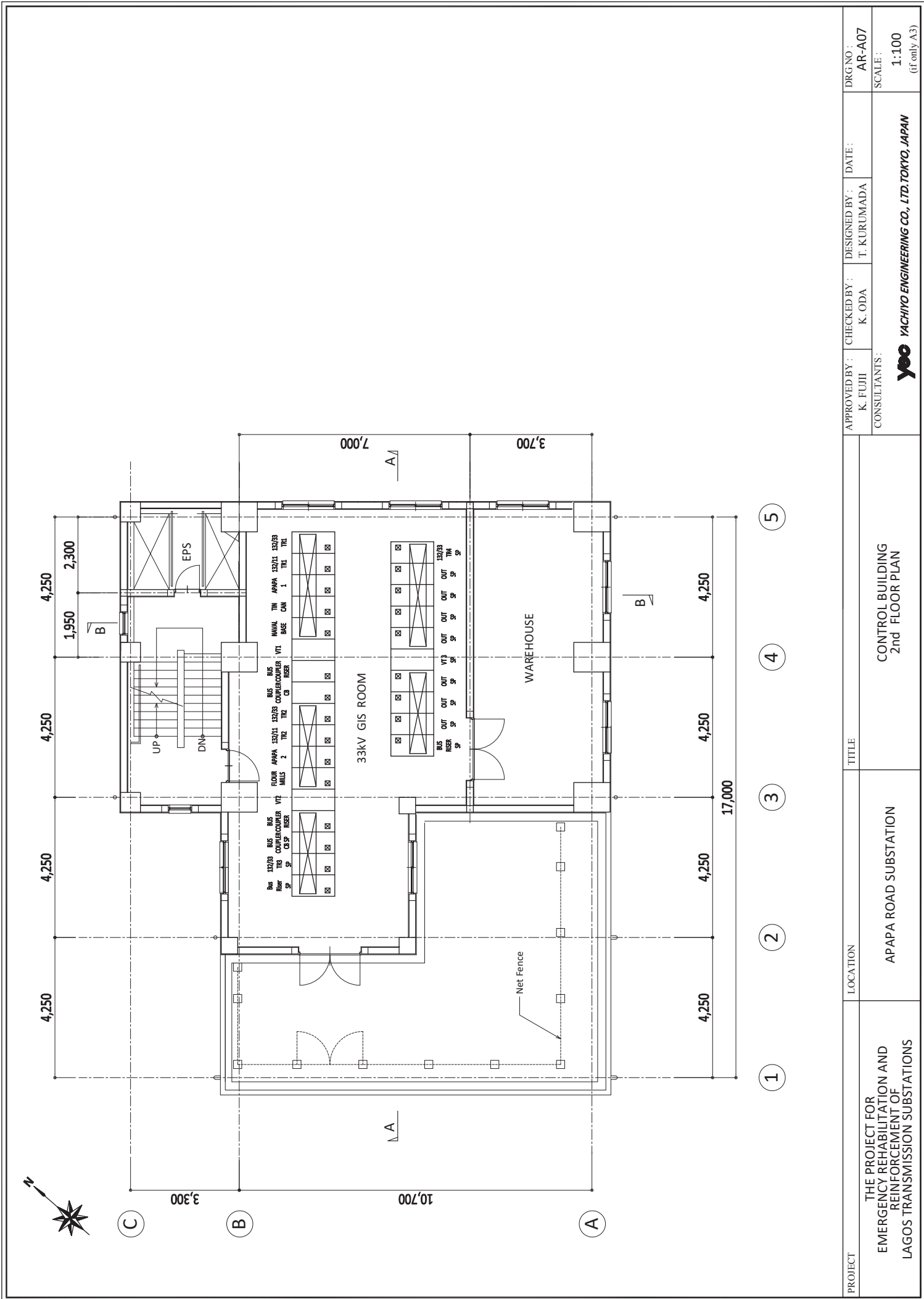


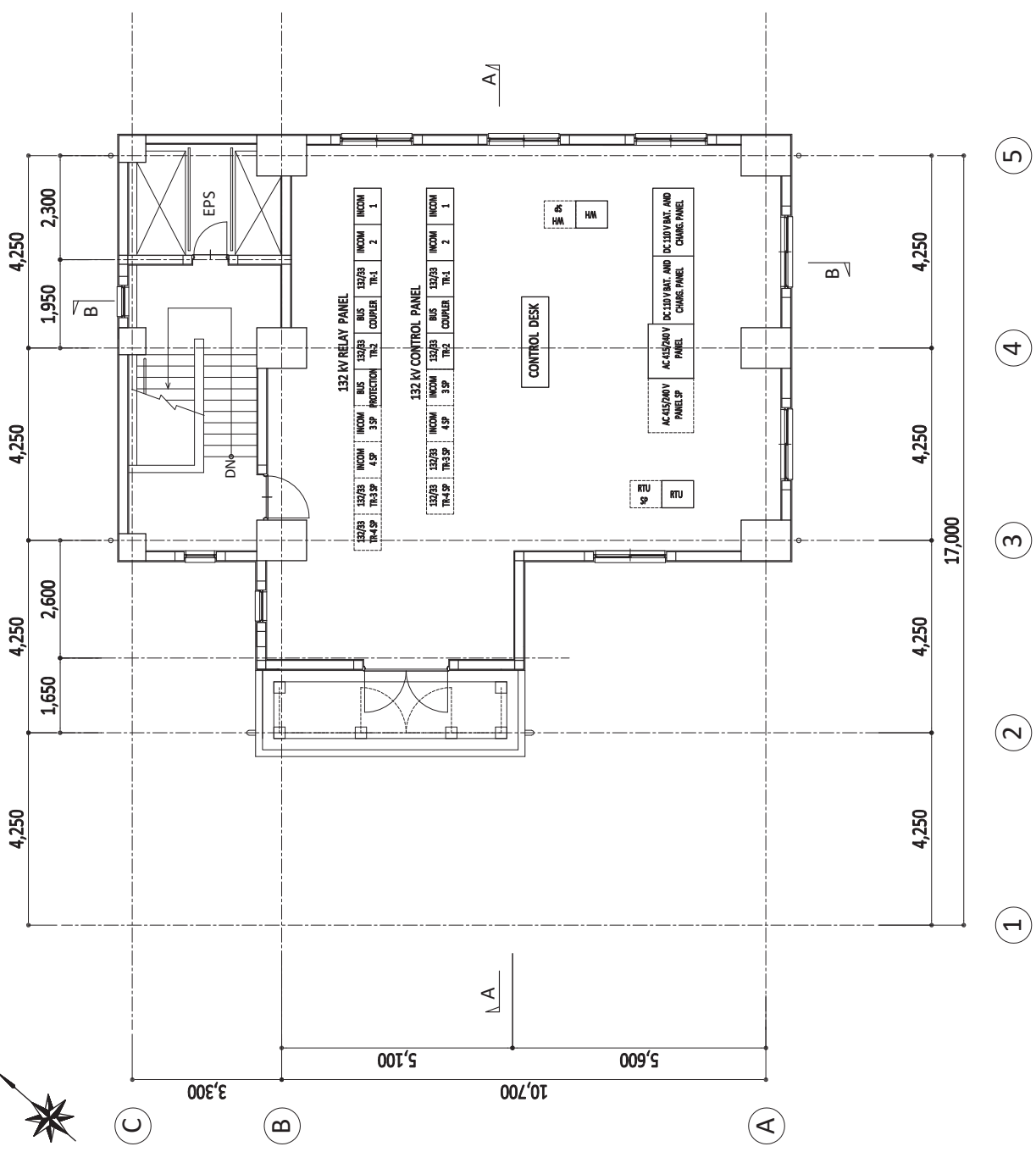


PROJECT	LOCATION	TITLE	APPROVED BY : K. FUJII	CHECKED BY : K. ODA	DESIGNED BY : T. KURUMADA	DATE :	DRG NO : AR-A05
THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	APAPA ROAD SUBSTATION	CONTROL BUILDING MIDDLE 1st FLOOR PLAN	CONSULTANTS :		YEO	YACHIYO ENGINEERING CO., LTD. TOKYO, JAPAN	SCALE : 1:100 (if only A3)

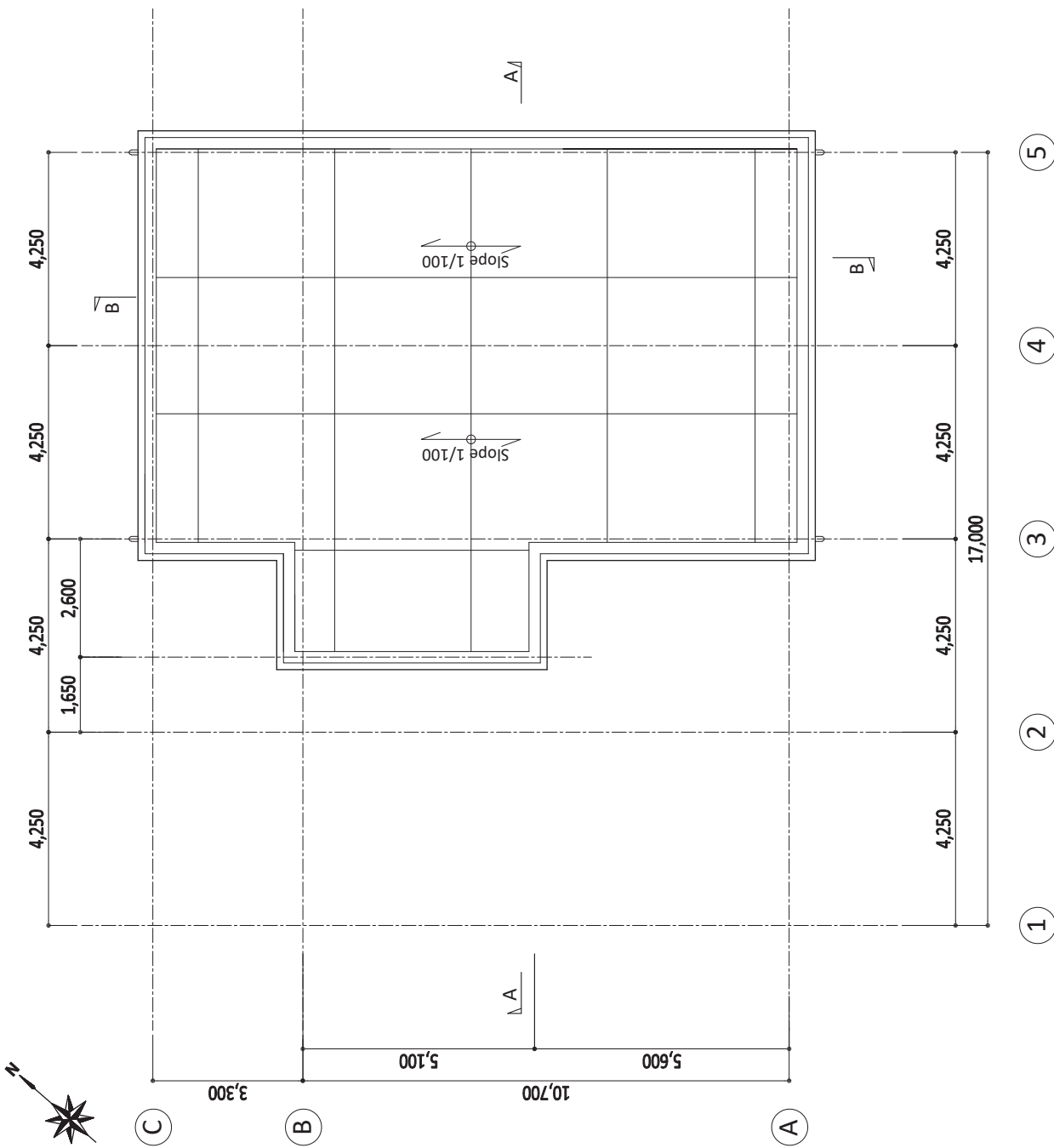


PROJECT	LOCATION	TITLE	APPROVED BY : K. FUJII	CHECKED BY : K. ODA	DESIGNED BY : T. KURUMADA	DATE :	DRG NO : AR-A06
EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	APAPA ROAD SUBSTATION	CONTROL BUILDING MIDDLE FLOOR PLAN	CONSULTANTS :		YEO	YACHIYO ENGINEERING CO., LTD. TOKYO, JAPAN	SCALE : 1:100 (if only A3)

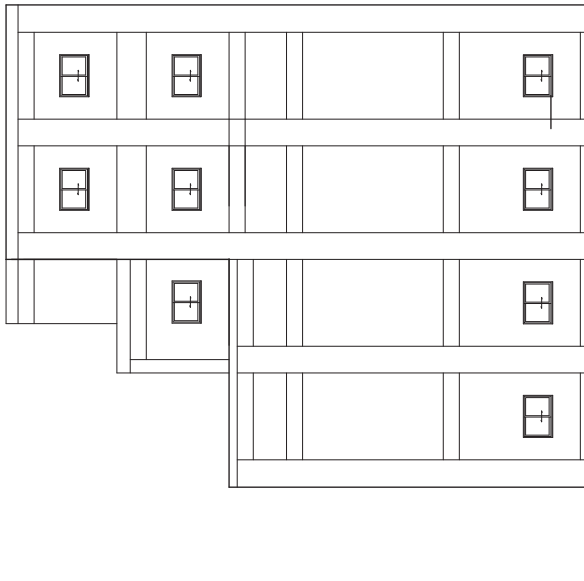




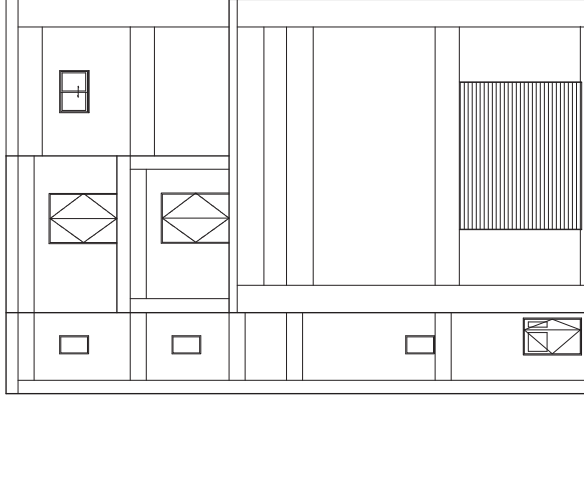
PROJECT	LOCATION	TITLE	APPROVED BY : K. FUJII	CHECKED BY : K. ODA	DESIGNED BY : T. KURUMADA	DATE :	DRGNO : AR-A08
EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	APAPA ROAD SUBSTATION	CONTROL BUILDING 3rd FLOOR PLAN	CONSULTANTS :		YEO	YACHIYO ENGINEERING CO., LTD. TOKYO, JAPAN	SCALE : 1:100 (if only A3)



PROJECT	LOCATION	TITLE	APPROVED BY : K. FUJII	CHECKED BY : K. ODA	DESIGNED BY : T. KURUMADA	DATE :	DRG NO : AR-A09
THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	APAPA ROAD SUBSTATION	CONTROL BUILDING ROOF PLAN	CONSULTANTS :		<b>yoo</b> YACHIYO ENGINEERING CO., LTD. TOKYO, JAPAN	SCALE : 1:100 (if only A3)	

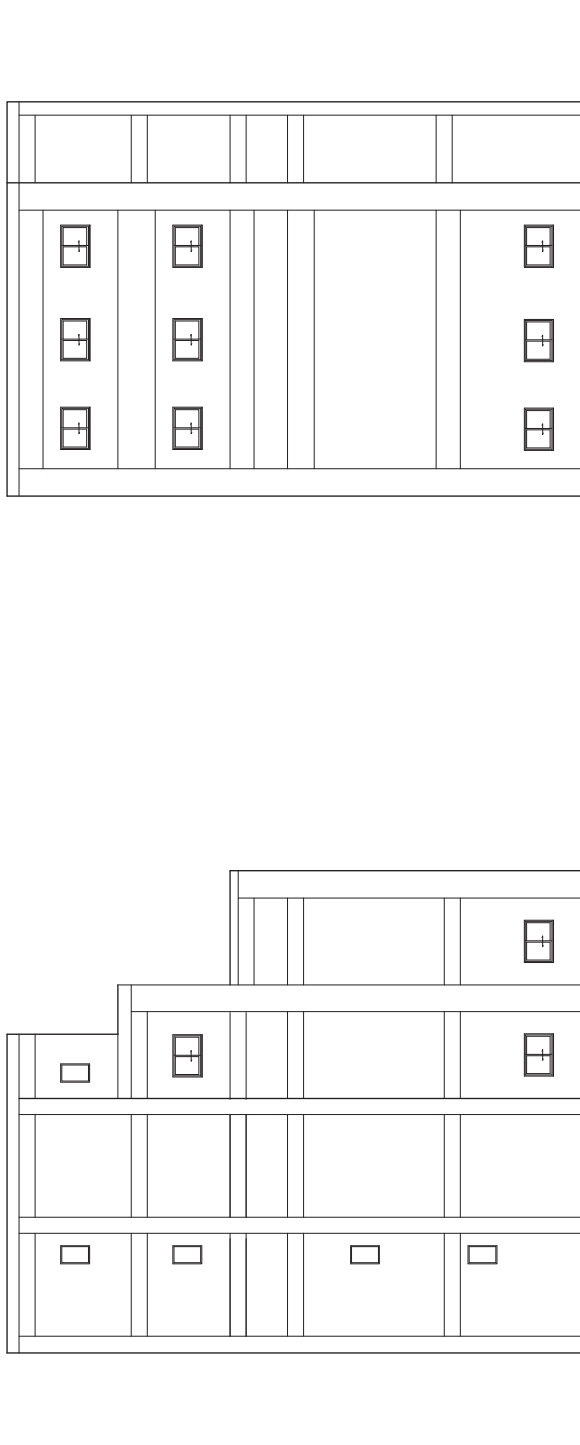


EAST ELEVATION



SOUTH ELEVATION

PROJECT	LOCATION	TITLE	APPROVED BY : K. FUJII	CHECKED BY : K. ODA	DESIGNED BY : T. KURUMADA	DATE :	DRG NO : AR-A10
THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	APAPA ROAD SUBSTATION	CONTROL BUILDING ELEVATION-1	CONSULTANTS :		 <b>YPC</b> <b>YACHIYO ENGINEERING CO., LTD. TOKYO, JAPAN</b>	SCALE : 1:200 (if only A3)	

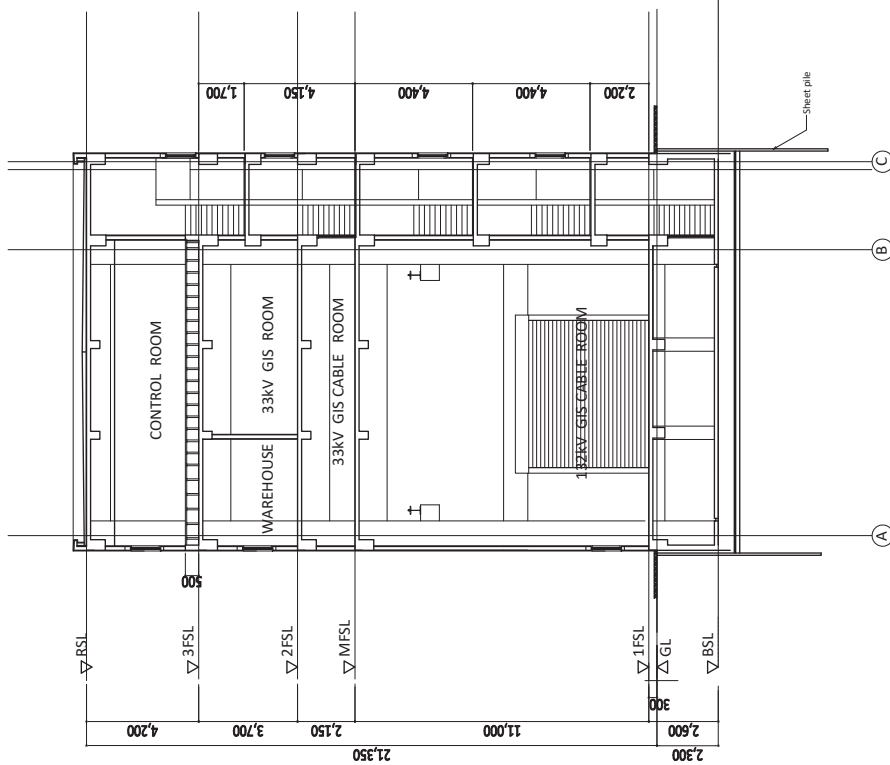


NORTH ELEVATION

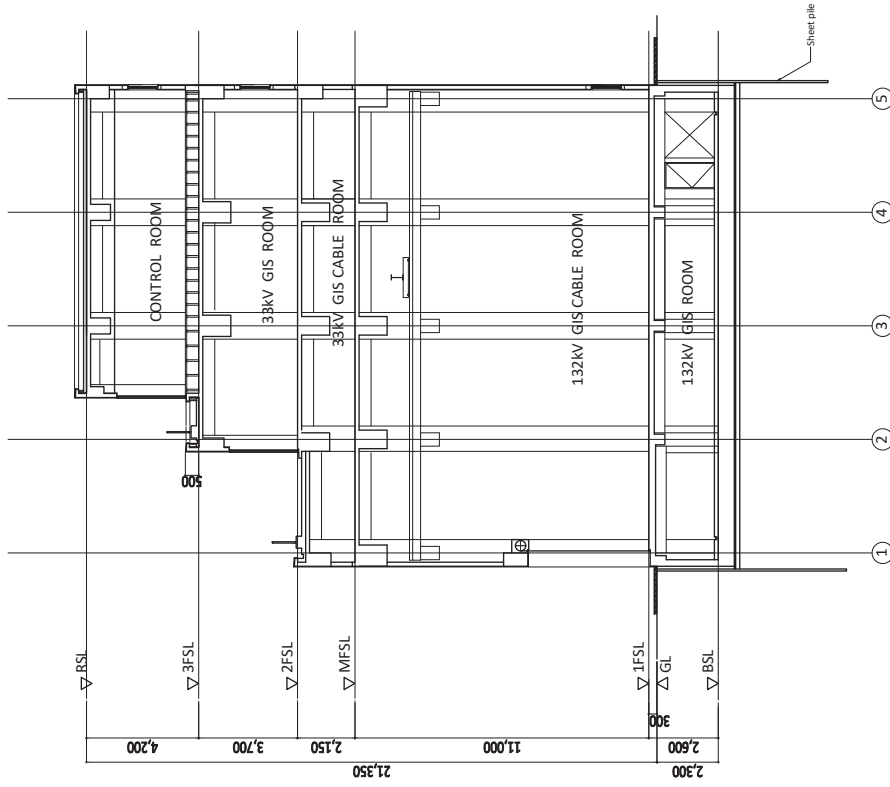
WEST ELEVATION

PROJECT	LOCATION	TITLE	APPROVED BY : K. FUJII	CHECKED BY : K. ODA	DESIGNED BY : T. KURUMADA	DATE :	DRG NO : AR-A11
THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	APAPA ROAD SUBSTATION	CONTROL BUILDING ELEVATION-2	CONSULTANTS :		 <b>YPC</b> <b>YACHIYO ENGINEERING CO., LTD. TOKYO, JAPAN</b>	SCALE :	1:200 (if only A3)




