

ELECTRICITY GENERATING AUTHORITY OF THAILAND

Supplemental Notice No. 1

Invitation to Bid No. TS12-DSS-04

Supply of Digital Substation Protection and Automation System

Transmission System Expansion Project No. 12

The attached Supplemental Notice shall be considered as part of the bidding documents No. TS12-DSS-04.

As acknowledgement of receipt that all additions, deletions and revisions contained in this Supplemental Notice are incorporated into the above bidding documents, Bidder is requested to sign and return this acknowledgement via email address : wirinya.cha@egat.co.th within three (3) days from the date of the announcement of this Supplemental Notice on <http://www4.egat.co.th/fprocurement/biddingeng/>.

The original acknowledgement which is manually signed in ink by a person or persons duly authorized shall be included in the proposal to be submitted on the bid opening date.

ELECTRICITY GENERATING AUTHORITY OF THAILAND

May 24, 2023

ACKNOWLEDGEMENT

This undersigned Bidder hereby certifies that the additions, deletions and revisions set forth in this Supplemental Notice to Invitation to Bid No. TS12-DSS-04 are incorporated as part of the above bidding documents and will be fully included in any bids which he may submit.

Signed _____

Title _____

Company _____

Date _____

ELECTRICITY GENERATING AUTHORITY OF THAILAND

SUPPLEMENTAL NOTICE NO. 1
 INVITATION TO BID NO. TS12-DSS-04
 SUPPLY OF DIGITAL SUBSTATION PROTECTION AND
 AUTOMATION SYSTEM
 TRANSMISSION SYSTEM EXPANSION PROJECT NO.12

The following supplemental information is hereby given for the above described Invitation:

1. Section A : Invitation to Bid

Postpone the bid opening date from May 31, 2023 to **June 8, 2023**.

2. Section C : Proposal

- Revise Price Schedule (Bill of Materials for Schedule 1, 2 and 3) with the revised excel files of Price Schedule attached.
- Replace pages Part 2-C34 thru Part 2-C36 of Proposal Data with the revised pages with (Rev. 1) attached.
- Replace pages Part 3-C1 thru Part 3-C3 of Delivery Schedule and Distribution List with the revised pages with (Rev.1) attached.

3. Section J : Drawings

Delete and substitute as follows :

<u>Deleted Dwg. No.</u>	<u>Substitute with Attached Dwg.No.</u>
<u>Design Drawings</u>	
1. KLA-E-1 sh.1/2 Rev. 1	KLA-E-1 sh.1/2 Rev. 2
2. KLA-E-1 sh.2/2 Rev. 1	KLA-E-1 sh.2/2 Rev. 2
3. RA-E-1 sh.1/2 Rev. 1	RA-E-1 sh.1/2 Rev. 2
4. RA-E-1 sh.2/2 Rev. 1	RA-E-1 sh.2/2 Rev. 2
<u>Standard Drawings</u>	
5. TP-E-20.6 sh.2/3 Rev. 1	TP-E-20.6 sh.2/3 Rev. 2
6. TP-E-20.9 sh.- Rev.-	TP-E-20.9 sh.- Rev. 1

Bid submitted must be in accordance with this Notice. Receipt of this Notice shall be acknowledged by the Bidder on the proposal included in the Bidding Documents in the space provided on page C2, Article C-5 Supplemental Notices.

ELECTRICITY GENERATING
 AUTHORITY OF THAILAND

.....May 24....., 2023.....

**PROPOSAL DATA
SYSTEM INTEGRATOR FOR DIGITAL SUBSTATION**

BIDDER NAME _____ **BID NO.** _____

MANUFACTURER _____

- a. Name of System Integrator _____
- b. Headquarter/Country of System Integrator _____
- c. Experience with Digital Substation _____ years

** Please give details in the attached table.

- d. Capability of Data Supported for Process Bus
 - Maximum Number of Sampled Value (CT/PT) _____ points
 - Maximum Number of Analog Data (Condition Signal) _____ points
 - Maximum Number of Binary Input (Alarm & Status) _____ points
 - Maximum Number of Control Output _____ points

e. Application Function (e.g. automation function, disturbance analysis, power quality monitoring)

Application Function	Description

f. Service

f1. Details of System Startup Supervisor

- Tools Involved in System Startup Prepared by Supervisor

f2. Any Services (Please Give Details)

**PROPOSAL DATA
SYSTEM INTEGRATOR FOR DIGITAL SUBSTATION**

BIDDER NAME _____ **BID NO.** _____

MANUFACTURER _____

g. Network Configuration Design

Network Configuration Design for _____ Substation
<p>*** Please give details. ***</p>

**PROPOSAL DATA
SYSTEM INTEGRATOR FOR DIGITAL SUBSTATION**

BIDDER NAME _____ **BID NO.** _____

MANUFACTURER _____

Experience with Digital Substation

No.	Name of Project / Country	Year	Project Description
		(ex.20xx-20xx)	(New Substation, Substation Expansion with Conventional Control and Protection, New fully Digital substation with process bus, Substation Expansion with NCIT, etc.)

INVITATION TO BID NO. TS12-DSS-04**Delivery Schedule and Distribution List****TRANSMISSION SYSTEM EXPANSION PROJECT NO.12****Schedule 1 : 115 kV Digital Substation Protection and Automation Equipment**

Item No.	Description	Qty	Job no.	Substation	Delivery Required by EGAT (within months after confirmation of Letter of Award of Contract)
					DDP EGAT's Store
1-1	DSS : Digital Substation System including System Integrator	1	TS12-13-S01	KLAENG	15
1-2	Multi-function Protective IED (87L, 21BU, 67N, 50BF, 79, 25, 51S/51SG)	2	TS12-13-S02	CHANTHABURI	15
		1	TS12-16-S234	RAYONG 1	15
		2	TS12-16-S235	RAYONG 2	15
1-3	DSS : Spare Parts	1	TS12-13-S01	KLAENG	15
1-4	DIGITAL SUBSTATION SYSTEM -- 12 CORE METALLIC OPTICAL FIBER CABLE (MULTIMODE)	4000	TS12-13-S01	KLAENG	15
1-5	EFLEX AND/OR HDPE CONDUIT WITH HOT-DIP GALVANIZED STEEL CLAMP	1500	TS12-13-S01	KLAENG	15

EGAT's Store = KLAENG Substation

INVITATION TO BID NO. TS12-DSS-04**Delivery Schedule and Distribution List****TRANSMISSION SYSTEM EXPANSION PROJECT NO.12****Schedule 2 : 115 kV Digital Substation Protection and Automation Equipment**

Item No.	Description	Qty	Job no.	Substation	Delivery Required by EGAT (within months after confirmation of Letter of Award of Contract)
					DDP EGAT's Store
2-1	DSS : Digital Substation System including System Integrator	1	TS12-16-S220	RANOT	<i>13</i>
2-2	Multi-function Protective IED (87L, 21BU, 67N, 50BF, 79, 25, 51S/51SG)	2	TS12-16-S233	CHIAN YAI	<i>13</i>
2-3	DSS : Spare Parts	1	TS12-16-S220	RANOT	<i>13</i>
2-4	DIGITAL SUBSTATION SYSTEM -- 12 CORE METALLIC OPTICAL FIBER CABLE (MULTIMODE)	2500	TS12-16-S220	RANOT	<i>13</i>
2-5	EFLEX AND/OR HDPE CONDUIT WITH HOT-DIP GALVANIZED STEEL CLAMP	1000	TS12-16-S220	RANOT	<i>13</i>