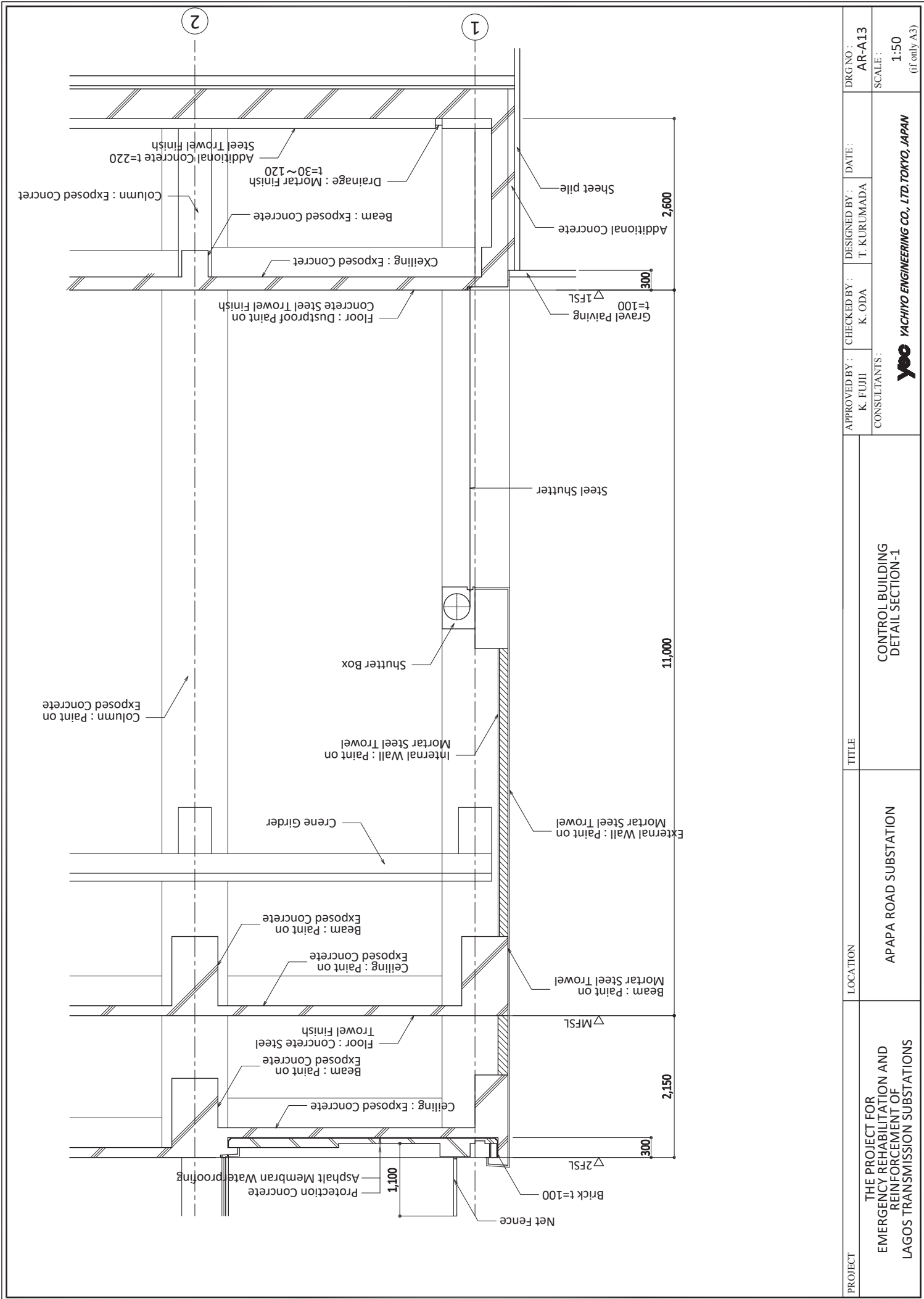


SECTION B - B

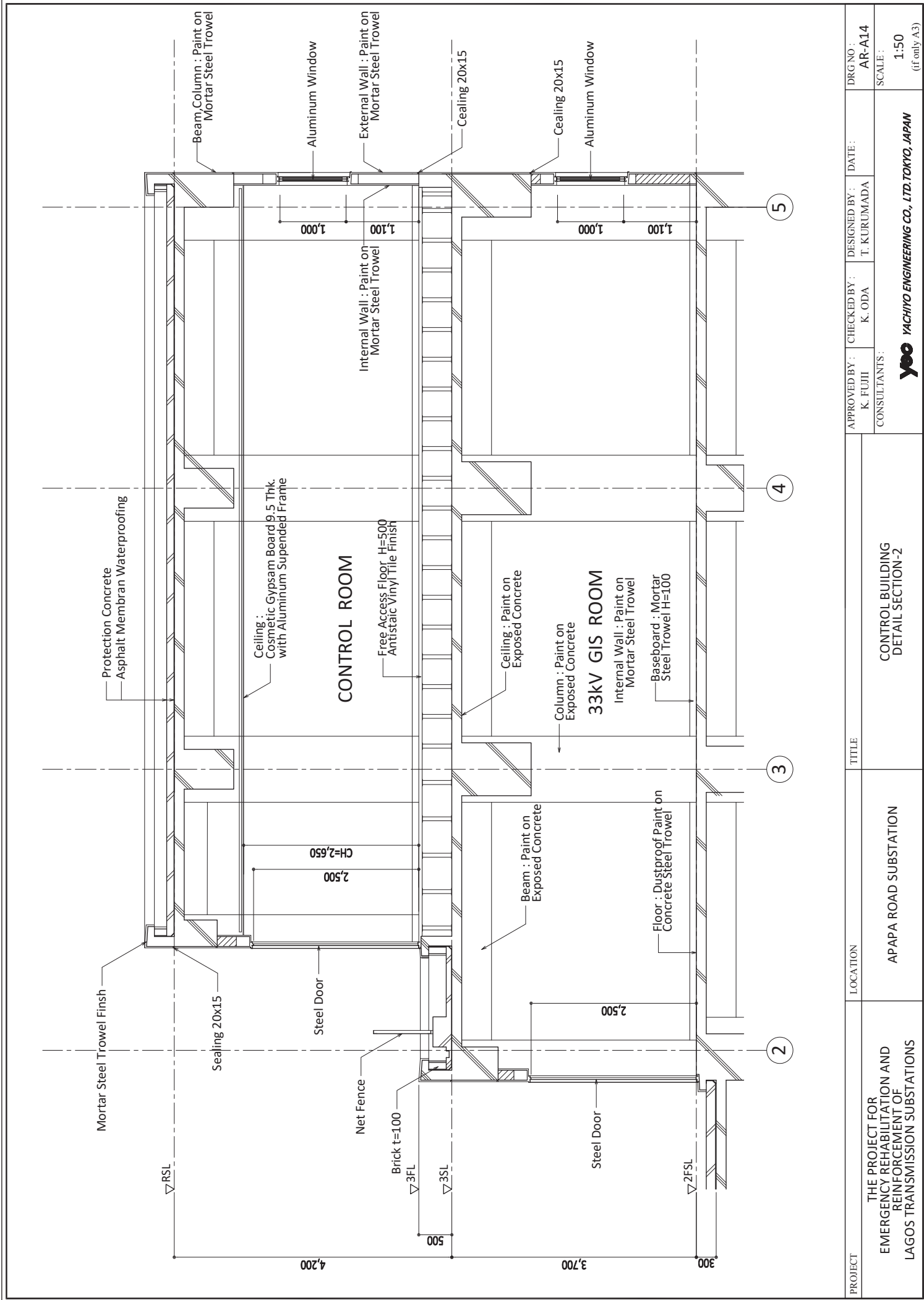


SECTION A - A

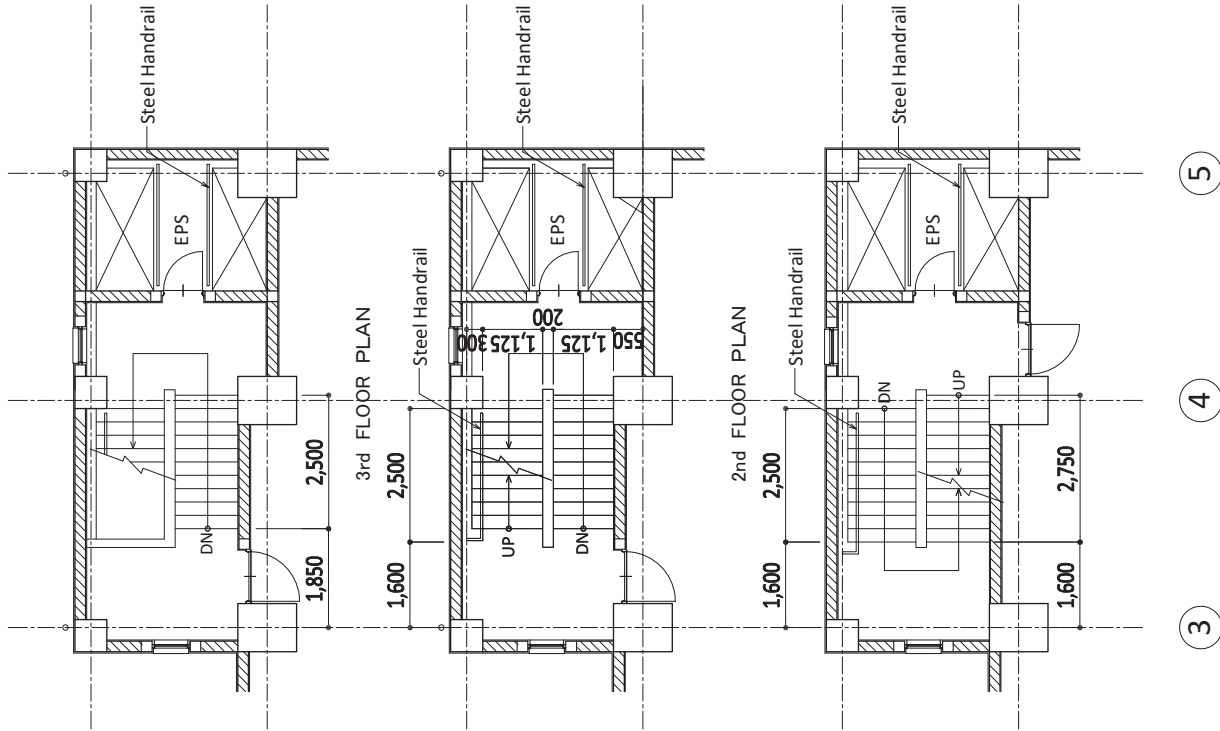
PROJECT	THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	LOCATION	APAPA ROAD SUBSTATION	APPROVED BY :	K. FUJII	CHECKED BY :	K. ODA	DESIGNED BY :	T. KURUMADA	DATE :		DRGNO :	AR-A12	SCALE :	1:200 (if only A3)
CONTROL BUILDING SECTION				CONSULTANTS :											
				 <b>YPC</b> YACHIYO ENGINEERING CO., LTD. TOKYO, JAPAN											



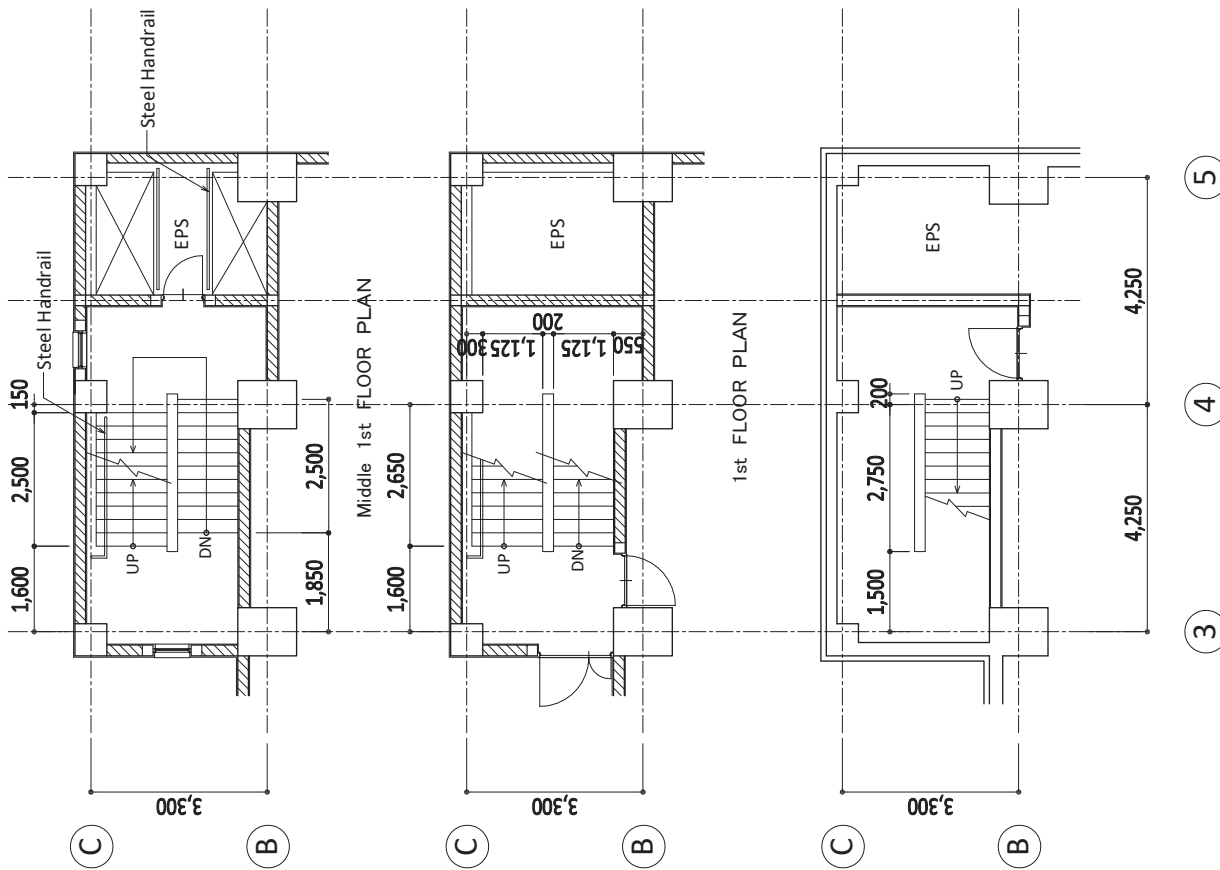
PROJECT	THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS		LOCATION	APAPA ROAD SUBSTATION		TITLE	CONTROL BUILDING DETAIL SECTION-1		APPROVED BY :	CHECKED BY :	DESIGNED BY :	DATE :	DRG NO :	
									K. FUJII	K. ODA	T. KURUMADA		AR-A13	
									CONSULTANTS :		YEO YACHIO ENGINEERING CO., LTD. TOKYO, JAPAN			
													SCALE :	1:50 (if only A3)



PROJECT THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	LOCATION APAPA ROAD SUBSTATION	TITLE CONTROL BUILDING DETAIL SECTION-2	APPROVED BY : K. FUJII	CHECKED BY : K. ODA	DESIGNED BY : T. KURUMADA	DATE :	DRG NO : AR-A14
			CONSULTANTS : <b>yep</b> YACHIYO ENGINEERING CO., LTD. TOKYO, JAPAN			SCALE : 1:50 (if only A3)	

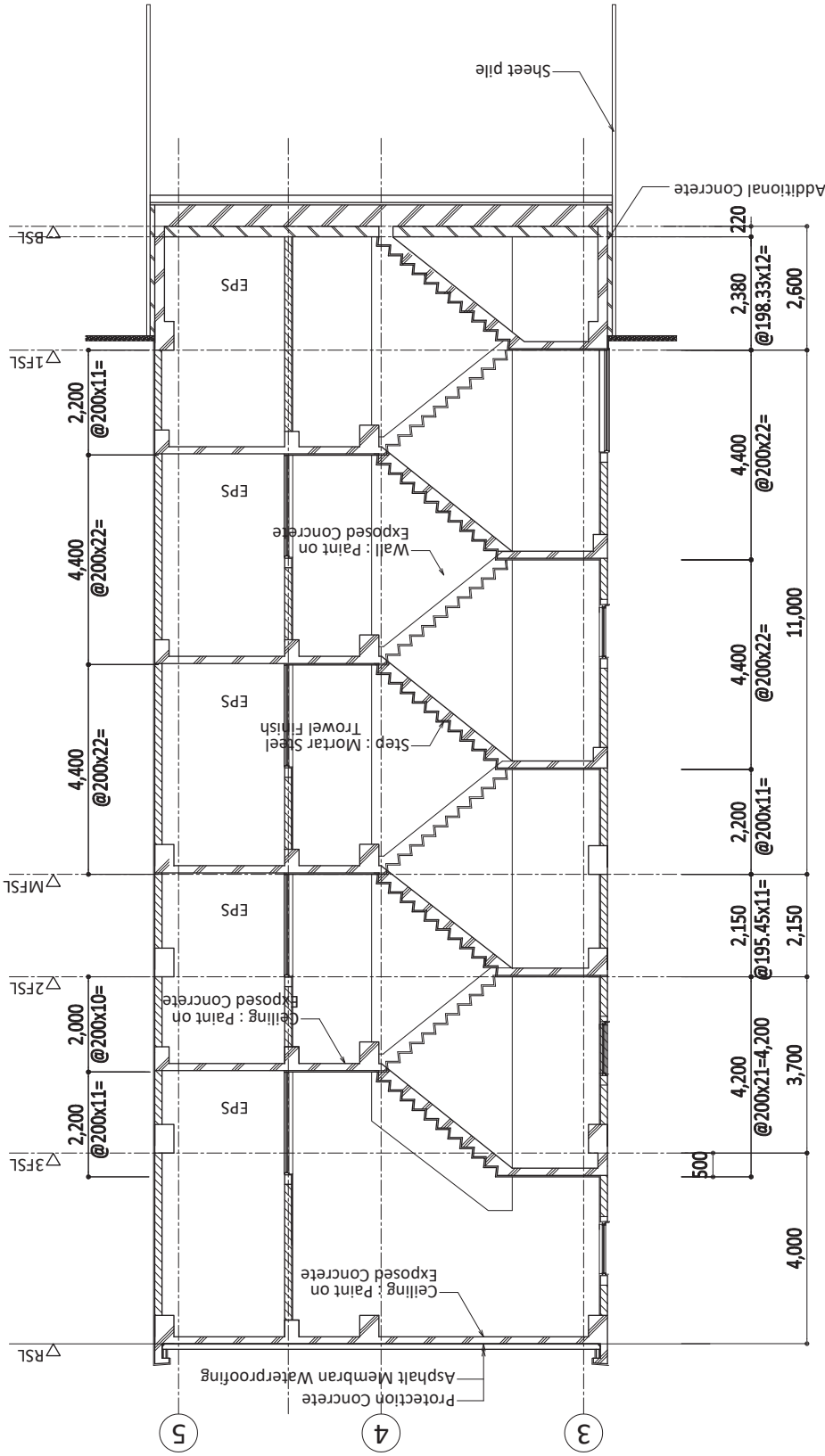


MIDDLE FLOOR PLAN



BEASEMENT FLOOR PLAN

PROJECT	THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	LOCATION	APAPA ROAD SUBSTATION	TITLE	CONTROL BUILDING STAIR PLAN	APPROVED BY : K. FUJII	CHECKED BY : K. ODA	DESIGNED BY : T. KURUMADA	DATE :	DRG NO : AR-A15
					CONSULTANTS : <b>yep</b> YACHIYO ENGINEERING CO., LTD. TOKYO, JAPAN					SCALE : 1:100 (if only A3)



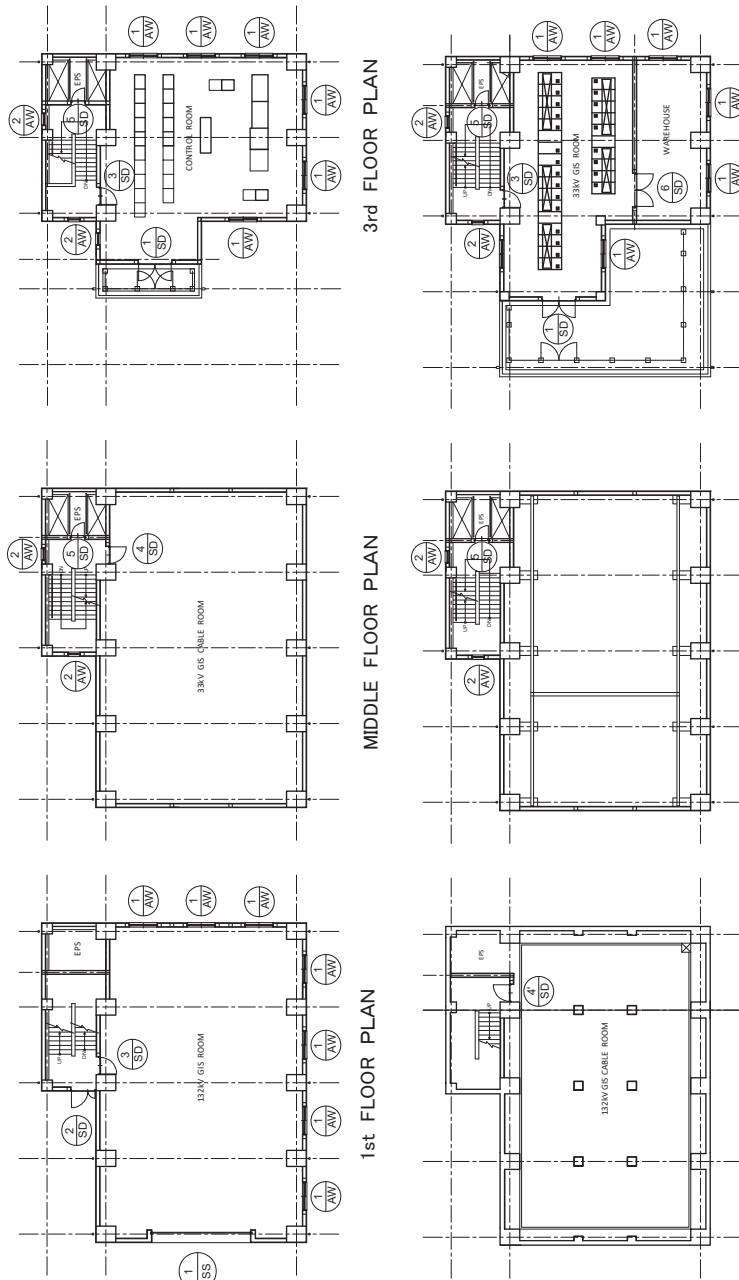
SECTION A - A

PROJECT THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	LOCATION APAPA ROAD SUBSTATION	TITLE CONTROL BUILDING DETAIL SECTION OF STAIR	APPROVED BY : K. FUJII	CHECKED BY : K. ODA	DESIGNED BY : T. KURUMADA	DATE :	DRG NO : AR-A16
			CONSULTANTS : <b>yep</b> YACHIYO ENGINEERING CO., LTD. TOKYO, JAPAN			SCALE : 1:100 (if only A3)	

SYMBOL & QTY:														
ELEVATION														
TYPE	DOUBLE SWING DOOR	DOUBLE SWING DOOR	SINGLE SWING DOOR	SINGLE SWING DOOR	SINGLE SWING DOOR	DOUBLE SWING DOOR	SINGLE SWING DOOR	SINGLE SWING DOOR	SINGLE SWING DOOR	SINGLE SWING DOOR	DOUBLE SWING DOOR	DOUBLE SWING DOOR	SLIDING WINDOW	FIXED WINDOW
MATERIAL & FINISH	STEEL PAINT(OP)	STEEL PAINT(OP)	STEEL PAINT(OP)	STEEL PAINT(OP)	STEEL PAINT(OP)	STEEL PAINT(OP)	STEEL PAINT(OP)	STEEL PAINT(OP)	STEEL PAINT(OP)	STEEL PAINT(OP)	STEEL PAINT(OP)	STEEL PAINT(OP)	ALUMINUM - ELECTRO COLOR	ALUMINUM - ELECTRO COLOR
GLASS													CLEAR GLASS #5	CLEAR GLASS #5
HARDWEAR	HINGE, LEVER HANDLE, STOPPER DOOR CLOSER, CYLINDER LOCK	HINGE, LEVER HANDLE, STOPPER DOOR CLOSER, CYLINDER LOCK	HINGE, LEVER HANDLE, STOPPER DOOR CLOSER, CYLINDER LOCK	HINGE, LEVER HANDLE, STOPPER DOOR CLOSER, CYLINDER LOCK	HINGE, LEVER HANDLE, STOPPER DOOR CLOSER, CYLINDER LOCK	HINGE, LEVER HANDLE, STOPPER DOOR CLOSER, CYLINDER LOCK	HINGE, LEVER HANDLE, STOPPER DOOR CLOSER, CYLINDER LOCK	HINGE, LEVER HANDLE, STOPPER DOOR CLOSER, CYLINDER LOCK	HINGE, LEVER HANDLE, STOPPER DOOR CLOSER, CYLINDER LOCK	HINGE, LEVER HANDLE, STOPPER DOOR CLOSER, CYLINDER LOCK	HINGE, LEVER HANDLE, STOPPER DOOR CLOSER, CYLINDER LOCK	HINGE, LEVER HANDLE, STOPPER DOOR CLOSER, CYLINDER LOCK		
REMARK														

SYMBOL & QTY:	
ELEVATION	
TYPE	STEEL SHUTTER (ELECTRIC)
MATERIAL & FINISH	STEEL PAINT(OP)
GLASS	
HARDWEAR	STAINLESS GUIDERAIL, STEEL SHUTTER BOX
REMARK	

FITTING KEY PLAN S=1/200

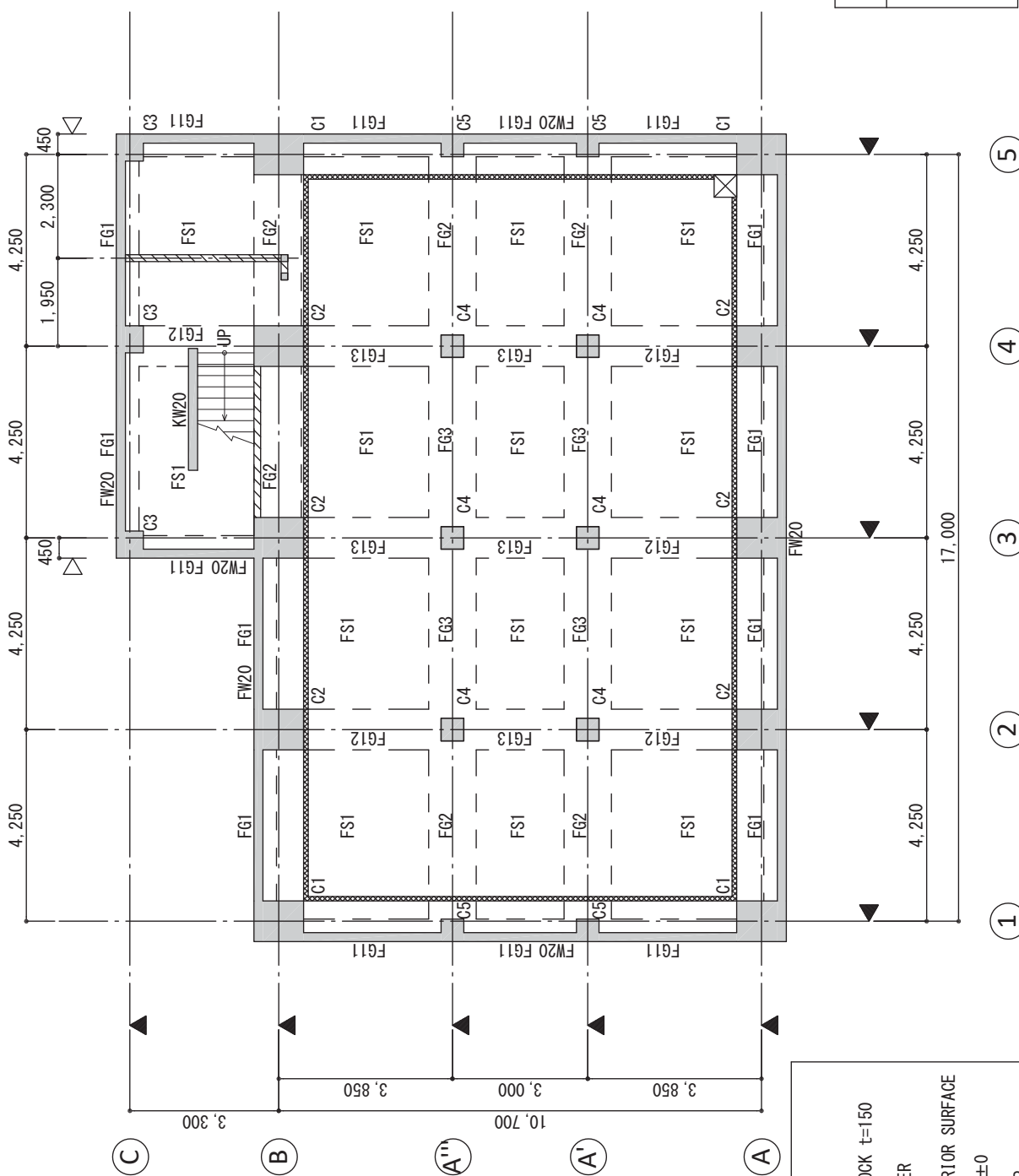


BASEMENT FLOOR PLAN

MIDDLE 1st FLOOR PLAN

2nd FLOOR PLAN

PROJECT	THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	LOCATION	APAPA ROAD SUBSTATION	TITLE	CONTROL BUILDING FITTING SCHEDULE	APPROVED BY:	K. FUJII	CHECKED BY:	K. ODA	DESIGNED BY:	T. KURUMADA	DATE:		DRGNO:	AR-A17	
														SCALE:	1:100 (if only A3)	
														CONSULTANTS:		YACHIYO ENGINEERING CO., LTD. TOKYO, JAPAN



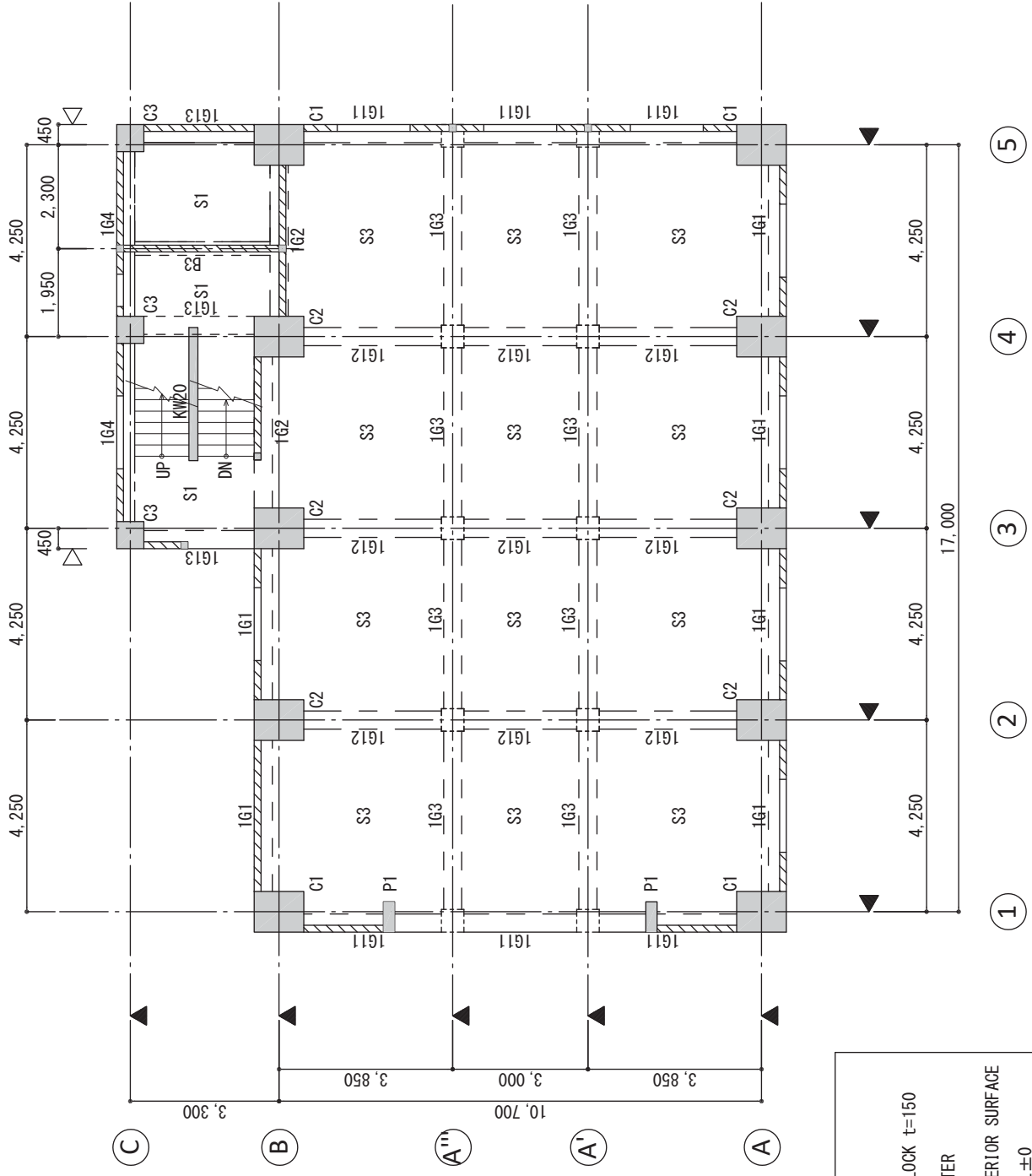
- GENERAL NOTES**
- 1) CONCRETE BLOCK t=150
  - 2) COLUMN CENTER
  - 3) SLAB UPPER BED BFSL ±0
  - 4) SHALLOW SUMP
  - 5) DRAINAGE

USED MATERIAL	
CONCRETE	Fc24
RE-BAR	SD345 (D19, D22, D25)
	SD295 (D10, D12, D16)

- ①      ②      ③      ④      ⑤

**FOUNDATION&UNDERGROUND FLOOR FRAMING PLAN s-1/10**

PROJECT	LOCATION	TITLE	APPROVED BY :	CHECKED BY :	DESIGNED BY :	DATE :	DRG NO :
THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	APAPA ROAD SUBSTATION	FOUNDATION & UNDERGROUND FLOOR FRAMING PLAN	K. FUJII	K. ODA	T. KURUMADA		AR-S01
							SCALE :
							1:100
							(f only A3)
<b>YACHINO ENGINEERING CO., LTD. TOKYO, JAPAN</b>							

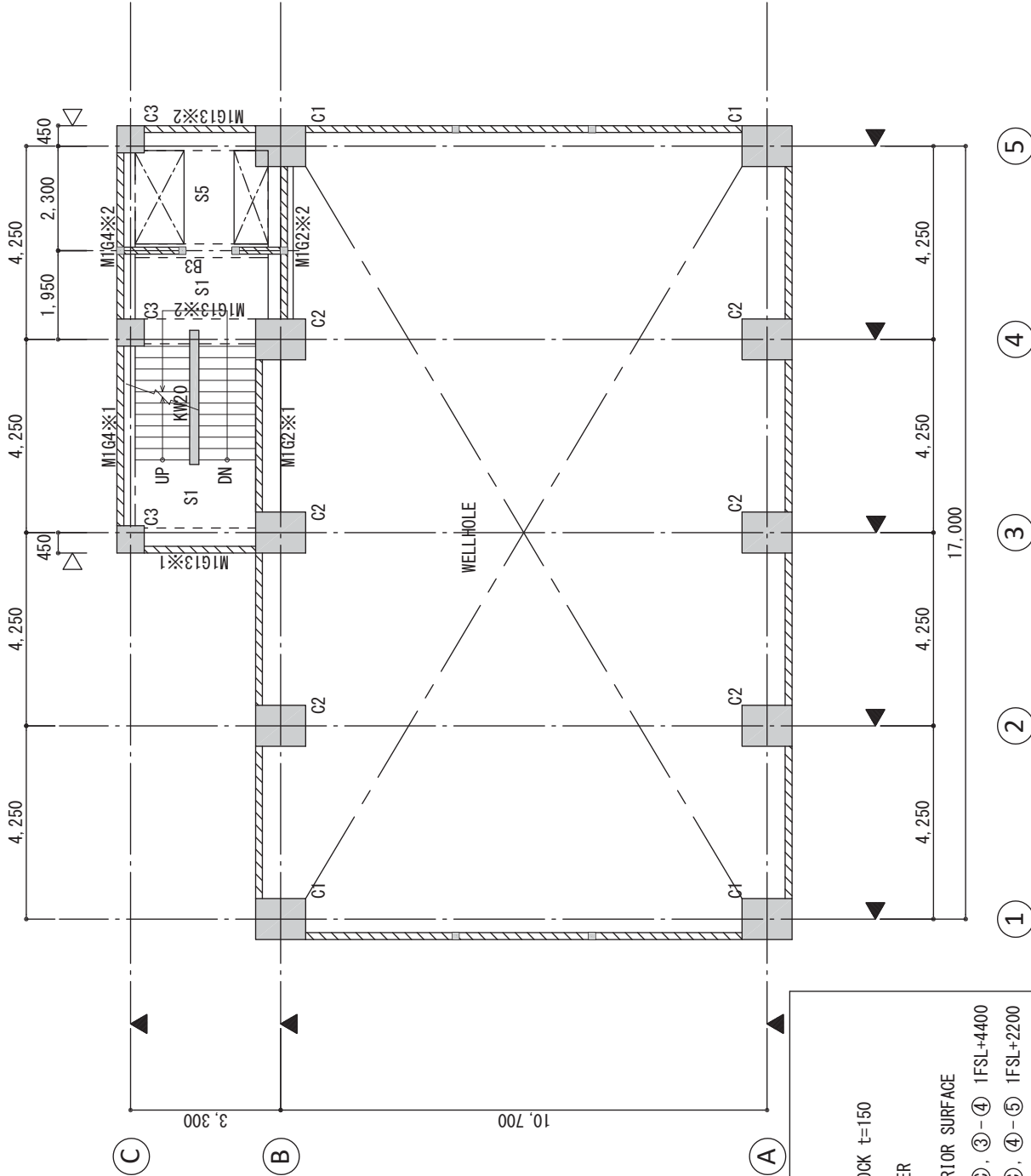


1st FLOOR FRAMING PLAN s=1/100

- GENERAL NOTES**
- 1) CONCRETE BLOCK t=150
  - 2) COLUMN CENTER
  - 3) SLAB UPPER BED 1FSL ±0

PROJECT	LOCATION		TITLE		DRG NO. : AR-S02
	APAPA ROAD SUBSTATION		CONTROL BUILDING 1st FLOOR FRAMING PLAN		SCALE : 1:100 (if only A3)
THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS			APPROVED BY : K. FUJII	CHECKED BY : K. ODA	DESIGNED BY : T. KURUMADA
			DATE :		CONSULTANTS : <b>yoo</b> YACHIYO ENGINEERING CO., LTD. TOKYO, JAPAN



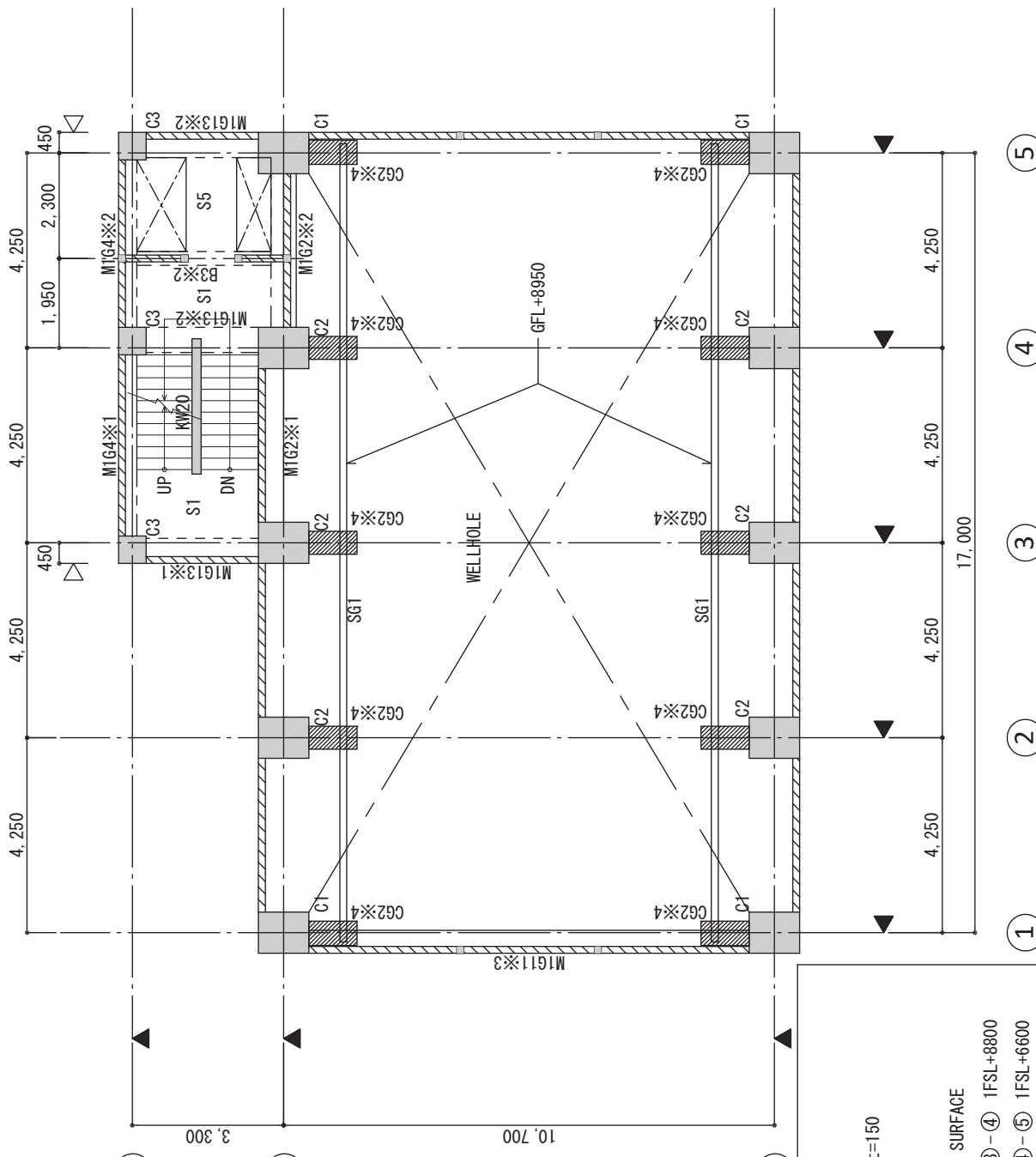


- GENERAL NOTES**
- 1) CONCRETE BLOCK t=150
  - 2) COLUMN CENTER
  - 3) SLAB UPPER BED ② - ③ - ④ 1FSL+4400  
⑤ - ⑥ - ④ - ⑤ 1FSL+2200
  - 4) FRAME UPPER BED ※1 1FSL+4400  
※2 1FSL+2200

MIDDLE 1st FLOOR FRAMING PLAN 6/1/10

PROJECT	LOCATION	TITLE	APPROVED BY : K. FUJII	CHECKED BY : K. ODA	DESIGNED BY : T. KURUMADA	DATE :	DRG NO : AR-S03	
THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	APAPA ROAD SUBSTATION	CONTROL BUILDING MIDDLE 1st FLOOR FRAMING PLAN					SCALE : 1:100 (f only A3)	

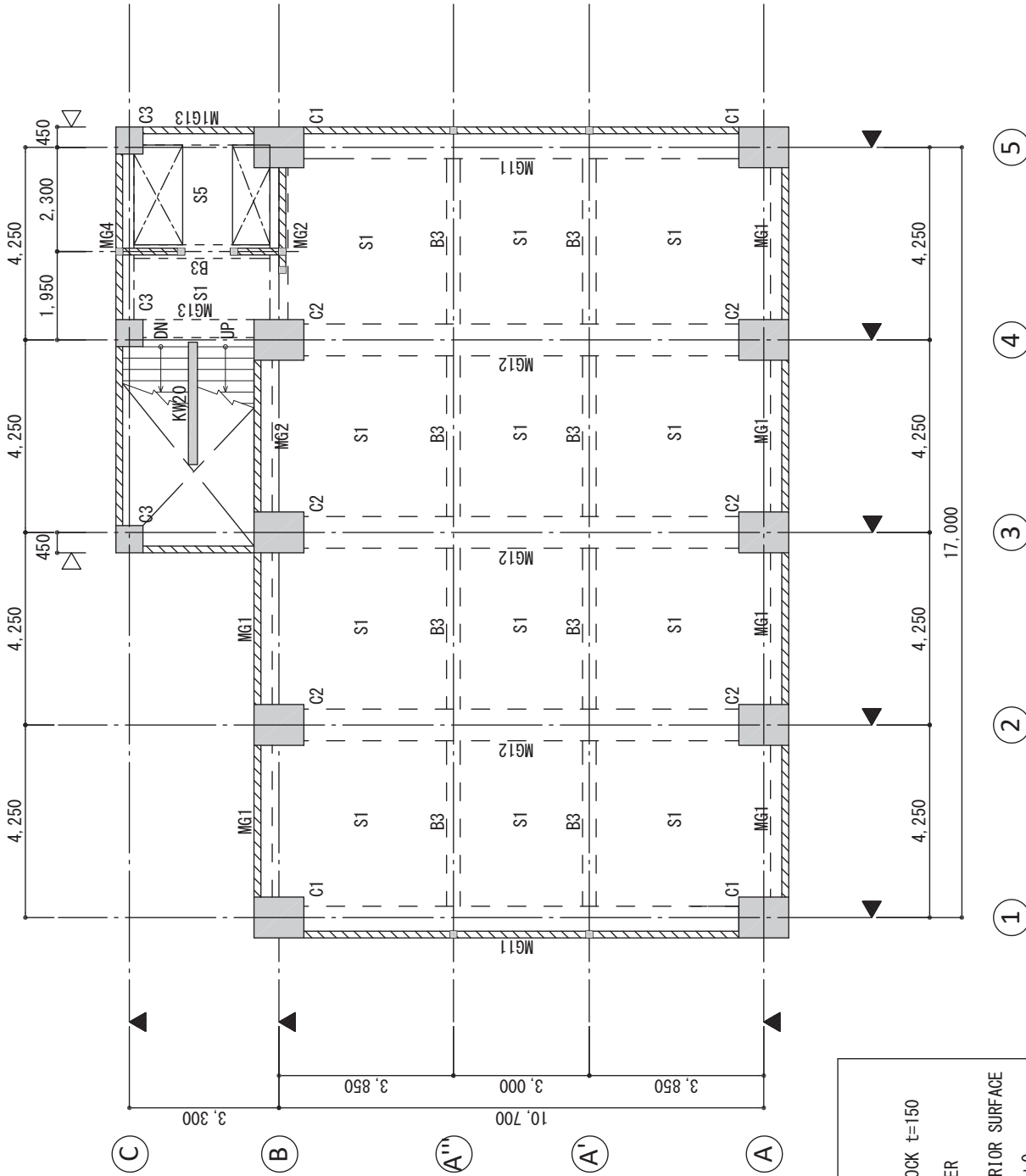
YEO YACHIO ENGINEERING CO., LTD. TOKYO, JAPAN



- GENERAL NOTES**
- 1) CONCRETE BLOCK t=150
  - 2) COLUMN CENTER
  - 3) SLAB UPPER BED (B-C), (3-4) 1FSL+8800  
(B-C), (4-5) 1FSL+6600
  - 4) FRAME UPPER BED ※1 1FSL+8800 ※2 1FSL+6600  
※3 1FSL+5100 ※4 1FSL+8500

MIDDLE 1st FLOOR FRAMING PLAN s=1/100

<b>PROJECT</b>	<b>LOCATION</b>	<b>TITLE</b>	<b>DATE</b>
THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	APAPA ROAD SUBSTATION	CONTROL BUILDING MIDDLE 1st FLOOR FRAMING PLAN	DESIGNED BY : T. KURUMADA
			CHECKED BY : K. ODA
			APPROVED BY : K. FUJII
			CONSULTANTS :
			<b>YEO</b> YACHIO ENGINEERING CO., LTD. TOKYO, JAPAN
			DRG NO : AR-S04
			SCALE : 1:100 (f only A3)

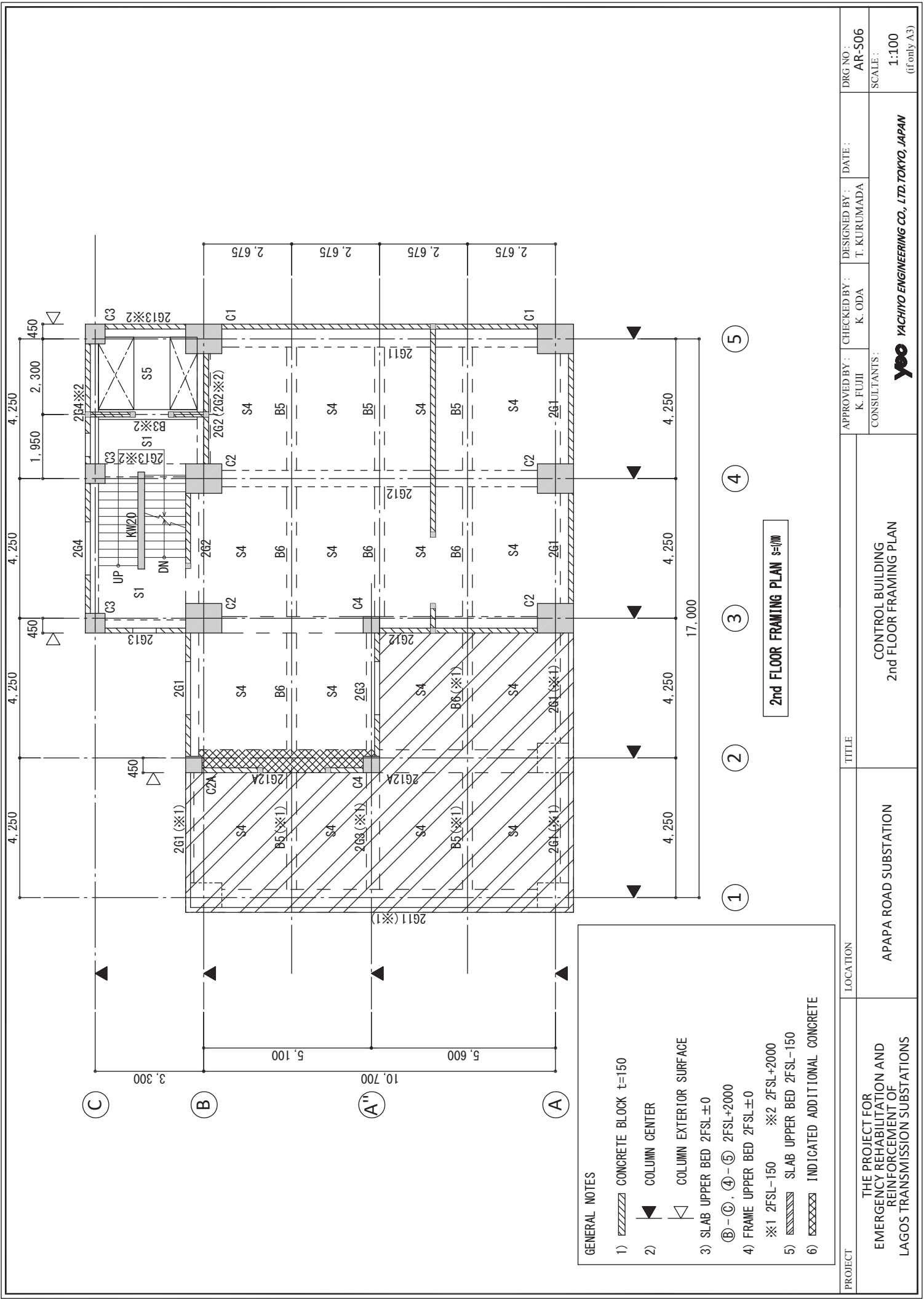


MIDDLE FLOOR FRAMING PLAN 5-1/100

- GENERAL NOTES**
- 1) CONCRETE BLOCK t=150
  - 2) COLUMN CENTER
  - 3) SLAB UPPER BED MF-SL ±0
  - 4) FRAME UPPER BED MF-SL ±0

①      ②      ③      ④      ⑤

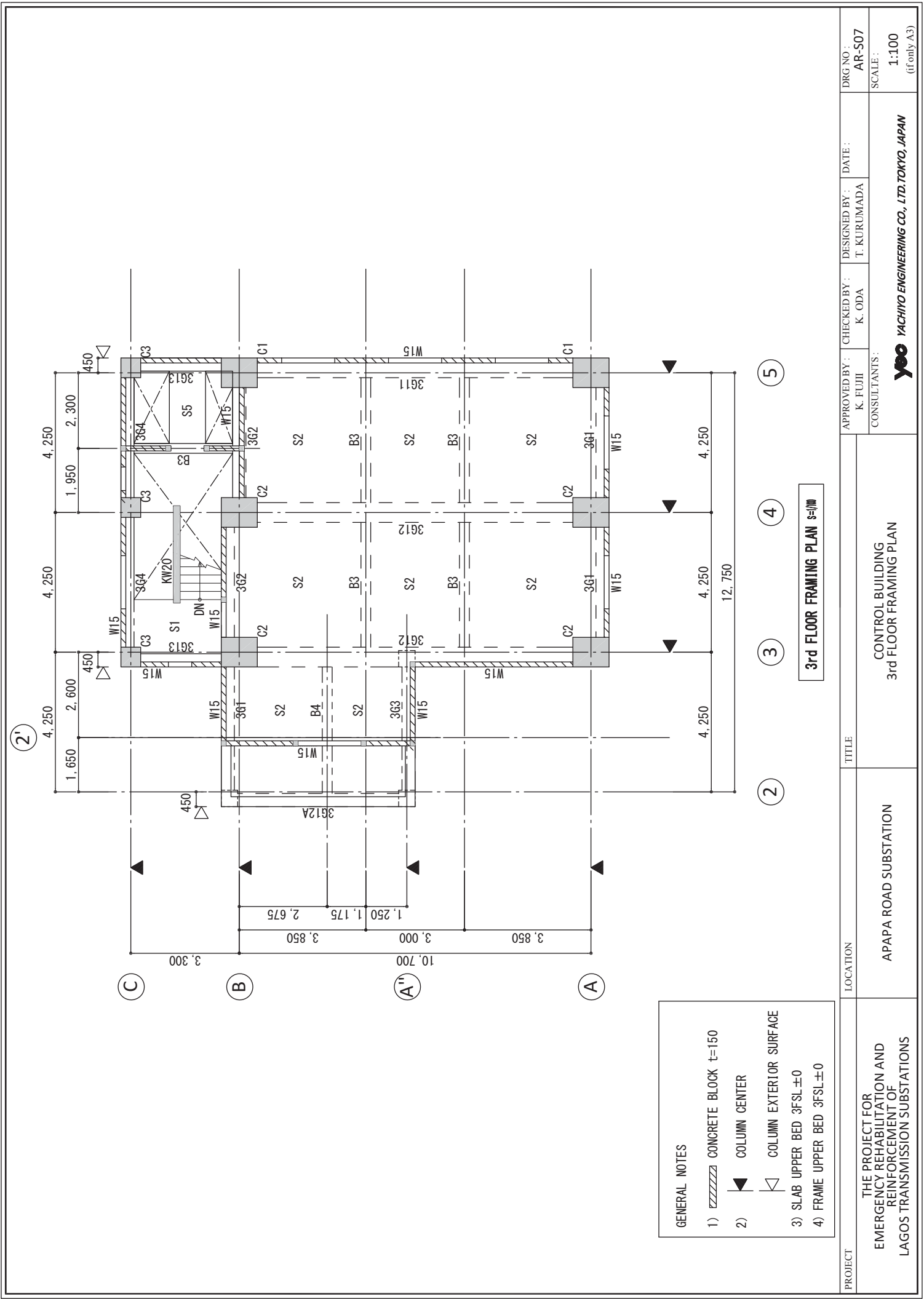
PROJECT	LOCATION	TITLE	DRG NO :
THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	APAPA ROAD SUBSTATION	CONTROL BUILDING MIDDLE FLOOR FRAMING PLAN	AR-S05
			SCALE :
			1:100 (if only A3)
		APPROVED BY : K. FUJII	DESIGNED BY : T. KURUMADA
		CHECKED BY : K. ODA	DATE :
		CONSULTANTS :	
		yoo YACHIYO ENGINEERING CO., LTD. TOKYO, JAPAN	



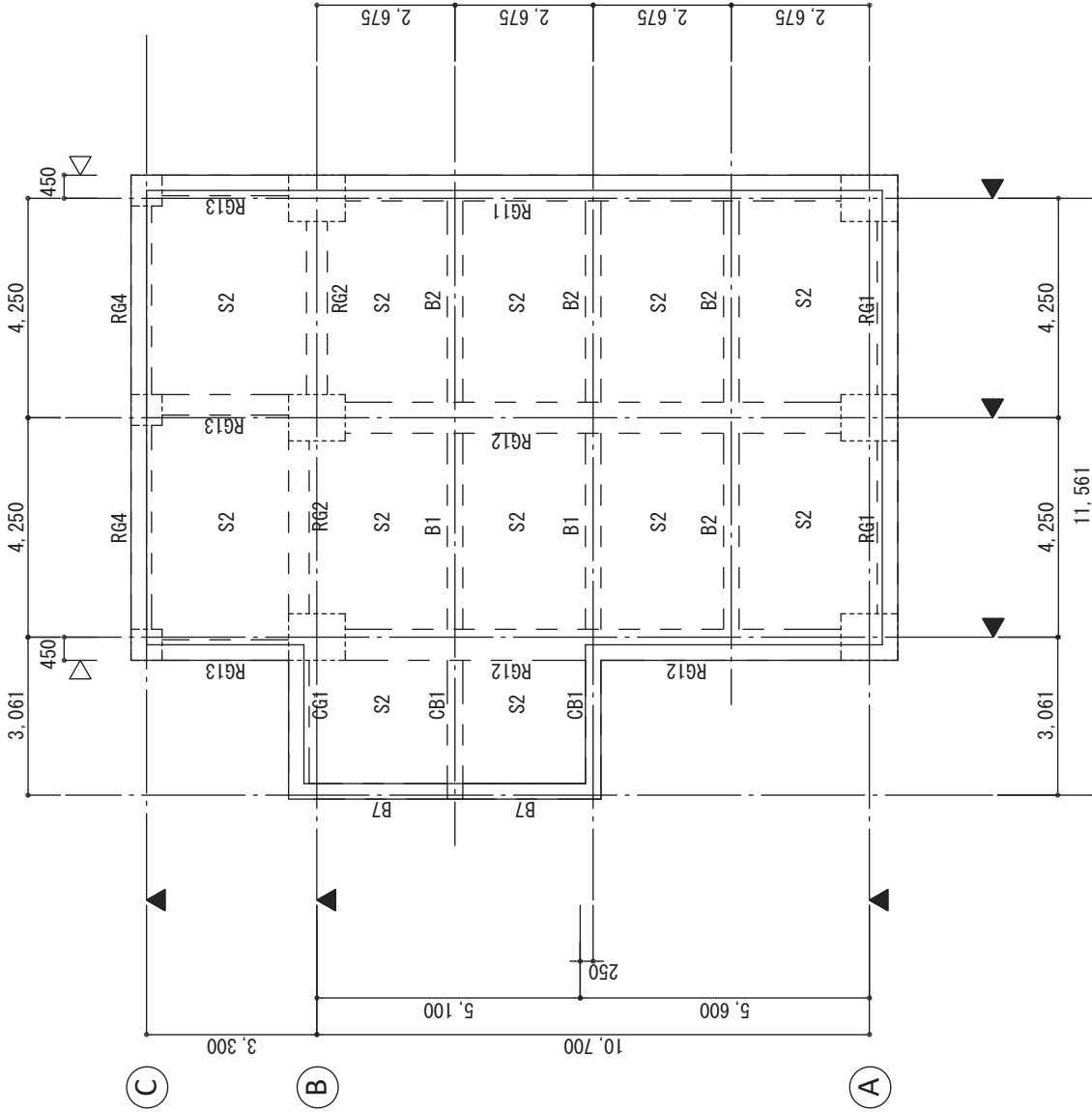
- GENERAL NOTES**
- 1) CONCRETE BLOCK t=150
  - 2) COLUMN CENTER
  - COLUMN EXTERIOR SURFACE
  - 3) SLAB UPPER BED 2FSL±0
  - (Ⓑ)-(Ⓒ), (Ⓓ)-(Ⓔ) 2FSL+2000
  - 4) FRAME UPPER BED 2FSL±0
  - ※1 2FSL-150 ※2 2FSL+2000
  - SLAB UPPER BED 2FSL-150
  - 6) INDICATED ADDITIONAL CONCRETE

2nd FLOOR FRAMING PLAN s=1/100

<b>PROJECT</b>	<b>LOCATION</b>	<b>TITLE</b>	<b>DRG NO.:</b>
EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	APAPA ROAD SUBSTATION	CONTROL BUILDING 2nd FLOOR FRAMING PLAN	AR-S06
		APPROVED BY: K. FUJII	DESIGNED BY: T. KURUMADA
		CHECKED BY: K. ODA	DATE:
		<b>YEO YACHIYO ENGINEERING CO., LTD. TOKYO, JAPAN</b>	
		CONSULTANTS:	
		SCALE: 1:100 (f only A3)	



- GENERAL NOTES**
- 1) [Hatched pattern] CONCRETE BLOCK t=150
  - 2) [Triangle symbol] COLUMN CENTER
  - 3) [Inverted triangle symbol] COLUMN EXTERIOR SURFACE
  - 4) [Square symbol] SLAB UPPER BED 3FSL±0
  - 5) [Square symbol] FRAME UPPER BED 3FSL±0

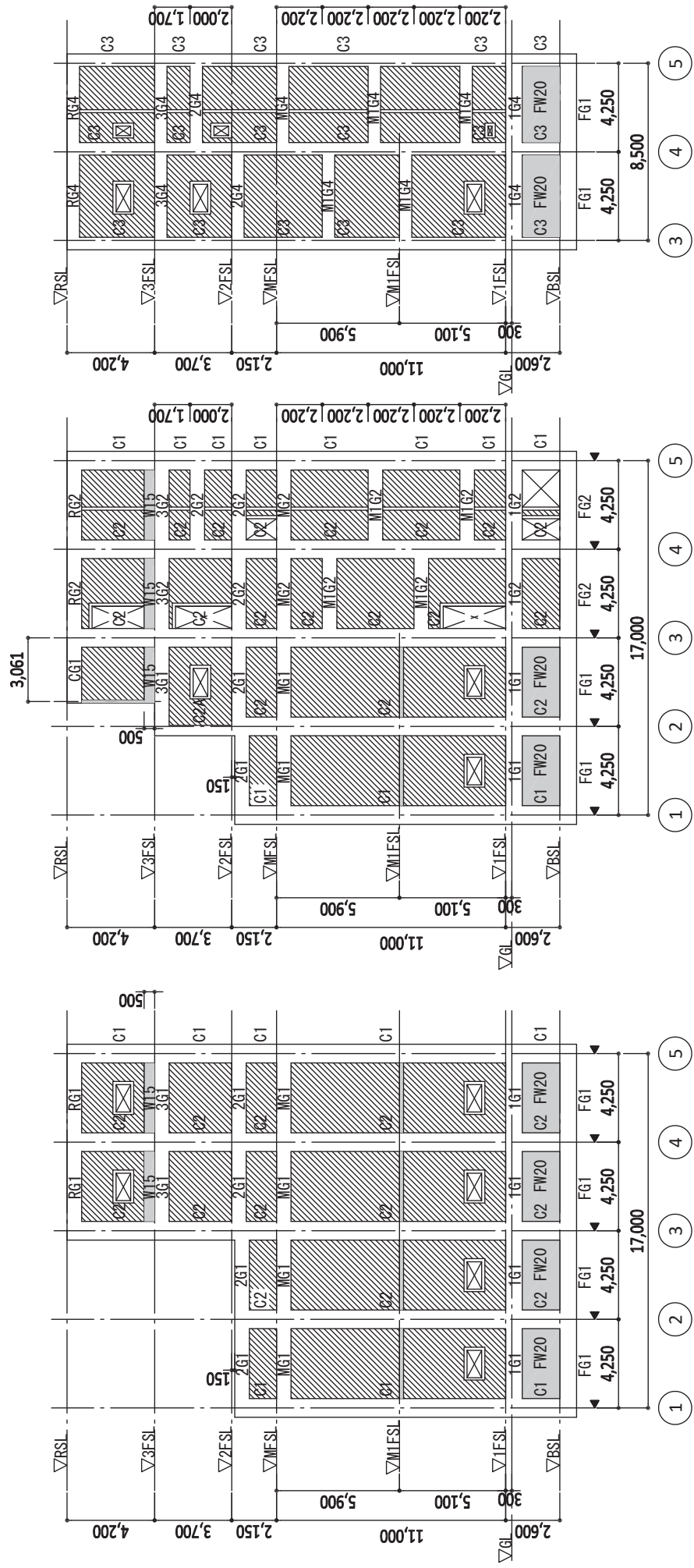


- GENERAL NOTES
- 1) COLUMN CENTER
  - 2) BEAM UPPER BED RFSL ± 0
  - 3) SLAB UPPER BED RFSL ± 0

② ③ ④ ⑤

ROOF FLOOR FRAMING PLAN 5-f/100

PROJECT	LOCATION	TITLE	APPROVED BY : K. FUJII	CHECKED BY : K. ODA	DESIGNED BY : T. KURUMADA	DATE :	DRG NO : AR-S08	
THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	APAPA ROAD SUBSTATION	CONTROL BUILDING ROOF FLOOR FRAMING PLAN	CONSULTANTS: <b>yoo</b> YACHIYO ENGINEERING CO., LTD. TOKYO, JAPAN				SCALE : 1:100 (f only A3)	



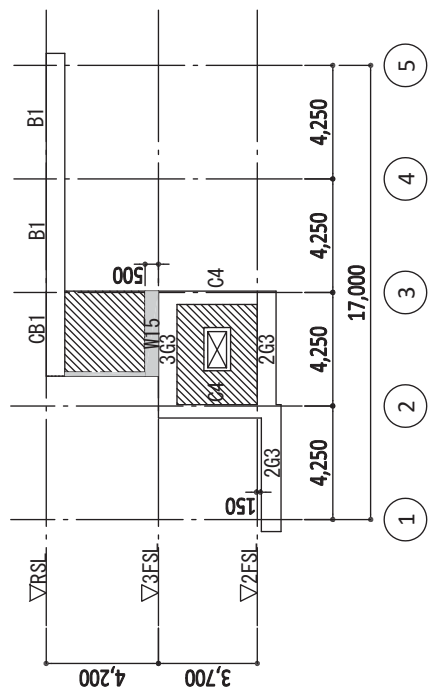
Ⓐ LINE FRAMING ELEVATION s=1/200

Ⓑ LINE FRAMING ELEVATION s=1/200

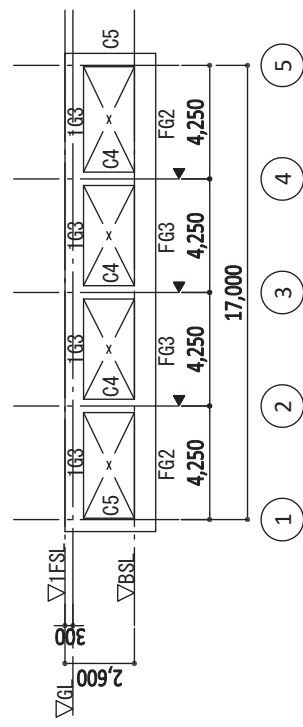
Ⓒ LINE FRAMING ELEVATION s=1/200

GENERAL NOTES  
 1) CONCRETE BLOCK t=150

PROJECT	LOCATION	TITLE	DRG NO. : AR-S09
THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	APAPA ROAD SUBSTATION	CONTROL BUILDING FRAMING ELEVATION (1)	SCALE : 1:200 (if only A3)
			DATE :
			DESIGNED BY : T. KURUMADA
			CHECKED BY : K. ODA
			APPROVED BY : K. FUJII
			CONSULTANTS : YACHIO ENGINEERING CO., LTD. TOKYO, JAPAN

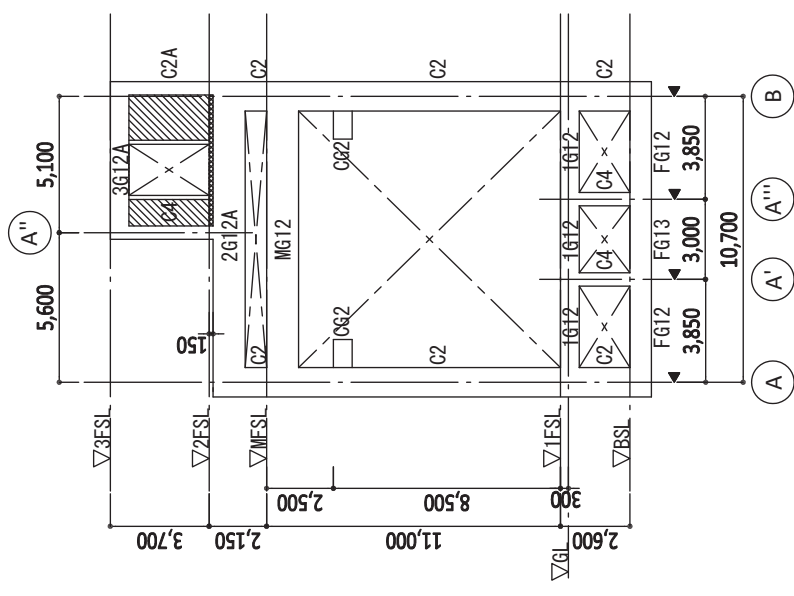


① LINE FRAMING ELEVATION s=1/200

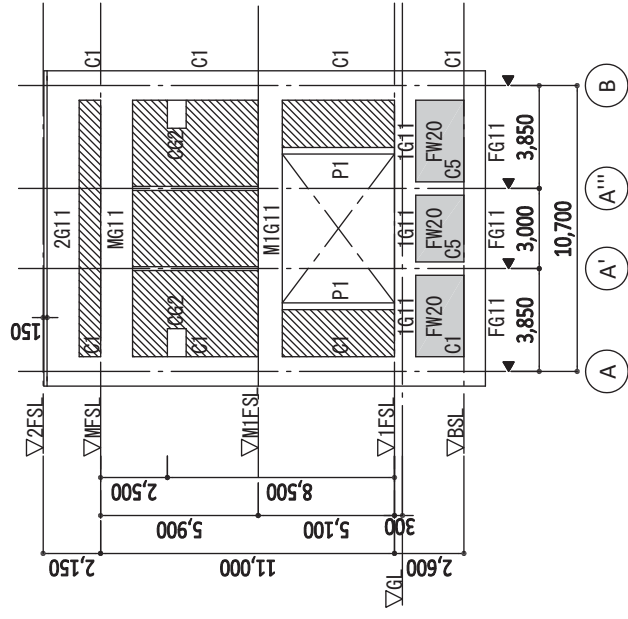


② LINE FRAMING ELEVATION s=1/200

**GENERAL NOTES**  
 1) [Hatched pattern] CONCRETE BLOCK t=150  
 2) [Cross-hatched pattern] INDICATED ADDITIONAL CONCRETE



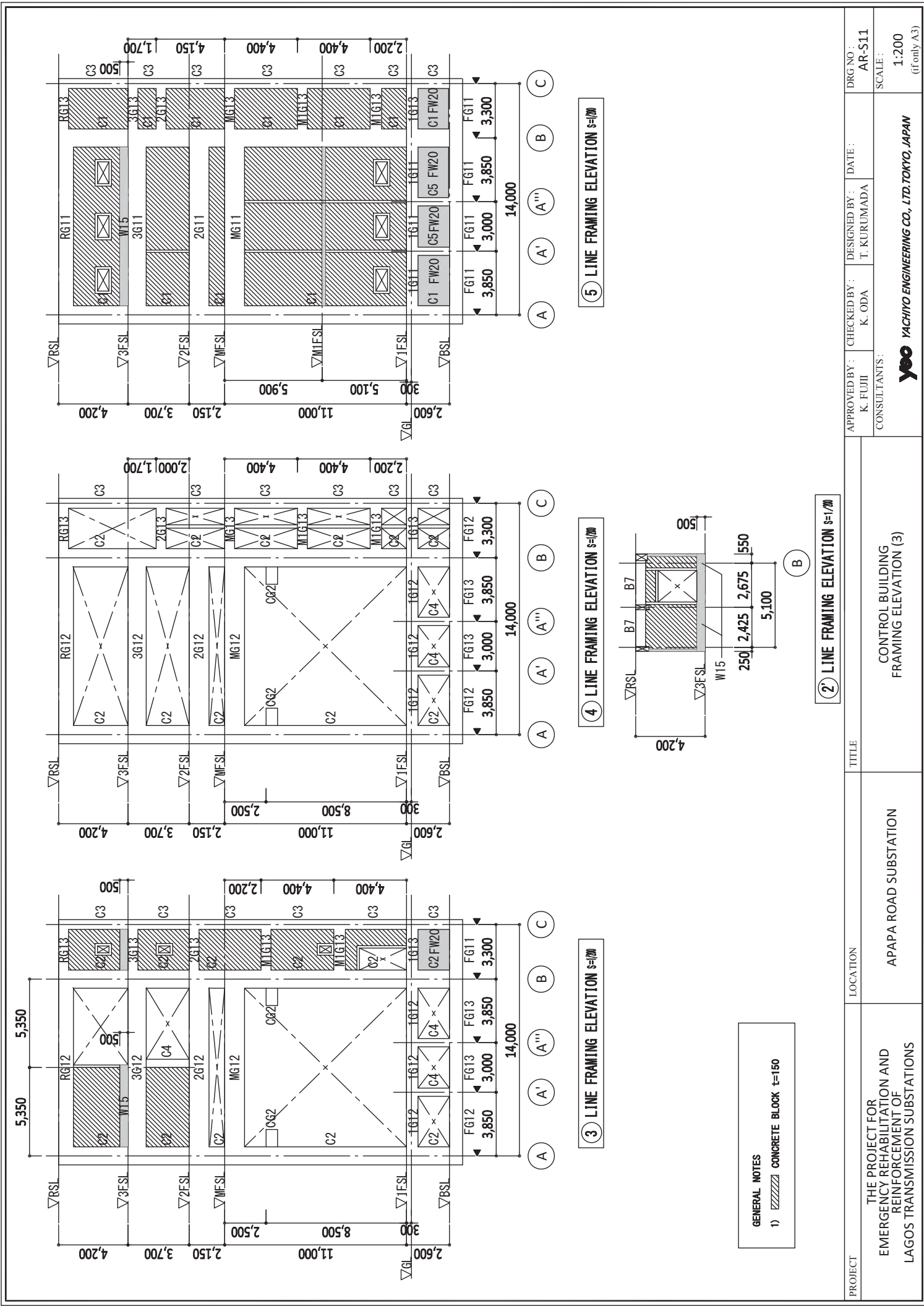
③ LINE FRAMING ELEVATION s=1/200



④ LINE FRAMING ELEVATION s=1/200

PROJECT	EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	LOCATION	APAPA ROAD SUBSTATION	TITLE	CONTROL BUILDING FRAMING ELEVATION (2)	APPROVED BY:	K. FUJII	CHECKED BY:	K. ODA	DESIGNED BY:	T. KURUMADA	DATE:	DRG NO.:	AR-S10
CONSULTANTS:														
SCALE: 1:200 (if only A3)														





**GENERAL NOTES**  
 1) CONCRETE BLOCK t=150

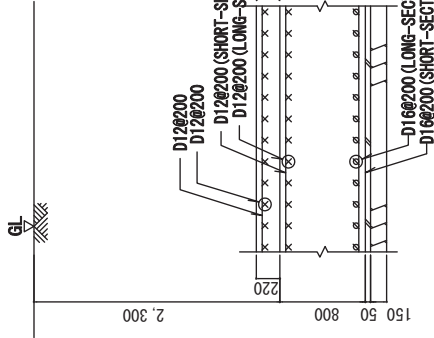
PROJECT	EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	LOCATION	APAPA ROAD SUBSTATION	TITLE	CONTROL BUILDING FRAMING ELEVATION (3)	APPROVED BY:	K. FUJII	CHECKED BY:	K. ODA	DESIGNED BY:	T. KURUMADA	DATE:		DRG NO.:	AR-S11
						CONSULTANTS:	<b>YEO YACHIO ENGINEERING CO., LTD. TOKYO, JAPAN</b>			SCALE:	1:200	(f only A3)			

# FOUNDATION GIRDER SCHEDULE §=1/50

UNLESS OTHERWISE NOTED  
SPREADER D10@1,000

# FOUNDATION SCHEDULE §=1/50

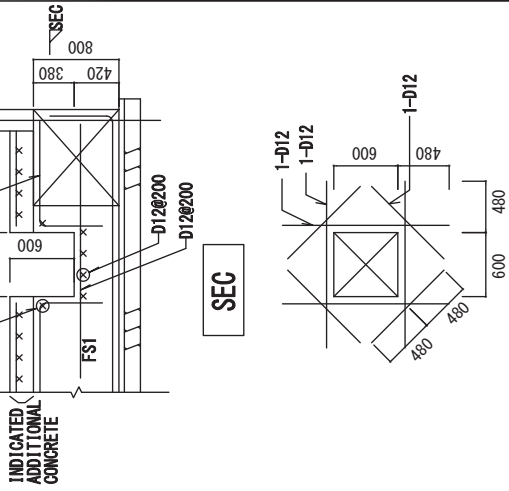
MARK	FG2					FG3
	FG1	OUTSIDE END	CENTER	INSIDE END	END	
SECTION (BIF)						
B x D	500x800	1050x800				
TOP BARS	3-D25	8-D25	8-D25	8-D25	8-D25	8-D25
BOT. BARS	3-D25	8-D25	6-D25	10-D25	10-D25	6-D25
STIRRUPS	□-D12-@200	(4) □-D12-@200				
WEB BARS	2-D12	-				



FS1

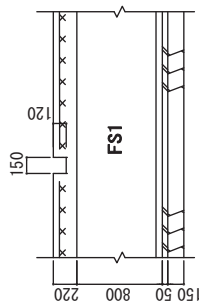
MARK	FG12					FG13
	FG11	OUTSIDE END	CENTER	INSIDE END	END	
SECTION (BIF)						
B x D	500x800	900x800				
TOP BARS	3-D25	6-D25	6-D25	6-D25	6-D25	6-D25
BOT. BARS	3-D25	6-D25	5-D25	8-D25	8-D25	5-D25
STIRRUPS	□-D12-@200	(4) □-D12-@200				
WEB BARS	2-D12	-				

SHALLOW SUMP



SEC

DRAINAGE



PROJECT	LOCATION	TITLE	DESIGNED BY : T. KURUMADA	DRG NO : AR-S12
THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	APAPA ROAD SUBSTATION	CONTROL BUILDING FOUNDATION GIRDER SCHEDULE	APPROVED BY : K. FUJII	DATE :
			CHECKED BY : K. ODA	SCALE : 1:50 (if only A3)
			CONSULTANTS :	

**COLUMN SCHEDULE** §=1/50

MARK	C1	C2	C3	C4	C5	C2A	C3	C4
SECTION (MF) Y ↑ X →								
B x D	900x1100	900x1100	600x600				600x600	
BARS	16-D25	24-D25	8-D25				8-D25	
HOOPS	D12-@100	D12-@100	D12-@100				D12-@100	
REMARKS	-	-	-				-	
SECTION (1F) Y ↑ X →								
B x D	900x1100	900x1100	600x600				600x600	500x500
BARS	16-D25	24-D25	8-D25				8-D25	8-D25
HOOPS	D12-@100	D12-@100	D12-@100				D12-@100	D12-@100
REMARKS	-	-	-				-	-
SECTION (BF) Y ↑ X →								
B x D	900x1100	900x1100	600x600				600x600	500x500
BARS	16-D25	24-D25	8-D25				8-D25	8-D25
HOOPS	D12-@100	D12-@100	D12-@100				D12-@100	D12-@100
REMARKS	-	-	-				-	-
SECTION (3F) Y ↑ X →								
B x D	900x1100	900x1100	600x600				600x600	500x500
BARS	16-D25	16-D25	8-D25				8-D25	8-D25
HOOPS	D12-@100	D12-@100	D12-@100				D12-@100	D12-@100
REMARKS	-	-	-				-	-

PROJECT

THE PROJECT FOR  
EMERGENCY REHABILITATION AND  
REINFORCEMENT OF  
LAGOS TRANSMISSION SUBSTATIONS

LOCATION

APAPA ROAD SUBSTATION

TITLE

CONTROL BUILDING  
COLUMN SCHEDULE

APPROVED BY :  
K. FUJII

CHECKED BY :  
K. ODA

DESIGNED BY :  
T. KURUMADA

DATE :

DRG NO. :  
AR-S13

SCALE :  
1:50  
(if only A3)

CONSULTANTS :  
**yoo** YACHIYO ENGINEERING CO., LTD. TOKYO, JAPAN

**COLUMN SCHEDULE** §=1/50  
UNLESS OTHERWISE NOTED  
SPREADER D10@1,000

MARK	G1		G2		G3	G4		G11		G12		G13
	END	CENTER	END	CENTER		ALL SEC.	END	CENTER	END	CENTER	END	
SECTION (MF)												
B x D	400x700		400x700			400x600	700x1200	700x1200	700x1200	700x1200	400x600	
TOP BARS	4/1-D25	4-D25	4/2-D25	4-D25		3-D25	7/1-D25	5-D25	5-D25	7/2-D25	3-D25	
BOT. BARS	4-D25	3-D25	4-D25	3-D25		3-D25	6-D25	6-D25	7-D25	6-D25	3-D25	
STIRRUPS	□-D12-@100	□-D12-@100	□-D12-@100	□-D12-@100		□-D12-@200	□-D12-@150	□-D12-@150	□-D12-@150	□-D12-@150	□-D12-@200	
WEB BARS	2-D12	2-D12	2-D12	2-D12		2-D12	3x2-D12	3x2-D12	3x2-D12	3x2-D12	2-D12	
POSITION	END	CENTER	END	CENTER		END	CENTER	END	CENTER	END	CENTER	END
SECTION (MF)												
B x D	550x700		550x700			400x600	500x900	500x900	500x900	550x700		
TOP BARS	5/4-D25	5-D25	5/4-D25	5-D25		4-D25	5-D25	3-D25	3-D25	5/3-D25		
BOT. BARS	5/4-D25	5-D25	5/4-D25	5-D25		3-D25	5-D25	5-D25	5-D25	5/3-D25		
STIRRUPS	□-D12-@100	□-D12-@100	□-D12-@100	□-D12-@100		□-D12-@100	□-D12-@200	□-D12-@200	□-D12-@200	□-D12-@100		
WEB BARS	2-D12	2-D12	2-D12	2-D12		2-D12	2x2-D12	2x2-D12	2x2-D12	2-D12		
POSITION	ALL SEC.	CENTER	END	CENTER		ALL SEC.	ALL SEC.	ALL SEC.	ALL SEC.	ALL SEC.		
SECTION (1F)												
B x D	400x700		400x700			400x600	400x700	400x700	400x600	400x600		
TOP BARS	3-D25	3-D25	4-D25	3-D25		3-D25	3-D25	3-D25	3-D25	3-D25		
BOT. BARS	3-D25	3-D25	3-D25	3-D25		3-D25	3-D25	3-D25	3-D25	3-D25		
STIRRUPS	□-D12-@200	□-D12-@200	□-D12-@150	□-D12-@150		□-D12-@200	□-D12-@200	□-D12-@200	□-D12-@200	□-D12-@150		
WEB BARS	2-D12	2-D12	2-D12	2-D12		2-D12	2-D12	2-D12	2-D12	2-D12		

PROJECT	LOCATION	TITLE	APPROVED BY :	CHECKED BY :	DESIGNED BY :	DATE :	DRG NO. :
THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	APAPA ROAD SUBSTATION	CONTROL BUILDING COLUMN SCHEDULE (1.)	K. FUJII	K. ODA	T. KURUMADA		AR-S14
CONSULTANTS :							SCALE :
yoo YACHIYO ENGINEERING CO., LTD. TOKYO, JAPAN							1:50 (f only A3)

UNLESS OTHERWISE NOTED  
SPREADER D10@1,000

**COLUMN SCHEDULE** §=1/50

MARK	G1		G2		G3		G4		G11		G12		G12A		G13	
	POSITION	ALL SEC.	ALL SEC.	ALL SEC.	ALL SEC.	ALL SEC.	ALL SEC.	ALL SEC.	END	CENTER	END	CENTER	END	CENTER	ALL SEC.	ALL SEC.
SECTION (RF)																
B x D	400x700	400x700	400x700	400x700	400x600	400x600	400x600	400x600	500x900	500x900	600x900	600x900	600x900	600x900	400x600	400x600
TOP BARS	3-D25	3-D25	3-D25	3-D25	3-D25	3-D25	3-D25	3-D25	5/1-D25	4-D25	6/4-D25	5-D25	5-D25	5-D25	3-D25	3-D25
BOT. BARS	3-D25	3-D25	3-D25	3-D25	3-D25	3-D25	3-D25	3-D25	5-D25	5-D25	6-D25	6-D25	6-D25	6-D25	3-D25	3-D25
STIRRUPS	□-D12-@200	□-D12-@200	□-D12-@200	□-D12-@200	□-D12-@200	□-D12-@200	□-D12-@200	□-D12-@200	□-D12-@150	□-D12-@150	□-D12-@150	□-D12-@150	□-D12-@150	□-D12-@150	□-D12-@200	□-D12-@200
WEB BARS	2-D12	2-D12	2-D12	2-D12	2-D12	2-D12	2-D12	2-D12	2x2-D12	2x2-D12	2x2-D12	2x2-D12	2x2-D12	2x2-D12	2-D12	2-D12
POSITION	ALL SEC.	ALL SEC.	ALL SEC.	CENTER	ALL SEC.	ALL SEC.	ALL SEC.	ALL SEC.	END	CENTER	END	CENTER	END	CENTER	ALL SEC.	ALL SEC.
SECTION (3F)																
B x D	400x700	400x700	400x700	400x700	400x600	400x600	400x600	400x600	600x1100	600x1100	600x1100	600x1100	600x1100	600x1100	400x600	400x600
TOP BARS	3-D25	4-D25	3-D25	3-D25	3-D25	3-D25	3-D25	3-D25	6-D25	4-D25	6/3-D25	5-D25	5-D25	5-D25	3-D25	3-D25
BOT. BARS	3-D25	3-D25	3-D25	3-D25	3-D25	3-D25	3-D25	3-D25	5-D25	5-D25	6-D25	6-D25	6-D25	6-D25	3-D25	3-D25
STIRRUPS	□-D12-@200	□-D12-@200	□-D12-@200	□-D12-@200	□-D12-@200	□-D12-@200	□-D12-@200	□-D12-@200	□-D12-@150	□-D12-@150	□-D12-@150	□-D12-@150	□-D12-@150	□-D12-@150	□-D12-@200	□-D12-@200
WEB BARS	2-D12	2-D12	2-D12	2-D12	2-D12	2-D12	2-D12	2-D12	2x2-D12	2x2-D12	2x2-D12	2x2-D12	2x2-D12	2-D12	2-D12	2-D12
POSITION	ALL SEC.	ALL SEC.	ALL SEC.	ALL SEC.	ALL SEC.	ALL SEC.	ALL SEC.	ALL SEC.	END	CENTER	END	CENTER	END	CENTER	ALL SEC.	ALL SEC.
SECTION (2F)																
B x D	400x700	400x700	400x700	400x700	400x600	400x600	400x600	400x600	700x1200	700x1200	500x1200	500x1200	500x1200	700x1200	400x600	400x600
TOP BARS	4-D25	4-D25	3-D25	3-D25	3-D25	3-D25	3-D25	3-D25	7/1-D25	5-D25	5/5-D25	5-D25	5-D25	7/5-D25	3-D25	3-D25
BOT. BARS	3-D25	3-D25	3-D25	3-D25	3-D25	3-D25	3-D25	3-D25	5-D25	7-D25	5/2-D25	5/2-D25	5/2-D25	7/3-D25	3-D25	3-D25
STIRRUPS	□-D12-@200	□-D12-@100	□-D12-@200	□-D12-@100	□-D12-@200	□-D12-@200	□-D12-@200	□-D12-@200	□-D12-@150	□-D12-@150	□-D12-@150	□-D12-@150	□-D12-@150	□-D12-@100	□-D12-@200	□-D12-@200
WEB BARS	2-D12	2-D12	2-D12	2-D12	2-D12	2-D12	2-D12	2-D12	3x2-D12	3x2-D12	3x2-D12	3x2-D12	3x2-D12	3x2-D12	2-D12	2-D12

PROJECT	LOCATION	TITLE	APPROVED BY :	CHECKED BY :	DESIGNED BY :	DATE :	DRG NO :
THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	APAPA ROAD SUBSTATION	CONTROL BUILDING COLUMN SCHEDULE (2)	K. FUJII	K. ODA	T. KURUMADA		AR-S15
CONSULTANTS :							SCALE :
yoo YACHIYO ENGINEERING CO., LTD. TOKYO, JAPAN							1:50 (if only A3)

**BEAM SCHEDULE** 5-1/50  
UNLESS OTHERWISE NOTED  
SPREADER D10@1,000

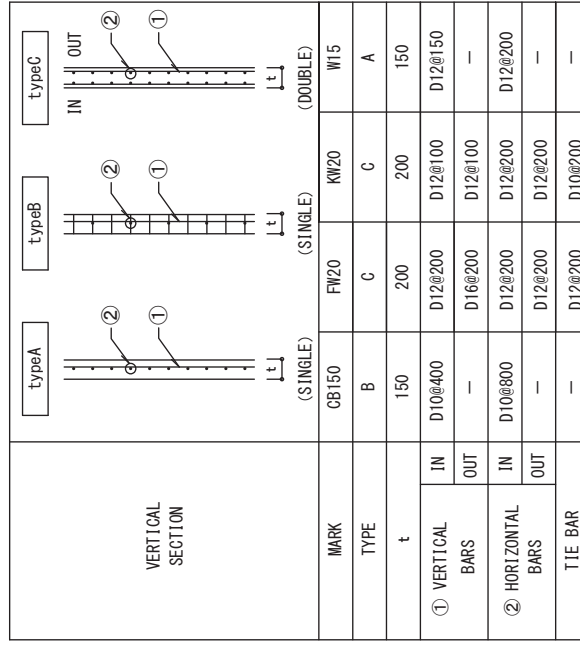
MARK	B1	B2	B3	B4	B5	B6	B7
POSITION	CB1, SIDE END	CENTER, B2 SIDE END	ALL SEC.	END	2, 4SIDE END	CENTER	ALL SEC.
SECTION							
B x D	300x800	300x800	300x500	300x500	300x500	300x500	300x550
TOP BARS	4/2-D22	3-D22	3-D22	3-D22	3-D22	3-D22	3-D22
BOT. BARS	3-D22	3-D22	3-D22	3-D22	3-D22	3-D22	3-D22
STIRRUPS	□ -D10-@200	□ -D10-@200	□ -D10-@200	□ -D10-@200	□ -D12-@150	□ -D12-@150	□ -D12-@200
WEB BARS	2-D10	2-D10	-	-	-	-	2-D10

**WALL SCHEDULE**

MARK	CB1	CB2	CB3	CB4	CB5
POSITION	ROOT END	TIP END	ROOT END	TIP END	ALL SEC.
SECTION					
B x D	300x800	300x800	400x700	400x700	500x700
TOP BARS	4/2-D22	3-D22	4/2-D25	3-D25	5-D22
BOT. BARS	3-D22	3-D22	4-D25	3-D25	3-D22
STIRRUPS	□ -D10-@200	□ -D10-@200	□ -D12-@200	□ -D12-@200	□ -D12-@200
WEB BARS	2-D10	2-D10	2-D10	2-D10	2-D10

**SLAB SCHEDULE**

MARK	t	SHORT-SECTION			LONG-SECTION		
		SIDE AREA	CENTER AREA	SIDE AREA	CENTER AREA	CENTER AREA	
S1	150	TOP BARS	D10@200	↑	D10@200	↑	↑
		BOT. BARS	D10@200	↑	D10@200	↑	↑
S2	150	TOP BARS	D10+D12@200	↑	D10@200	↑	↑
		BOT. BARS	D10+D12@200	↑	D10@200	↑	↑
S3	150	TOP BARS	D12@200	↑	D12@200	↑	↑
		BOT. BARS	D10+D12@200	↑	D10+D12@200	↑	↑
S4	150	TOP BARS	D12@150	↑	D12@200	↑	↑
		BOT. BARS	D12@150	↑	D12@200	↑	↑
S5	150	TOP BARS	D12@150	↑	D12@150	↑	↑
		BOT. BARS	D12@150	↑	D12@150	↑	↑



PROJECT

THE PROJECT FOR  
EMERGENCY REHABILITATION AND  
REINFORCEMENT OF  
LAGOS TRANSMISSION SUBSTATIONS

LOCATION

APAPA ROAD SUBSTATION

CONTROL BUILDING  
SLAB, BEAM, WALL SCHEDULE

TITLE

APPROVED BY :  
K. FUJII

CHECKED BY :  
K. ODA


DESIGNED BY :  
T. KURUMADA

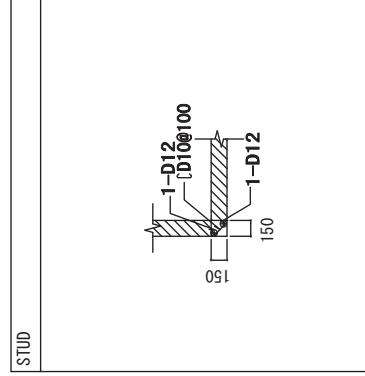
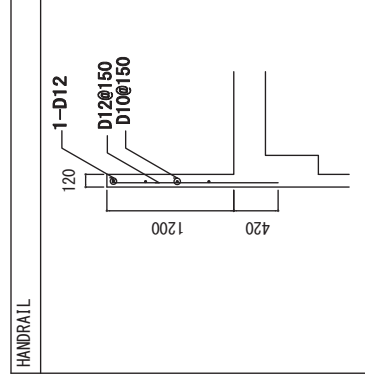
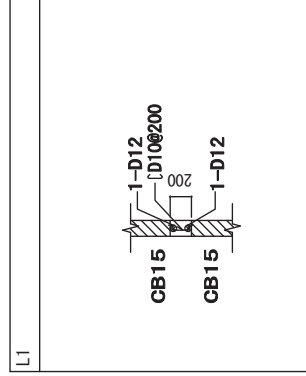
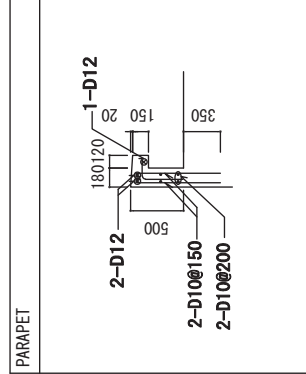
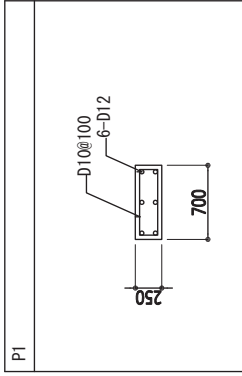
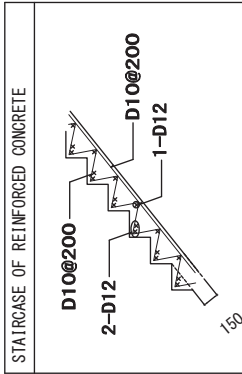
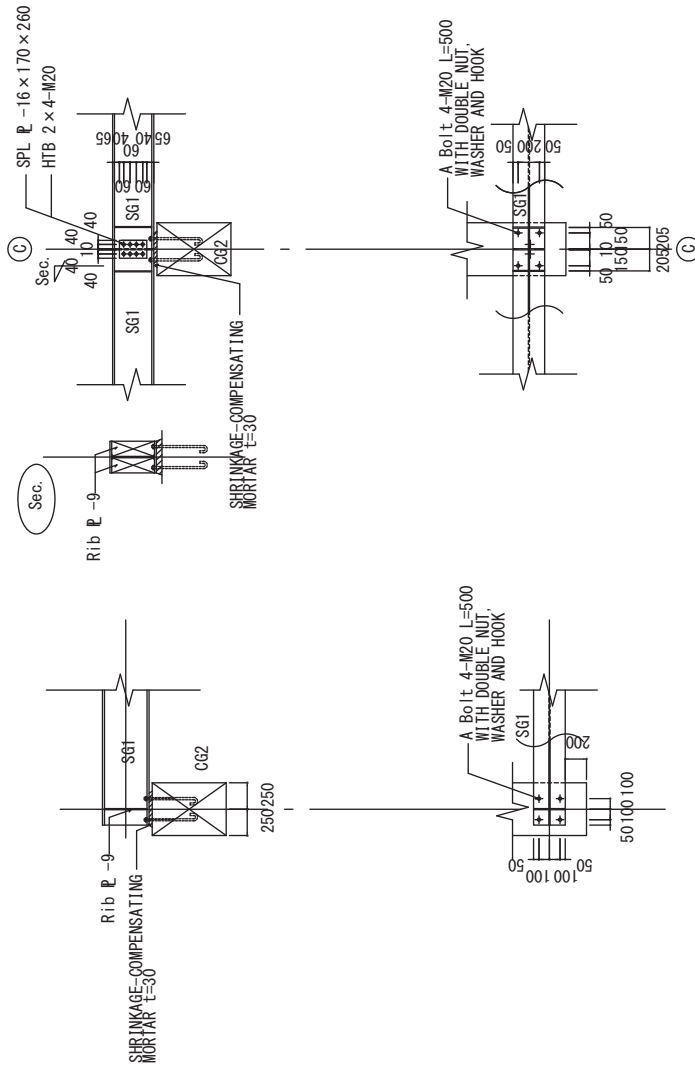
DATE :

DRG NO :  
AR-S16

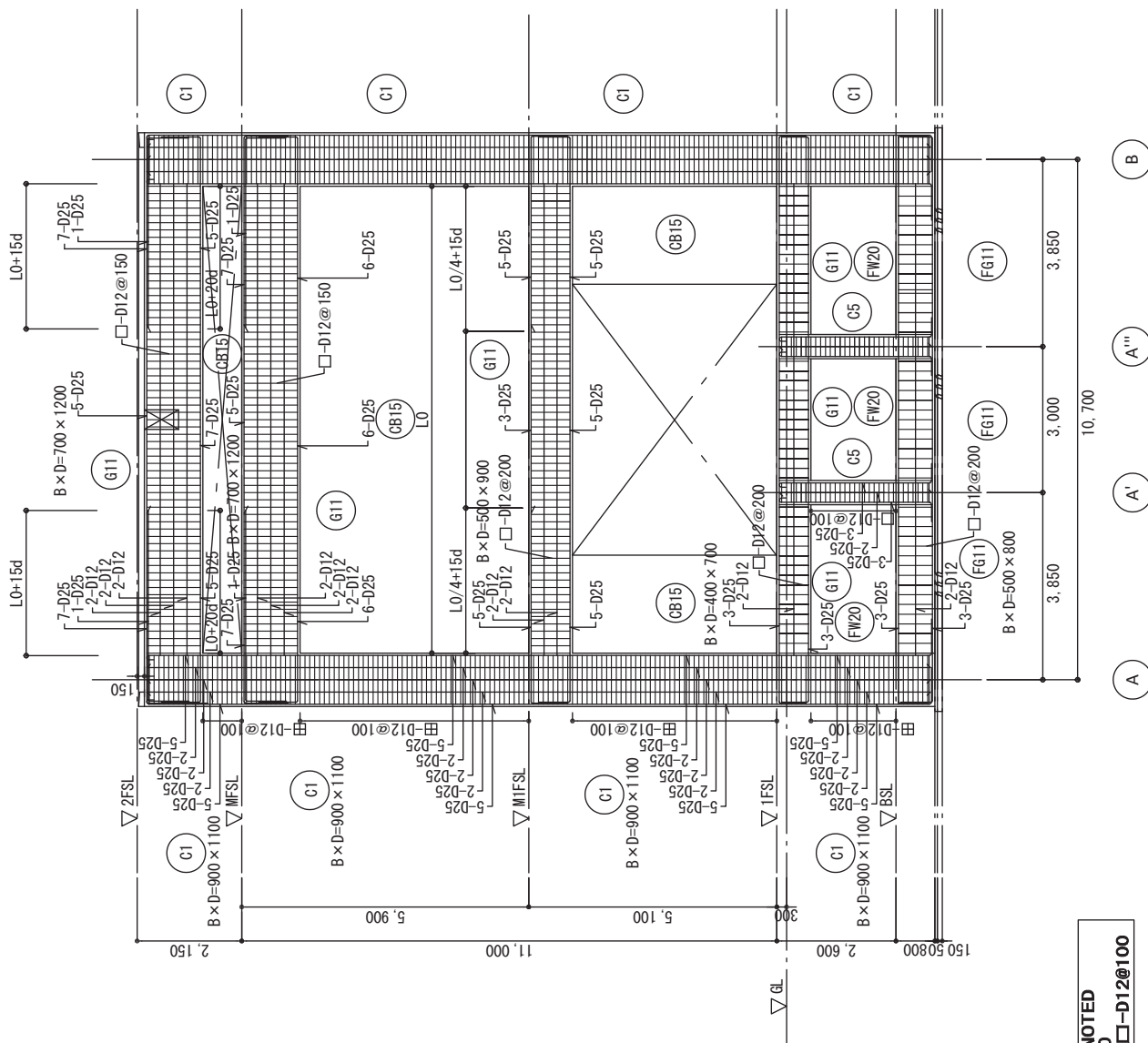
SCALE :  
1:50  
(f only A3)

CONSULTANTS:  
**yoo** YACHIYO ENGINEERING CO., LTD. TOKYO, JAPAN

STEEL MEMBER LIST
SG1 H390×300×10×16 (SS400)
 Rib ϕ -9@2000



PROJECT	LOCATION	TITLE	APPROVED BY : K. FUJII	CHECKED BY : K. ODA	DESIGNED BY : T. KURUMADA	DATE :	DRG NO : AR-S17
THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	APAPA ROAD SUBSTATION	CONTROL BUILDING DETAIL OF RUNWAY GIRDER	CONSULTANTS:  YEO		SCALE : 1:50 (if only A3)		

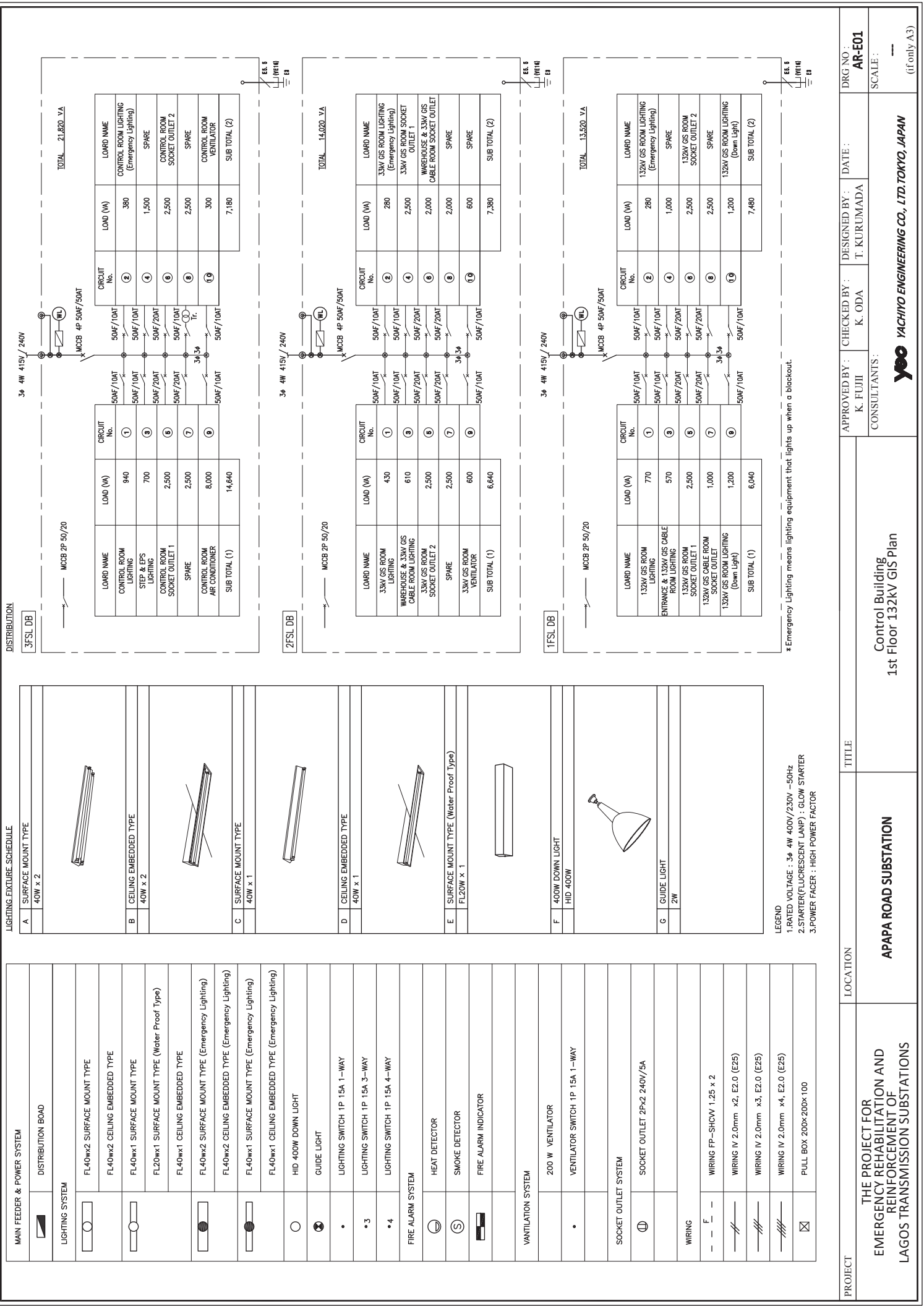


**1 LINE FRAMING DETAIL s=1/100**

**UNLESS OTHERWISE NOTED**  
 1. SPREADER D10@1,000  
 2. PANEL ZONE HOOP □-D12@100

PROJECT	LOCATION	TITLE	APPROVED BY: K. FUJII	CHECKED BY: K. ODA	DESIGNED BY: T. KURUMADA	DATE:	DRG NO.: AR-S18
EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	APAPA ROAD SUBSTATION	CONTROL BUILDING 1. LINE FRAMING DETAIL	CONSULTANTS: <b>YEO</b> YACHIO ENGINEERING CO., LTD. TOKYO, JAPAN		SCALE: 1:100 (f only A3)		





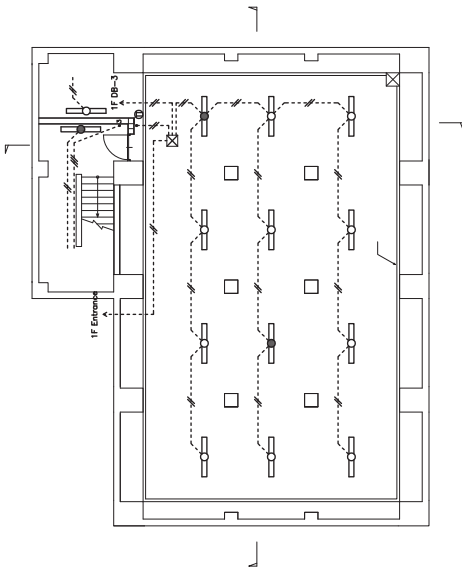
**LIGHTING FIXTURE SCHEDULE**

A	SURFACE MOUNT TYPE	40W x 2	
B	CEILING EMBEDDED TYPE	40W x 2	
C	SURFACE MOUNT TYPE	40W x 1	
D	CEILING EMBEDDED TYPE	40W x 1	
E	SURFACE MOUNT TYPE (Water Proof Type)	FL20W x 1	
F	400W DOWN LIGHT	HID 400W	
G	GUIDE LIGHT	2W	

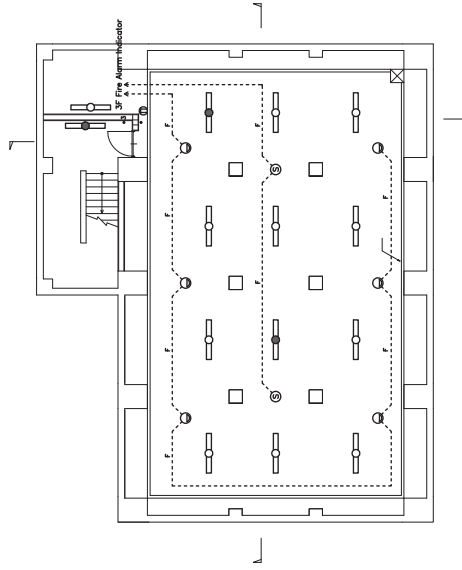
**LEGEND**  
 1. RATED VOLTAGE : 3Φ 4W 400V/230V -50Hz  
 2. STARTER(FLUORESCENT LAMP) : GLOW STARTER  
 3. POWER FACER : HIGH POWER FACTOR

<b>MAIN FEEDER &amp; POWER SYSTEM</b>		LOCATION	TITLE
DISTRIBUTION BOARD		APAPA ROAD SUBSTATION	Control Building 1st Floor 132KV GIS Plan
LIGHTING SYSTEM			
FL40wx2 SURFACE MOUNT TYPE		THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	DRG NO : <b>AR-E01</b> SCALE : ---
FL40wx2 CEILING EMBEDDED TYPE			
FL40wx1 SURFACE MOUNT TYPE			
FL20wx1 SURFACE MOUNT TYPE (Water Proof Type)			
FL40wx1 CEILING EMBEDDED TYPE			
FL40wx2 SURFACE MOUNT TYPE (Emergency Lighting)			
FL40wx2 CEILING EMBEDDED TYPE (Emergency Lighting)			
FL40wx1 SURFACE MOUNT TYPE (Emergency Lighting)			
FL40wx1 CEILING EMBEDDED TYPE (Emergency Lighting)			
HID 400W DOWN LIGHT			
GUIDE LIGHT			
LIGHTING SWITCH 1P 15A 1-WAY			
LIGHTING SWITCH 1P 15A 3-WAY			
LIGHTING SWITCH 1P 15A 4-WAY			
* 3			
* 4			
FIRE ALARM SYSTEM			
HEAT DETECTOR			
SMOKE DETECTOR			
FIRE ALARM INDICATOR			
VENTILATION SYSTEM			
200 W VENTILATOR			
VENTILATOR SWITCH 1P 15A 1-WAY			
•			
SOCKET OUTLET SYSTEM			
SOCKET OUTLET 2Px2 240V/15A			
WIRING			
---	WIRING FP-SHOW 1.25 x 2		
---	WIRING IV 2.0mm x2, E2.0 (E25)		
---	WIRING IV 2.0mm x3, E2.0 (E25)		
---	WIRING IV 2.0mm x4, E2.0 (E25)		
☒	PULL BOX 200x200x100		

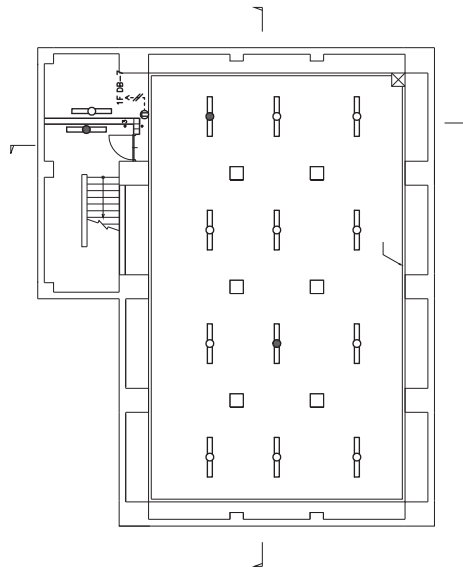
APPROVED BY : K. FUJII  
 CHECKED BY : K. ODA  
 DESIGNED BY : T. KURUMADA  
 DATE :  
 DRG NO : **AR-E01**  
 SCALE : ---  
 (if only A3)  
**YEO YACHIOY ENGINEERING CO., LTD. TOKYO, JAPAN**



Lighting

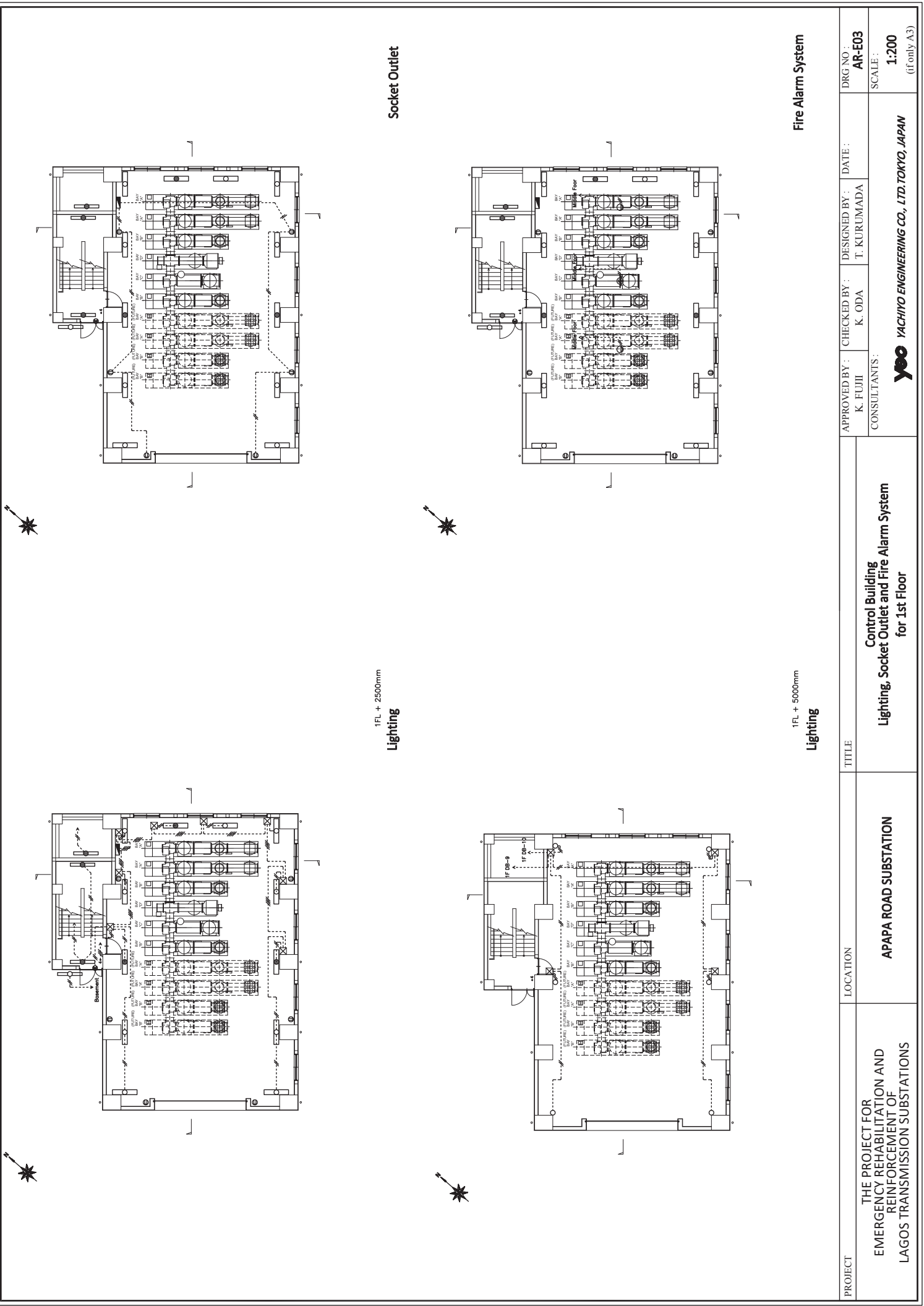


Fire Alarm System



Socket Outlet

PROJECT THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	LOCATION APAPA ROAD SUBSTATION	TITLE Control Building Lighting, Socket Outlet and Fire Alarm System for Basement	APPROVED BY : K. FUJII CONSULTANTS : <b>yoo</b> YACHIYO ENGINEERING CO., LTD. TOKYO, JAPAN CHECKED BY : K. ODA DESIGNED BY : T. KURUMADA DATE : DRG NO : <b>AR-E02</b> SCALE : <b>1:200</b> (if only A3)
--	-----------------------------------	--	---



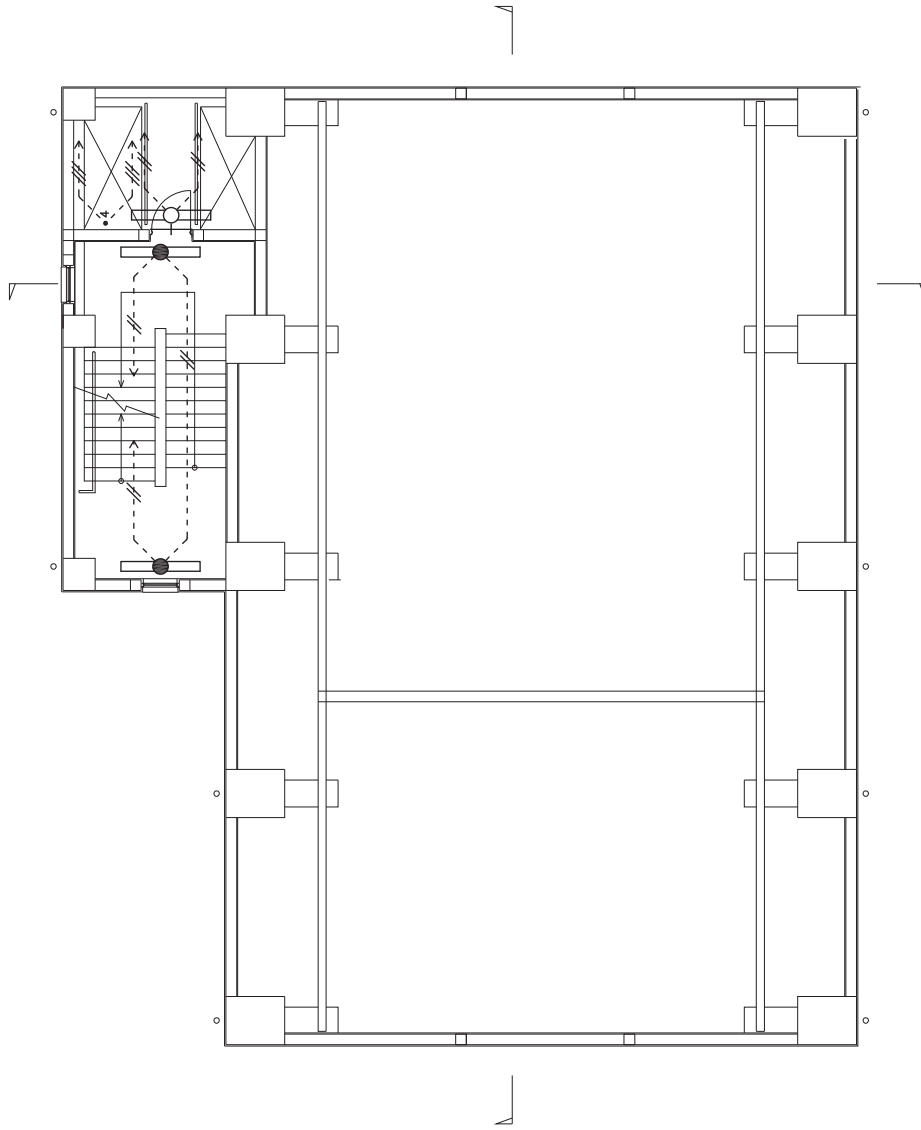
Socket Outlet

1FL + 2500mm  
Lighting

Fire Alarm System

1FL + 5000mm  
Lighting

PROJECT THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	LOCATION APAPA ROAD SUBSTATION	TITLE Control Building Lighting, Socket Outlet and Fire Alarm System for 1st Floor				APPROVED BY : K. FUJII	CHECKED BY : K. ODA	DESIGNED BY : T. KURUMADA	DATE :	DRG NO : AR-E03
	CONSULTANTS: <b>yoo</b> YACHIYO ENGINEERING CO., LTD. TOKYO, JAPAN									SCALE : 1:200 (if only A3)



PROJECT

THE PROJECT FOR  
EMERGENCY REHABILITATION AND  
REINFORCEMENT OF  
LAGOS TRANSMISSION SUBSTATIONS

LOCATION

APAPA ROAD SUBSTATION

TITLE

Control Building  
Lighting for Middle 1st Floor Plan

APPROVED BY :

K. FUJII

CONSULTANTS :



YACHIYO ENGINEERING CO., LTD. TOKYO, JAPAN

CHECKED BY :

K. ODA

DESIGNED BY :

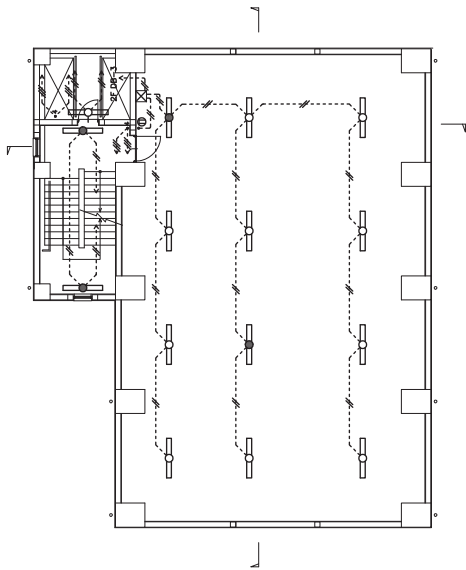
T. KURUMADA

DATE :

DRG NO :  
**AR-E04**

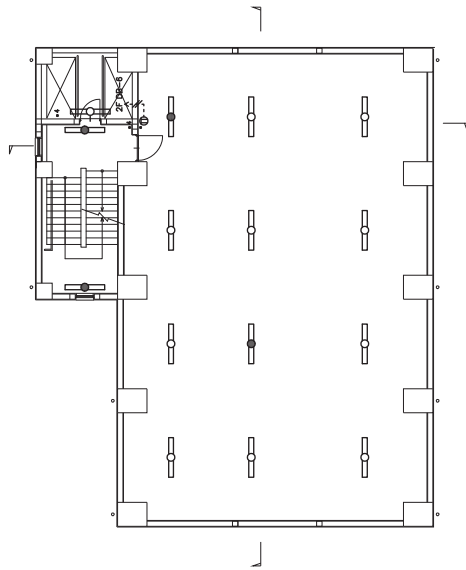
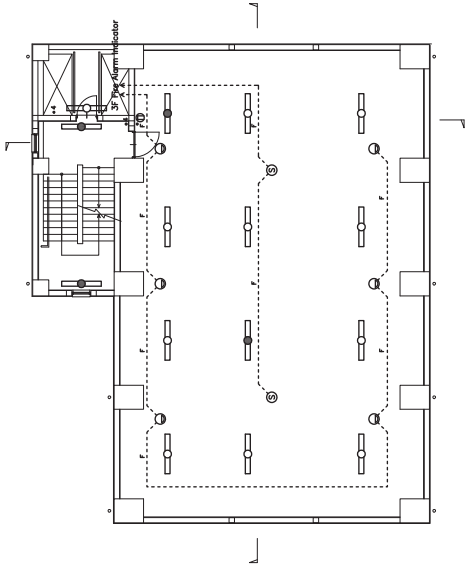
SCALE :

**1:100**  
(f only A3)




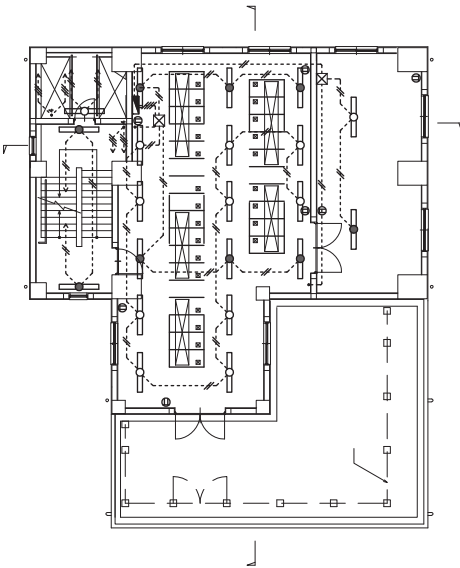
Lighting

Fire Alarm System

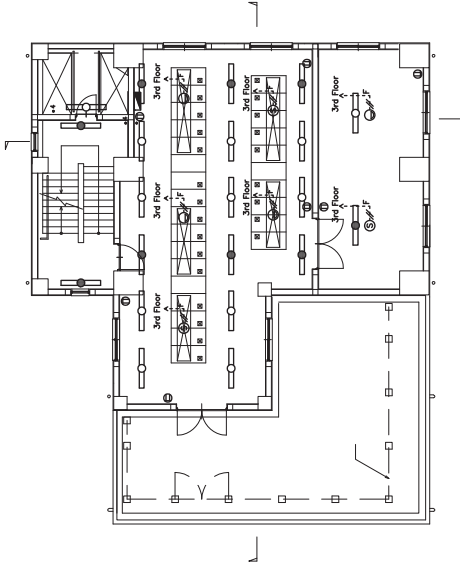


Socket Outlet

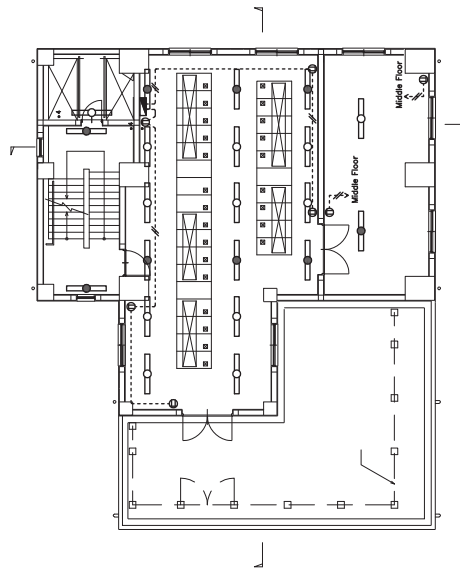
PROJECT	LOCATION	TITLE	APPROVED BY : K. FUJII	CHECKED BY : K. ODA	DESIGNED BY : T. KURUMADA	DATE :	DRG NO : <b>AR-E05</b>
THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	APAPA ROAD SUBSTATION	Control Building Lighting, Socket Outlet and Fire Alarm System for Middle Floor	CONSULTANTS:  <b>YEO</b> YACHIYO ENGINEERING CO., LTD. TOKYO, JAPAN		SCALE : <b>1:200</b> (if only A3)		



Lighting

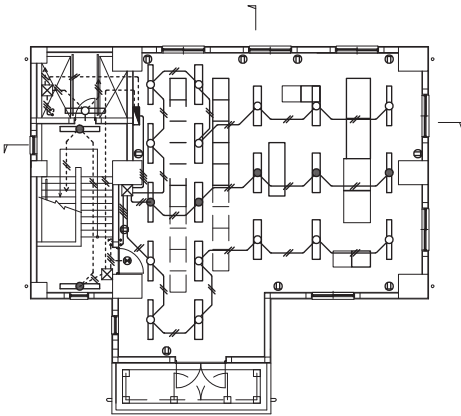


Fire Alarm System



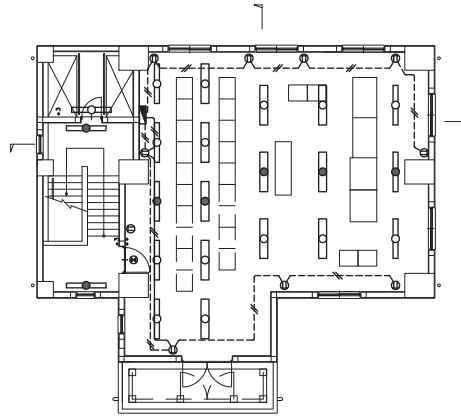
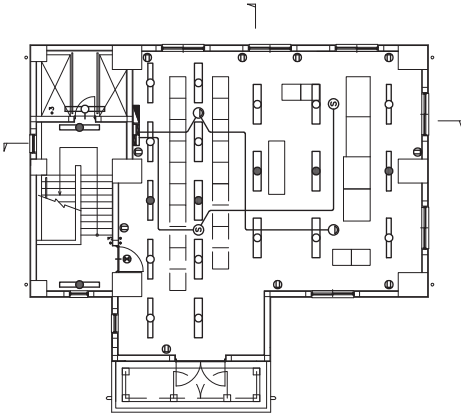
Socket Outlet

PROJECT THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	LOCATION APAPA ROAD SUBSTATION	TITLE Control Building Lighting, Socket Outlet and Fire Alarm System for 2nd Floor	APPROVED BY : K. FUJII CHECKED BY : K. ODA DESIGNED BY : T. KURUMADA DATE : DRG NO : AR-E06 SCALE : 1:200 (f only A3)
--	-----------------------------------	---	--




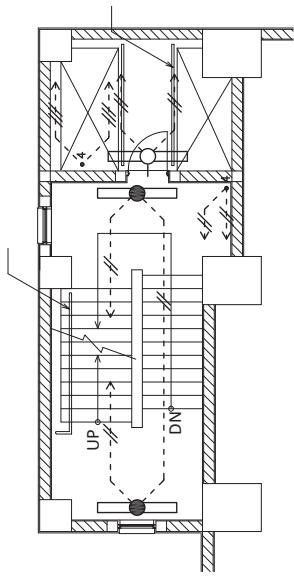
Lighting

Fire Alarm System

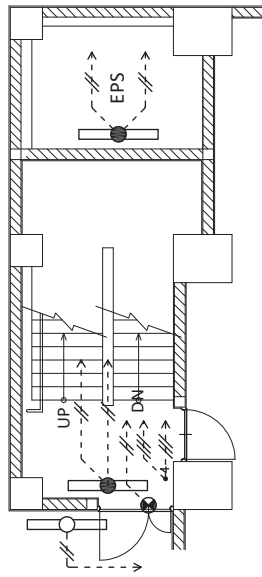


Socket Outlet

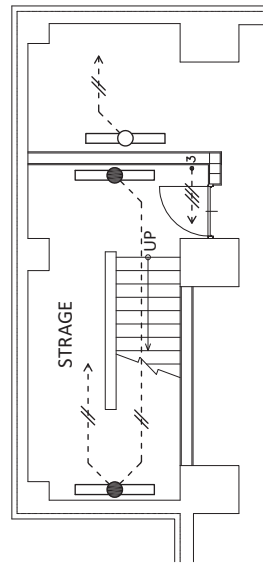
PROJECT THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	LOCATION APAPA ROAD SUBSTATION	TITLE Control Building Lighting, Socket Outlet and Fire Alarm System for 3rd Floor	APPROVED BY : K. FUJII CONSULTANTS :  YACHIO ENGINEERING CO., LTD. TOKYO, JAPAN	DRG NO : AR-E07 SCALE : 1:200 (if only A3)
--	-----------------------------------	---	---	--



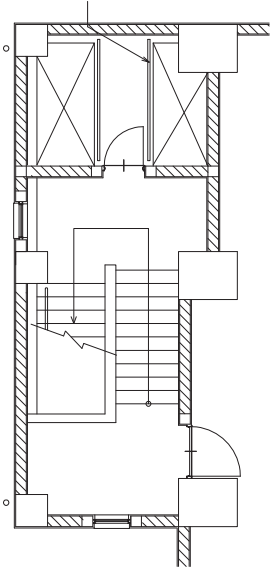
MIDDLE 1st FLOOR PLAN



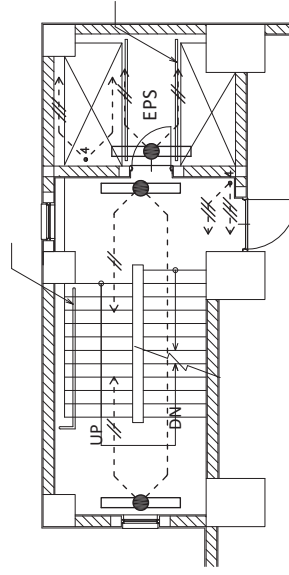
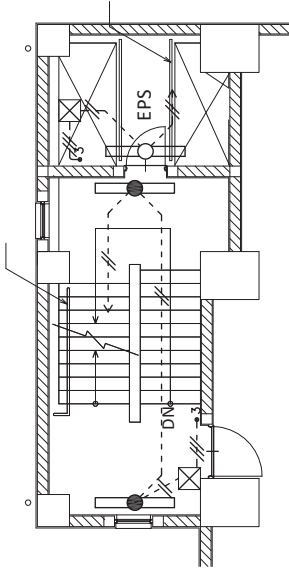
1st FLOOR PLAN



BEASEMENT PLAN



3rd FLOOR PLAN

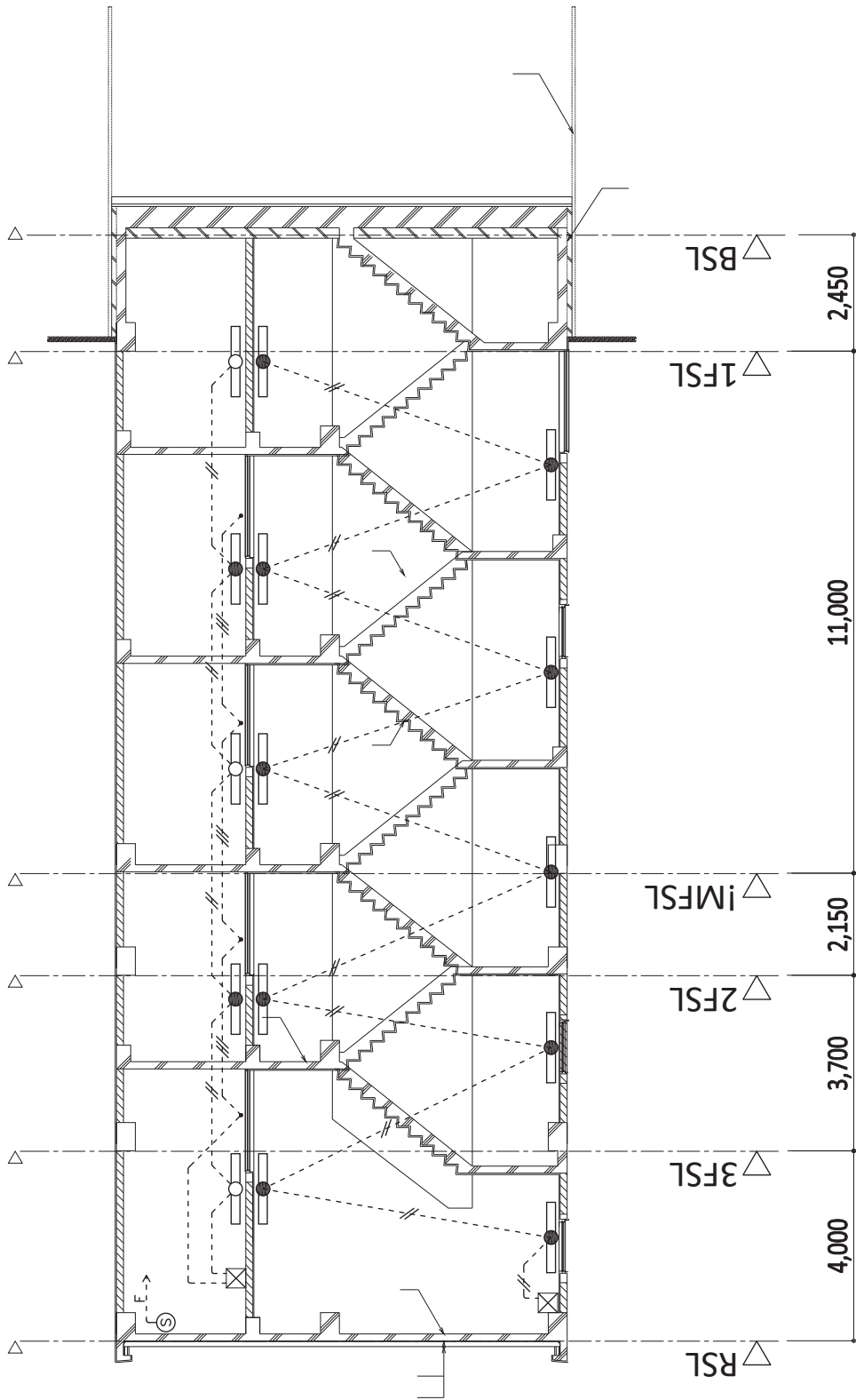


2nd FLOOR PLAN

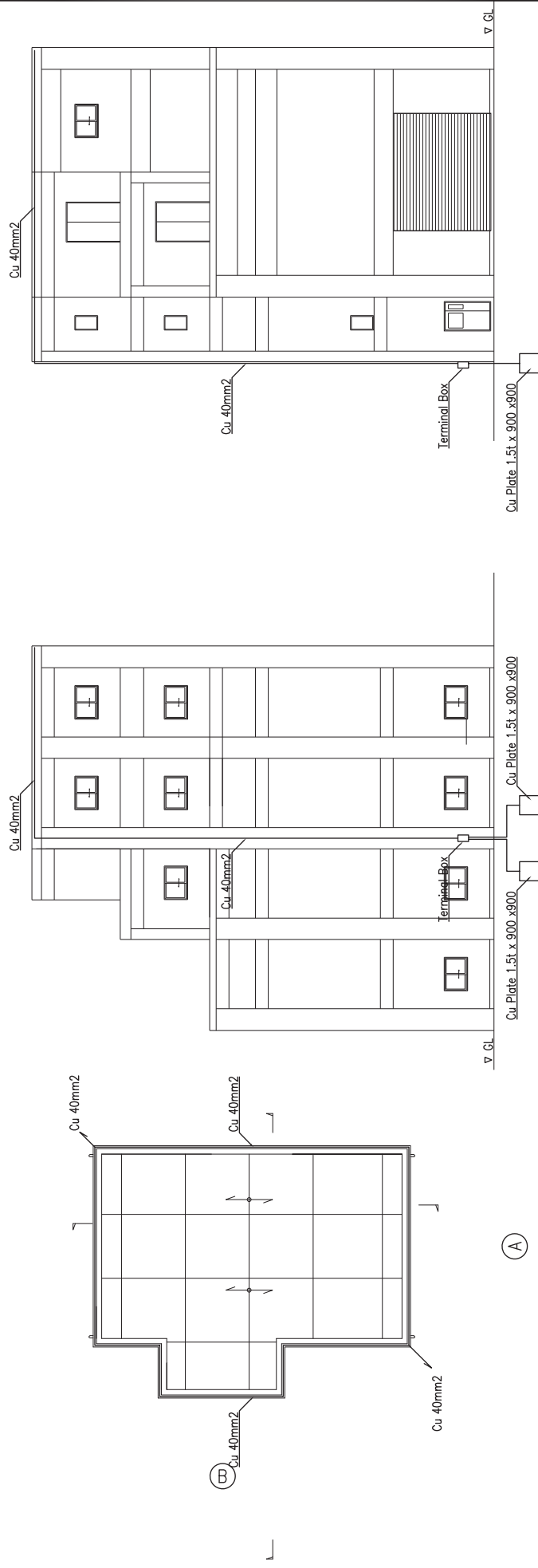
Control Building  
Lighting for Stair and EPS Plan

PROJECT THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	LOCATION APAPA ROAD SUBSTATION	TITLE Control Building Lighting for Stair and EPS Plan	APPROVED BY : K. FUJII CONSULTANTS : <b>yoo</b> YACHIO ENGINEERING CO., LTD. TOKYO, JAPAN	CHECKED BY : K. ODA DESIGNED BY : T. KURUMADA	DATE : DRG NO : AR-E08 SCALE : 1:100 (f only A3)
--	-----------------------------------	--	--	--	---






PROJECT	TITLE	LOCATION	DRG NO : <b>AR-E09</b>
THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	Control Building Lighting and Fire Alarm System for Stair Plan	APAPA ROAD SUBSTATION	SCALE : <b>1:100</b> (if only A3)
APPROVED BY : K. FUJII	DESIGNED BY : T. KURUMADA	YEO YACHIO ENGINEERING CO., LTD. TOKYO, JAPAN	CHECKED BY : K. ODA
DATE :	CONSULTANTS :		DATE :

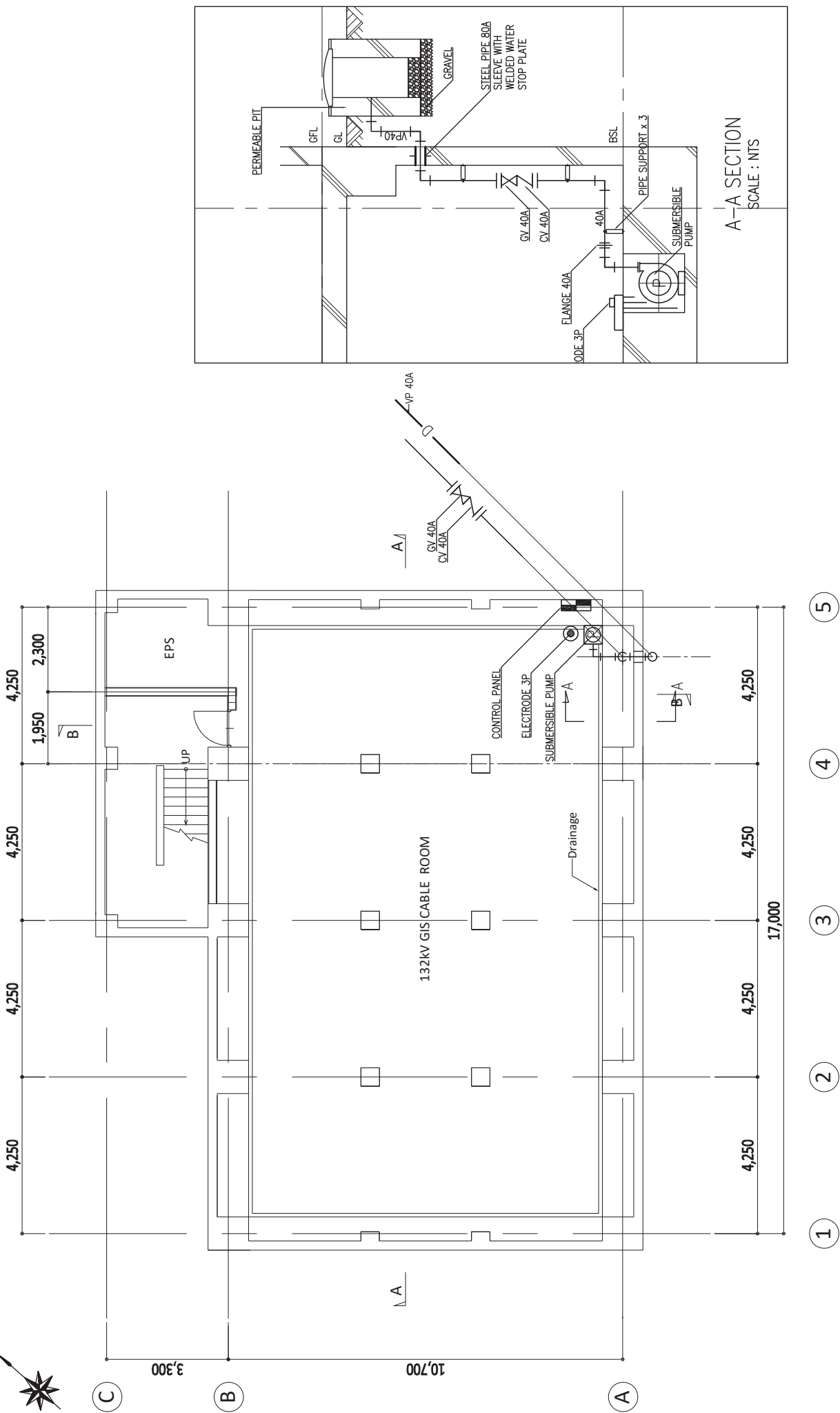


Roof Plan

View A

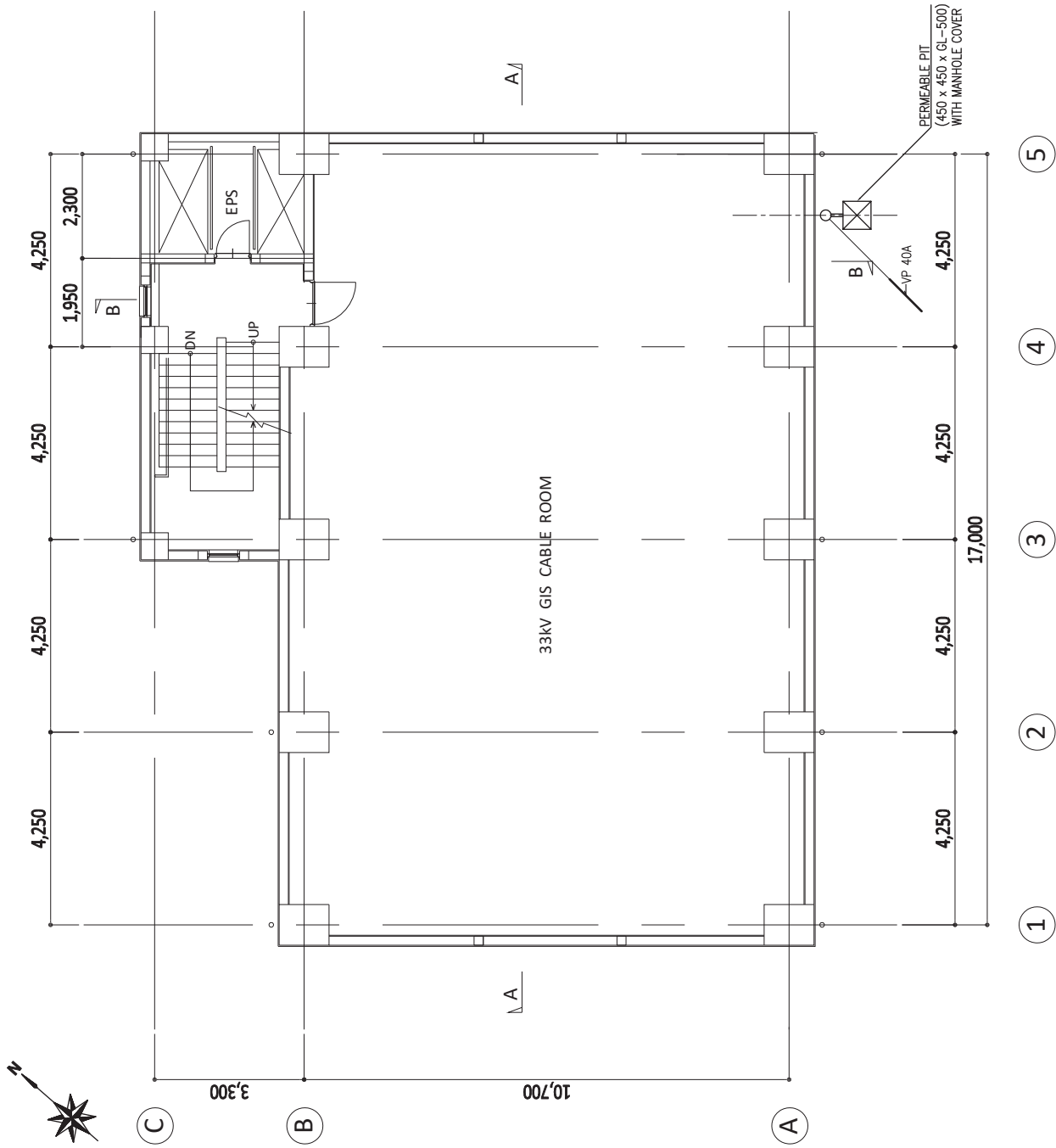
View B

PROJECT THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	LOCATION APAPA ROAD SUBSTATION	TITLE Control Building Lightning Protection	APPROVED BY : K. FUJII CONSULTANTS :  YACHIO ENGINEERING CO., LTD. TOKYO, JAPAN	DRG NO : AR-E10 SCALE : 1:200 (f only A3)
		CHECKED BY : K. ODA	DESIGNED BY : T. KURUMADA	DATE :

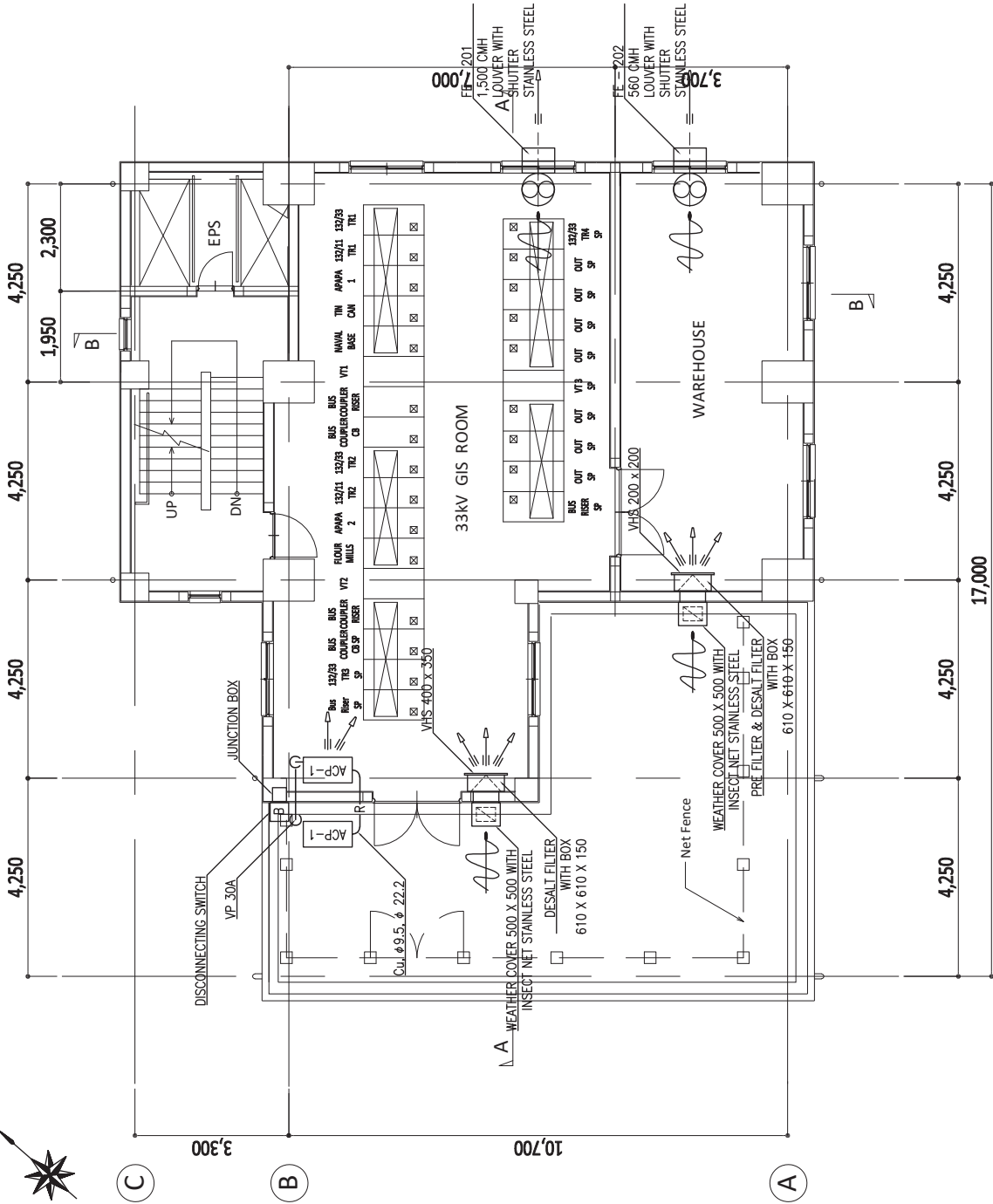


- 1
- 2
- 3
- 4
- 5

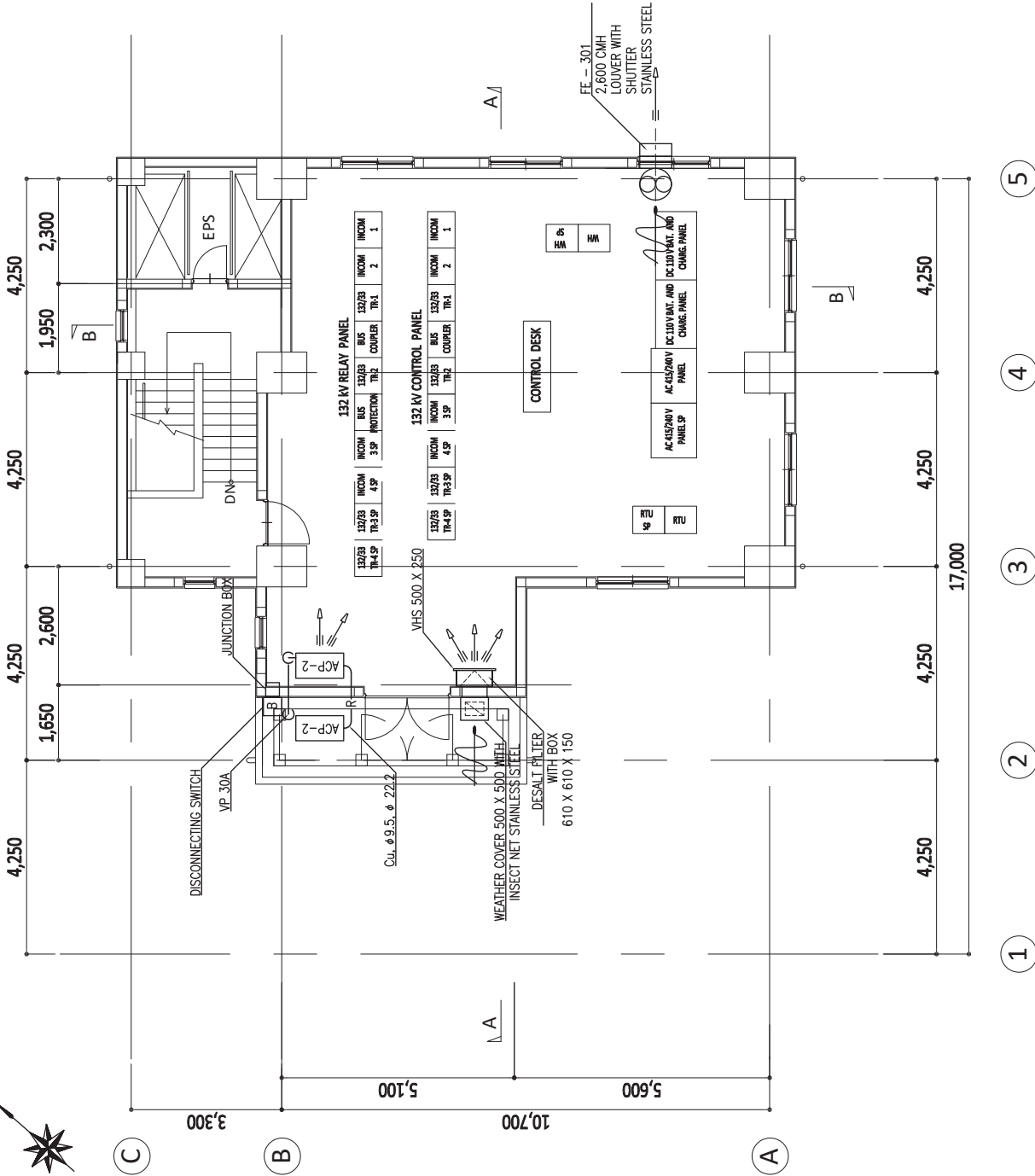
PROJECT EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	LOCATION APAPA ROAD SUBSTATION	TITLE Control Building Drainage System of Basement Plan	APPROVED BY : DESIGNED BY : CHECKED BY :	DATE :
			DRG NO : <b>AR-M01</b>	SCALE : <b>1:100</b> (f only A3)
			CONSULTANTS: <b>YACHIO ENGINEERING CO., LTD. TOKYO, JAPAN</b>	



PROJECT	LOCATION	TITLE	APPROVED BY :	CHECKED BY :	DESIGNED BY :	DATE :	DRG NO :	AR-M02
THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	APAPA ROAD SUBSTATION	Control Building of Drainage System of Outward	SCALE :	CONSULTANTS :	YEO YACHIO ENGINEERING CO., LTD. TOKYO, JAPAN	SCALE :	1:100	(f only A3)



<b>PROJECT</b> THE PROJECT FOR EMERGENCY REHABILITATION AND REINFORCEMENT OF LAGOS TRANSMISSION SUBSTATIONS	<b>LOCATION</b> APAPA ROAD SUBSTATION	<b>TITLE</b> Control Building Ventilation System of 2nd Floor	<b>APPROVED BY :</b>  <b>CHECKED BY :</b>  <b>DESIGNED BY :</b>  <b>DATE :</b>	<b>DRG NO. :</b> <b>AR-M03</b>  <b>SCALE :</b> <b>1:100</b> (f only A3)
<b>CONSULTANTS :</b> <b>YACHIO ENGINEERING CO., LTD. TOKYO, JAPAN</b>				



PROJECT

THE PROJECT FOR  
EMERGENCY REHABILITATION AND  
REINFORCEMENT OF  
LAGOS TRANSMISSION SUBSTATIONS

LOCATION

APAPA ROAD SUBSTATION

TITLE

Control Building  
Air Condition and Ventilation System of  
3rd Floor

APPROVED BY :

CHECKED BY :

DESIGNED BY :

DATE :

DRG NO :  
**AR-M04**

SCALE :  
**1:100**  
(if only A3)

CONSULTANTS :

**yoo** YACHIO ENGINEERING CO., LTD. TOKYO, JAPAN

## **A-6 Topographical Survey Report**

## TOPOGRAPHIC SURVEY REPORT

### APAPA ROAD SUBSTATION LAGOS STATE



**SURVEYED AND SUBMITTED**

BY

**Ψ PENGATE GLOBAL SERVICES LTD**

**(REGISTERED SURVEYORS)**  
SURVEYING, & GEONFORMATICS CONSULTANTS

TEL: - 08038592726 ,07082742542  
Email Address:  
[joeama2002@yahoo.com](mailto:joeama2002@yahoo.com)

**INTERNATIONAL OFFICE:**  
PENGATE GLOBAL SERVICES LTD  
Keruj O2 Mall and Champagne Lounge Suite C03,  
Near Games Village, Kaura District, Abuja

**AUGUST 2017**



# Survey Report of Apapa Road Substation

## Contents

<b>1.0 Background</b> .....	3
<b>2.0 Introduction</b> .....	3
<b>3.0 Scope of Work.</b> .....	3
<b>4.0 Methodology</b> .....	4
<b>5.0 Detailing</b> .....	6
<b>6.0 Conclusion</b> .....	7

## List of Figures

<b>Figure 1: Enclosed Boundary of Apapa Road Substation</b> .....	4
<b>Figure 2: Rover Receiver configuration</b> .....	5
<b>Figure 3: Detailing and capturing of terrain data.</b> .....	6
<b>Figure 4: Detailing of some features on project site</b> .....	7

**APPENDIX A: SAMPLE LIST OF COORDINATES**

**APPENDIX B: TOPOGRAPHIC MAP OF APAPA ROAD SUBSTATION**

## Survey Report of Apapa Road Substation

### 1.0 Background

The location of the project site is Apapa Road in the Apapa Local Government Area, Lagos State.

### 2.0 Introduction

Topographic map is a cartographic representation of the various features of the earth surface at a level of detail or scale intermediate between that of a plan. Within the limits of scale, it shows as accurately as possible the location and shape of both natural and man-made features; the former (natural) including relief, hydrographic features or any features characterizing the subject area; while the later (man-made) including populated places (cities, town, villages etc.), transportation infrastructure (roads, railroads etc.) and other features such as dams, bridges, tunnels etc. The need for three – dimensional geospatial information is inevitable when it comes to the issues of Power Generation and Transmission and allocating site for expansion. Therefore, there is need to provide Topographic Information System for the project site in question.

### 3.0 Scope of Work.

The scope of work involves Topographical Survey of Apapa Road substation

- a. To determine the size and the direction of the boundary line of the substation.
- b. To determine the Topography of the terrain.
- c. To determine the location of all Towers, Transformers, Gantries, and all the equipment support in the 132 KV and 33 KV switch yards. Also, all buildings and other man – made features in the Sub – station in order to have fair knowledge of the vacant areas within the sub – station.

## Survey Report of Apapa Road Substation

The objective of the detailed topographic survey of Apapa Substation is to determine the 3D Coordinates (X, Y, and Z) at 10m grid interval within the substation. The survey involves the data capture of all permanent features including roads, control rooms and offices, GIS building 132KV Towers and Gantries, 33KV towers and equipment supports, Transformers, switch yards fire walls. The Topographic detailed survey covers an area of - **3177.818sqm**



**Figure 1: Enclosed Boundary of Apapa Road Substation**

### 4.0 Methodology

Differential Global Positioning System was used to observe direct coordinates of points. With the use of a dual frequency, 220 channel Hi-Target GNSS receivers which is capable of tracking the American Satellites-GPS and the Russian Satellites-GLONASS, with centimeter accuracy, data was captured in 3-dimension i.e. X, Y and Z.

## Survey Report of Apapa Road Substation

Since the control points had been checked and their reliability ensured, the base receiver (also known as Reference) was set on the Control Point. The Rover GPS receiver was switched on and set up. The “survey” icon on the data logger was selected and then the station parameters was set by entering pillar identification value, and the receiver’s antenna height through the data logger. The verticality of the tracking rod carrying the rover receiver was ensured by checking the plumb (circular bubble attached to the tracking rod). The rover was taken to the first boundary point, and all necessary data such as the point identification value and codes were keyed in. The coordinate data were captured in 3-dimension i.e. X, Y and Z. The process was repeated at each boundary pillar until all boundary points were captured. Using the GNSS in the RTK Mode enables the levels to be determined at any arbitrary point within the substation. All data were captured in NIGERIA NATIONAL GRID MINNA DATUM UTM ZONE 31 as required by the Surveyors Council of Nigeria (SURCON) for all survey works in Nigeria.

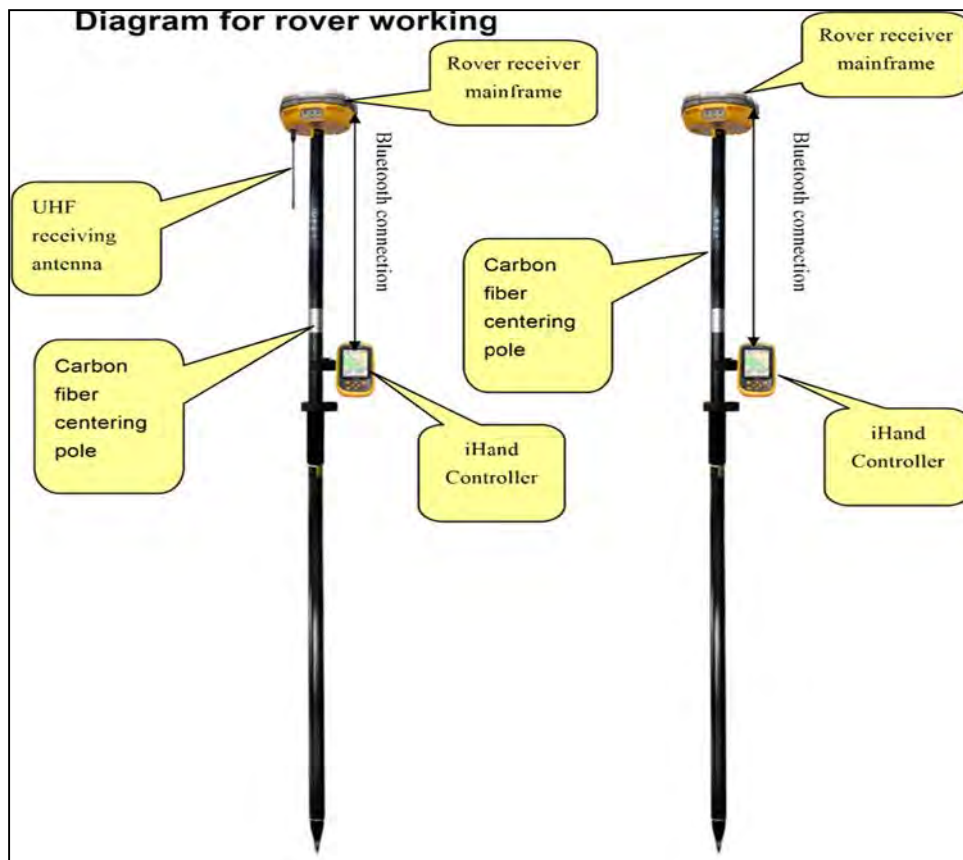


Figure 2: Rover Receiver configuration

## 5.0 Detailing

Apapa Road Substation is peculiar due to its very limited land space and presence of heavy equipments including GIS control room and 132KV gantry on top of the control building, therefore, detailing of this substation involves the use of Total station and Differential GPS in acquiring spatial data necessary to fix the positions of features in the substation. The instrument was taken to the edges of the features, e.g. road, Transformers, Gantries, Control Panels, Towers, Equipment Supports, etc, to determine their position, shapes and also the topological relationship between the features and the land parcel. Different point identification numbers and codes were used for various features within Akangba Substation.



**Figure 3: Detailing and capturing of terrain data.**

## Survey Report of Apapa Road Substation



**Figure 4: Detailing of some features on project site.**

### **6.0 Conclusion**

The survey of the project site was concluded and that the final output (Topographical plan) was satisfactorily okay as a result of the level of accuracy attained and the appropriate observational procedures that were strictly followed. The plan now could be used for various planning purposes, at different levels of required information, in the development efforts within the project area.

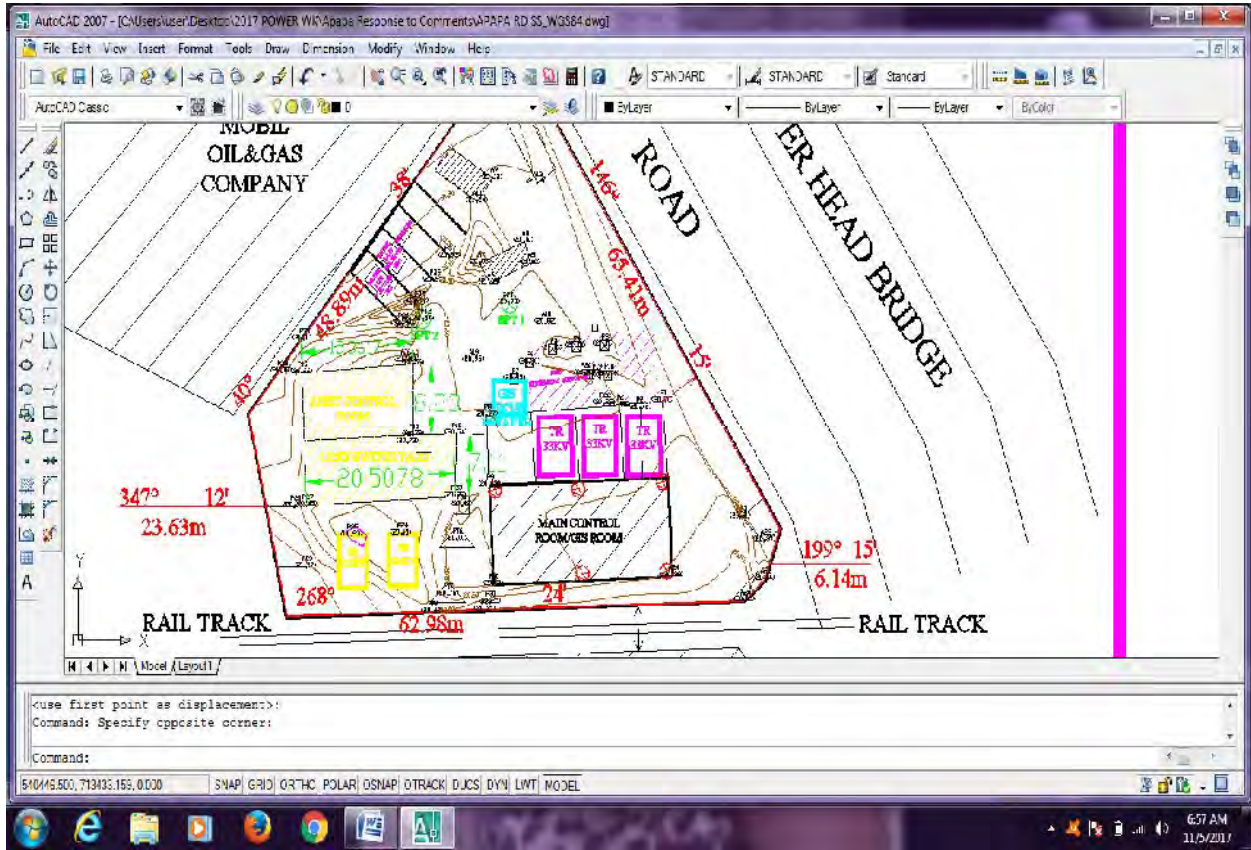
## Survey Report of Apapa Road Substation

### APPENDIX A: SAMPLE LIST OF COORDINATES

PID	E	N	H	DESCRIPTION
P1	540535.630	713313.462	20.698	Equip support
P2	540529.663	713312.958	20.817	Equip support
P3	540527.612	713319.803	21.113	33KV EQUIPMENT SUPPORTS
P4	540523.729	713319.628	21.104	33KV EQUIPMENT SUPPORTS
P5	540520.507	713319.362	21.158	33KV EQUIPMENT SUPPORTS
P6	540517.345	713317.812	20.804	33KV EQUIPMENT SUPPORTS
P7	540515.260	713315.971	20.951	33KV EQUIPMENT SUPPORTS
P8	540511.450	713311.822	20.770	GIS CIRCUIT BREAKER
P9	540511.816	713303.722	20.689	GIS CIRCUIT BREAKER
P10	540512.426	713292.479	20.813	MAIN CONTROL ROOM / GIS ROOM
P11	540508.062	713301.454	20.422	
P12	540507.260	713309.643	20.742	132KV SWITCH YARD
P13	540501.349	713309.484	20.778	132KV SWITCH YARD
P14	540501.362	713317.721	20.558	132KV SWITCH YARD
P15	540486.040	713316.618	20.664	132KV SWITCH YARD
P16	540507.361	713297.627	21.004	MAST
P17	540506.099	713291.300	20.764	MAST
P18	540528.220	713316.477	20.763	33KV EQUIPMENT SUPPORTS
P19	540526.546	713316.456	20.827	33KV EQUIPMENT SUPPORTS
P20	540524.974	713316.515	20.782	33KV EQUIPMENT SUPPORTS
P21	540532.583	713312.689	20.724	33KV TRANSFORMER

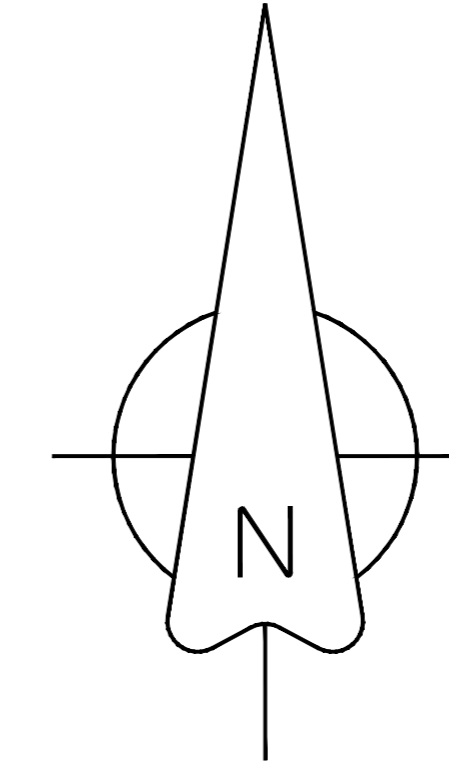
# Survey Report of Apapa Road Substation

## APPENDIX B: TOPOGRAPHIC MAP OF APAPA ROAD SUBSTATION





TRANSMISSION COMPANY OF NIGERIA  
TOPOGRAPHICAL SURVEY  
OF  
APAPA SUBSTATION, APAPA, LAGOS , LAGOS STATE.  
ORIGIN:UTM WGS84 (ZONE 31)  
AREA: 3177.818qm



### LEGEND

	CROSS SECTIONS
	PROFILES
	CPT AND SPT LOCATION
	GANTRY
	TOWER
	132 KV TRANSFORMER
	33 KV TRANSFORMER
	GIS CIRCUIT BREAKER
	TRANSMISSION LINE
	COMMUNICATION MAST
	INDEX CONTOUR

Reference Drawings	
Drawing No.:	Title:
<input type="checkbox"/> Approved <input type="checkbox"/> Approved with comments <input type="checkbox"/> Not Approved <input type="checkbox"/> For Information	
Date: _____	Signature/Stamp: _____ Project Consultant

**TRANSMISSION COMPANY OF NIGERIA**

**Japan International Cooperation Agency**

**YACHIYO ENGINEERING CO.,LTD.**  
Consulting Engineers & Architects

**Best & Crompton Engineering Limited**

SURVEYED BY:

Project Drawing No.	DC - 132 - XXX - X - X - X		
Name	Date	Drawing Detail	
Prepared: J.AMAGLO	12.2017	Lot : Project: APAPA ROADSIDE SUBSTATION	
Drawn: J.AMAGLO	12.2017	Title: <b>TOPOGRAPHIC SURVEY</b>	
Checked: S.ISHOLA	12.2017		
Approved: _____			

Revisions	No.	Name	Date	Notes / Description
	B			
	A			
	0		12.11.17	First Issue

SCALE: H=1:200  
V=1:200

Contractor's Drawing No.	XX - XXX - XXX - X - X	Sheet No.	1	Total Sheet	1
--------------------------	------------------------	-----------	---	-------------	---

## TOPOGRAPHIC SURVEY REPORT

### AKANGBA SUBSTATION LAGOS STATE



**SURVEYED AND SUBMITTED**

BY

**Ψ PENGATE GLOBAL SERVICES LTD**

**(REGISTERED SURVEYORS)**  
SURVEYING, & GEONFORMATICS CONSULTANTS

TEL: - 08038592726 ,07082742542  
Email Address:  
[joeama2002@yahoo.com](mailto:joeama2002@yahoo.com)

**INTERNATIONAL OFFICE:**  
PENGATE GLOBAL SERVICES LTD  
Keruj O2 Mall and Champagne Lounge Suite C03,  
Near Games Village, Kaura District, Abuja

**AUGUST 2017**

# Survey Report of Akangba Substation

## Contents

<b>1.0 Background</b> .....	<b>3</b>
<b>2.0 INTRODUCTION</b> .....	<b>3</b>
<b>3.0 Scope of Work</b> .....	<b>3</b>
<b>4.0 Methodology</b> .....	<b>4</b>
<b>5.0 DETAILING:</b> .....	<b>6</b>
<b>6.0 Conclusion</b> .....	<b>7</b>

## List of Figures

<b>Figure 1 Enclosed boundary of Akangba Substation Site</b> .....	<b>4</b>
<b>Figure 2: Rover Receiver Configuration</b> .....	<b>5</b>
<b>Figure 3: Detailing and capturing terrain data.</b> .....	<b>6</b>
<b>Figure 4: Detailing of salient features in the project site.</b> .....	<b>7</b>

## Appendices

**APPENDIX A: SAMPLE LIST OF COORDINATES**

**APPENDIX B: TOPOGRAPHIC MAP OF AKANGBA SUBSTATION**

# Survey Report of Akangba Substation

## 1.0 Background

The location of the project site is Akangba in the Surulere Local Government Area, Lagos State.

## 2.0 INTRODUCTION:

Topographical surveying is a three-dimensional (3-D) survey technique. It employs the technique of determining the true position (X, Y) of features (man-made and natural) and the heights of points over a particular area or portion of the earth's surface. The relief or configuration of a terrain are located by measurement and depicted on a topographical map thus explains facts in reality of the ground terrain. Within the limits of scale, it shows as accurately as possible the location and shape of both natural and man-made features

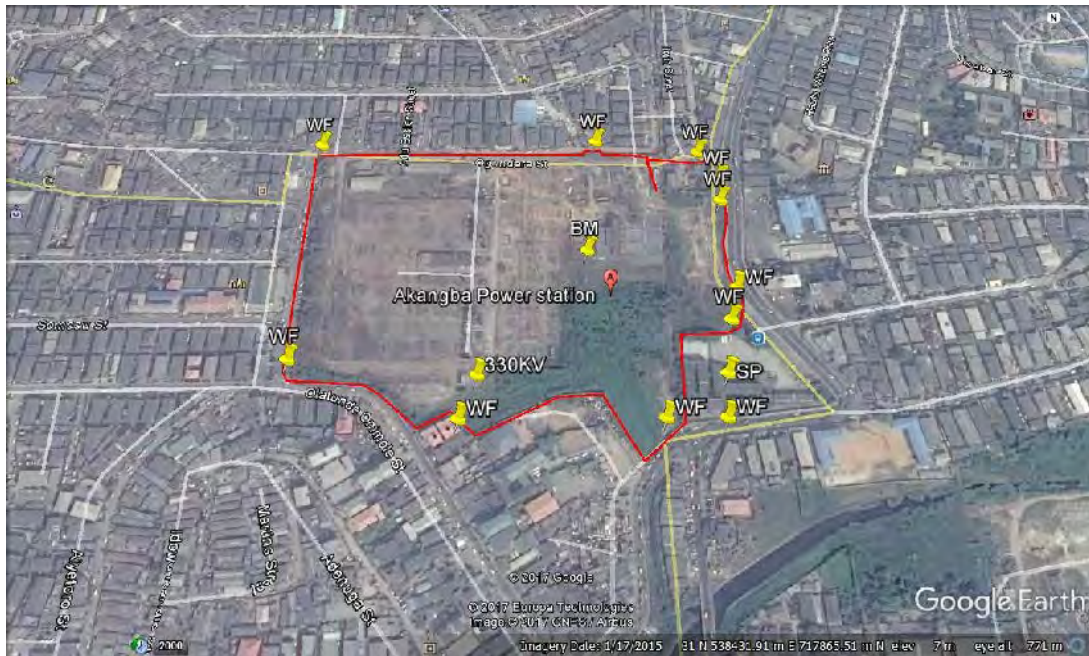
## 3.0 Scope of Work.

The scope of work involves Topographical Survey of Akangba substation

- a. To determine the size and the direction of the boundary line of the substation.
- b. To determine the Topography of the terrain.
- c. To determine the location of all Towers, Transformers, Gantries, and all the equipment support in the 132 KV and 33 KV switchyards. Also, all buildings and other man-made features in the Substation in order to have a fair knowledge of the vacant areas within the substation.

The objective of the detailed topographic survey is to determine the 3D Coordinates (X, Y, and Z) at 10m grid interval within the substation. The survey involves the data capture of all permanent features including all the existing roads, control rooms and offices, 132KV Towers and Gantries, 33KV towers and equipment supports, Transformers, switchyards and wet areas. The Topographic detailed survey covers an area of approximately 112813.429 square meters.

## Survey Report of Akangba Substation



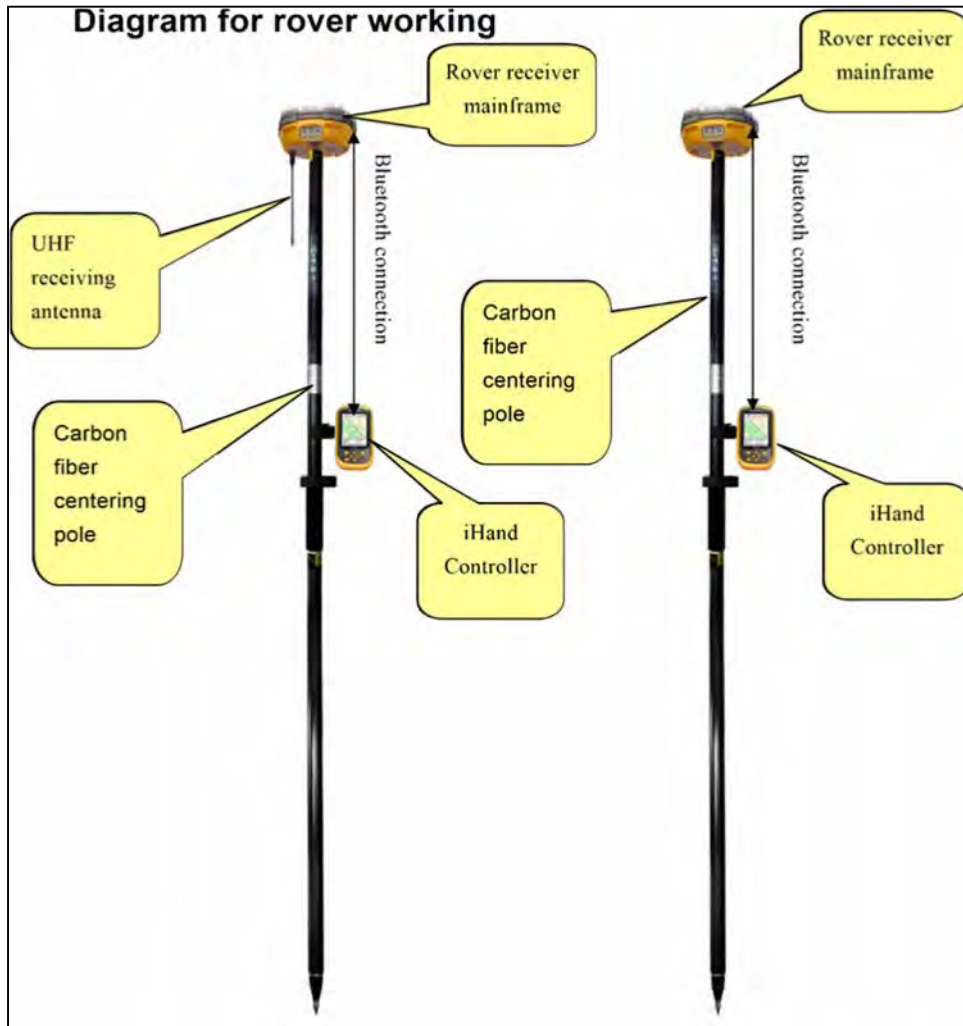
**Figure 1 Enclosed boundary of Akangba Substation Site**

### 4.0 Methodology

Differential Global Positioning System was used to observe direct coordinates of points. With the use of a dual frequency, 220 channel Hi-Target receivers which are capable of tracking the American Satellites-GPS and the Russian Satellites-GLONASS, with centimeter accuracy, data was captured in 3-dimension, i.e., X, Y, and Z.

Since the control points had been checked and their reliability ensured, the base receiver (also known as Reference) was set on the Control Point. The Rover GPS receiver was switched on and set up. The “survey” icon on the data logger was selected, and the station parameters were set to conform to the coordinate system to be used. By entering the pillar identification value and the receiver’s antenna height through the data logger, the coordinates as keyed were confirmed by putting the rover pole on the Control Point. The verticality of the tracking rod carrying the rover receiver was ensured by checking the plumb (circular bubble attached to the tracking rod) each time an observation is made.

## Survey Report of Akangba Substation



**Figure 2: Rover Receiver Configuration**

The rover was taken to the first boundary point, and all necessary data such as the point identification value and codes were keyed in, coordinate data were captured in 3-dimension, i.e., X, Y, and Z. The process was repeated at each boundary pillar until all boundary points were captured.

Using the GNSS in the RTK Mode enables the levels to be determined at any arbitrary point within the substation. All data were captured in the NIGERIAN NATIONAL GRID MINNA

## Survey Report of Akangba Substation

DATUM UTM ZONE 31 as required by the Surveyors Council of Nigeria (SURCON) for all survey works in Nigeria.

### 5.0 DETAILING:

This is the process of acquiring spatial data necessary to fix the positions of features in the project area. The instrument was taken to the edges of the features, e.g., road, transformers, gantries, control panels, towers, equipment supports, etc., to determine their position, shapes and also the topological relationship between the features and the land parcel. Different point identification numbers and codes were used for various features within the Akangba Substation.



**Figure 3: Detailing and capturing terrain data.**

## Survey Report of Akangba Substation



**Figure 4: Detailing of salient features in the project site.**

### 6.0 Conclusion

The survey of the project site was completed, and it is worth mentioning that, by the use of a modern, sophisticated Real Time Kinematic GPS, the survey was completed on a record time.



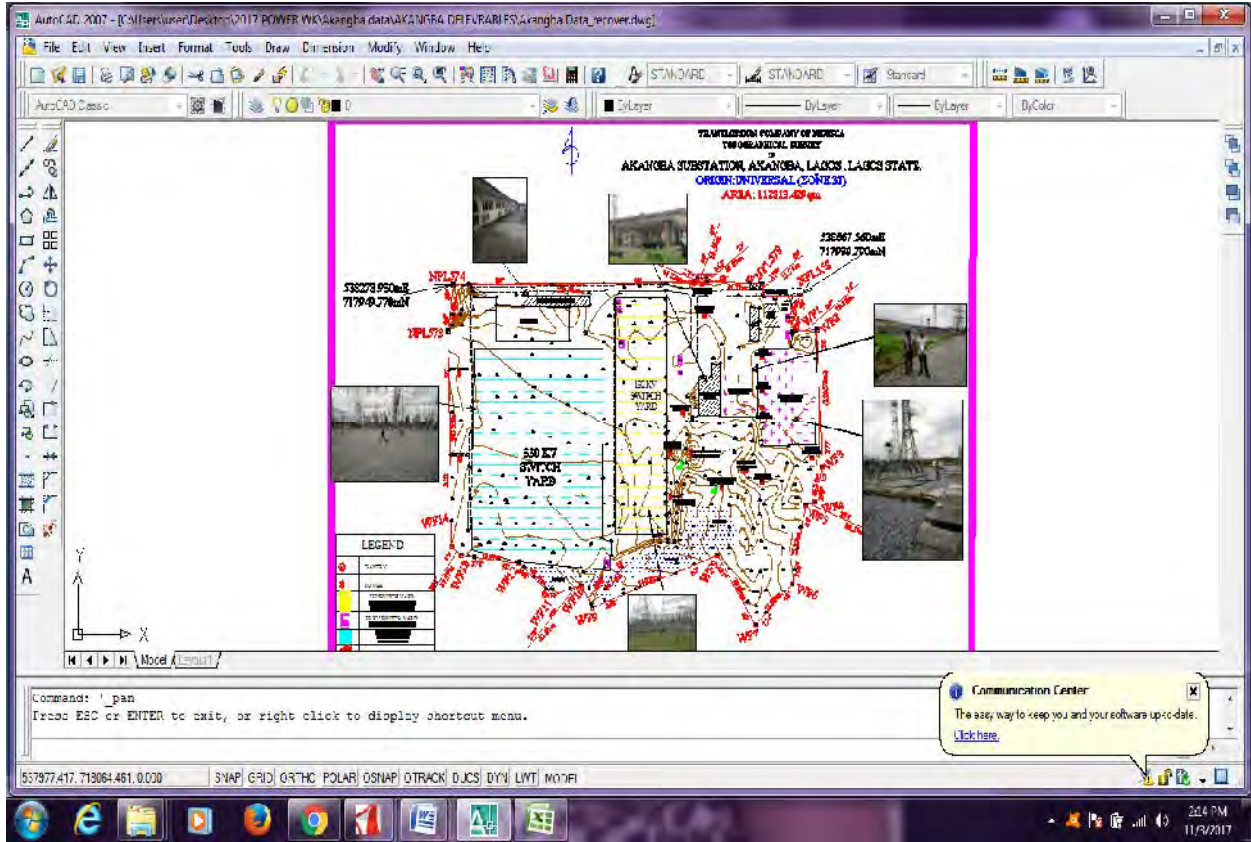
## Survey Report of Akangba Substation

### APPENDIX A: SAMPLE LIST OF COORDINATES

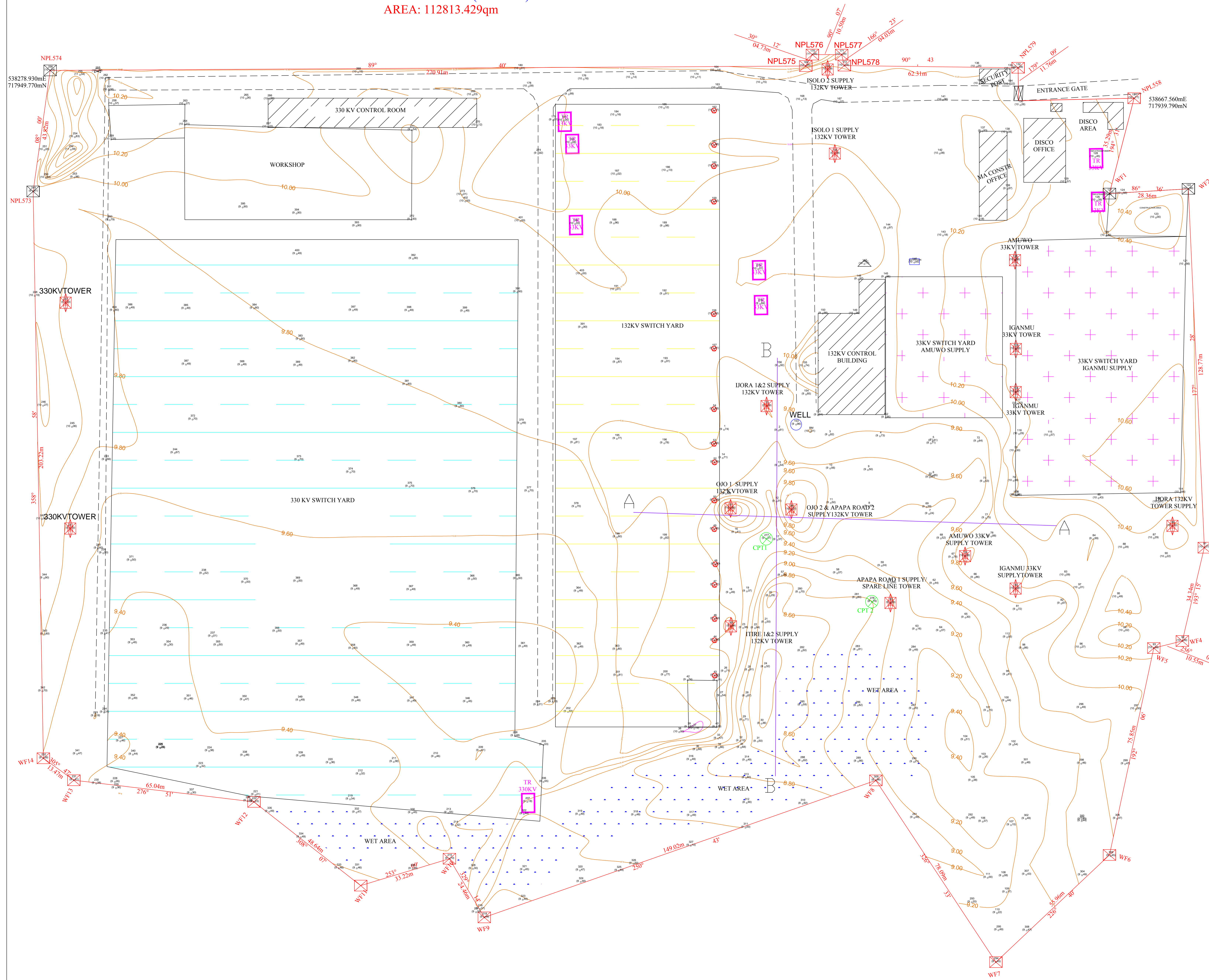
PID	EASTING	NORTHING	HEIGHT	DESCRIPTION
BM	538551.48	717820.23	10.01	
1	538520.54	717820.90	9.74	
2	538540.13	717820.65	9.61	
3	538558.25	717818.97	9.82	
4	538576.46	717818.60	9.73	
5	538595.35	717816.96	9.61	
6	538595.36	717804.39	9.65	
7	538594.11	717790.74	9.24	
8	538572.32	717793.39	9.47	
9	538572.15	717806.49	9.50	
10	538558.62	717807.04	9.56	
11	538558.81	717794.69	9.50	
12	538539.38	717795.18	9.31	
13	538540.19	717807.99	9.54	
14	538520.07	717810.78	9.71	
15	538521.23	717797.92	9.59	
16	538524.74	717784.08	9.41	
17	538539.63	717781.38	9.37	
18	538522.73	717762.44	9.49	
19	538528.75	717762.98	9.37	
20	538537.01	717761.32	8.29	
21	538535.46	717751.84	8.50	
22	538531.64	717749.81	8.94	
23	538527.40	717749.86	9.38	
24	538535.25	717735.87	8.32	
25	538529.44	717734.69	8.81	
26	538520.95	717734.27	9.71	
27	538519.49	717725.50	9.54	
28	538528.59	717725.39	8.67	
29	538527.61	717716.81	8.71	
30	538533.97	717715.56	8.36	
31	538532.62	717709.14	8.50	
32	538526.40	717709.36	9.12	
33	538518.42	717710.20	9.47	
34	538518.77	717706.89	8.86	

# Survey Report of Akangba Substation

## APPENDIX B: TOPOGRAPHIC MAP OF AKANGBA SUBSTATION



TRANSMISSION COMPANY OF NIGERIA  
 TOPOGRAPHICAL SURVEY  
 OF  
 AKANGBA SUBSTATION, AKANGBA, LAGOS,  
 LAGOS STATE.  
 ORIGIN: UTM WGS84 (ZONE 31)  
 AREA: 112813.429qm



LEGEND

- CROSS SECTIONS
- PROFILES
- CPT AND SPT LOCATION
- GANTRY
- TOWER
- TR 132KV
- TR 33KV
- GIS CIRCUIT BREAKER
- TRANSMISSION LINE
- COMMUNICATION MAST
- INDEX CONTOUR
- 132 SWITCH YARD (EQUIPMENT SUPPORTS AND TRANSFORMERS)
- 33 KV SWITCH YARD (EQUIPMENT SUPPORTS)
- 330KV SWITCH YARD (EQUIPMENT SUPPORTS AND TRANSFORMERS)

Reference Drawings  
 Drawing No.: \_\_\_\_\_ Title: \_\_\_\_\_

Approved  Approved with comments  Not Approved  For Information

Date: \_\_\_\_\_ Signature/Stamp: \_\_\_\_\_ Project Consultant



Best & Crompton Engineering Limited

SURVEYED BY: **PENGATE**

Project No.	DC - 132 - XXX - X - X - X
Prepared:	J.AMAGLO 12.2017
Drawn:	J.AMAGLO 12.2017
Checked:	S.ISHOLA 12.2017
Approved:	
<b>TOPOGRAPHIC SURVEY</b>	

Revisions	No.	Name	Date	Notes / Description
	0		12.11.17	First Issue
SCALE: H=1:500				
Drawing No. <b>XX - XXX - XXX - X - X</b> Sheet No. <b>1</b> Total Sheet <b>1</b>				