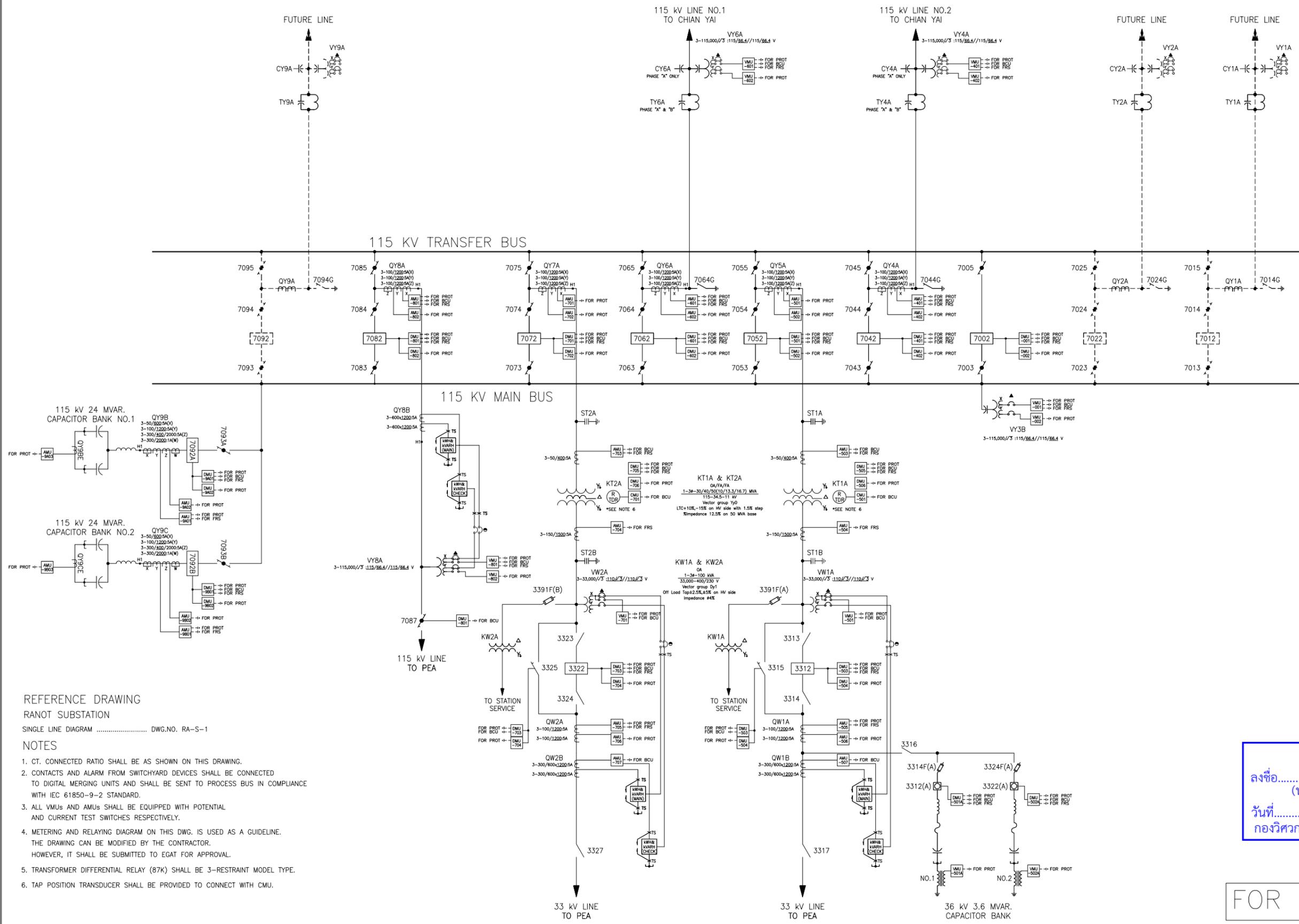
EGAT's Store = RANOT Substation

INVITATION TO BID NO. TS12-DSS-04
Delivery Schedule and Distribution List
TRANSMISSION SYSTEM EXPANSION PROJECT NO.12
Schedule 3 : 115 kV Fault Recording System

Item No.	Description	Qty	Job no.	Substation	Delivery Required by EGAT (within months after confirmation of Letter of Award of Contract)
					DDP EGAT's Store
3-1	DSS : Fault Recording System	1	TS12-13-S01	KLAENG	<i>15</i>
3-2	DSS : Fault Recording System	1	TS12-16-S220	RANOT	<i>13</i>
3-3	DSS : Spare Parts for Fault Recording System	1	TS12-16-S220	RANOT	<i>13</i>

EGAT's Store = KLAENG and RANOT Substations

LEGEND	DESCRIPTION
#7B	BUSBAR DIFFERENTIAL PROTECTION
#9B	BUS WIRE SUPERVISION PROTECTION
21P, 21BU	DISTANCE PROTECTION
67N	DIRECTIONAL EARTH FAULT RELAY
67/67N	DIRECTIONAL OVERCURRENT RELAY
87L	CURRENT DIFFERENTIAL PROTECTION
51T/51TO	TRANSFORMER OVERCURRENT RELAY
51/51O	OVERCURRENT RELAY
81	UNDER-FREQUENCY RELAY
27	UNDERVOLTAGE RELAY
25	SYNCHRO-CHECK RELAY
79	AUTORECLOSURE DEVICE
50BF	BREAKER FAILURE PROTECTION
PIT	PERMISSIVE TRANSFER TRIP
DEF	DIRECTIONAL EARTH FAULT
DTT	DIRECT TRANSFER TRIP
E1	E1 INTERFACE
TELE	TELE PROTECTION
FRS	FAULT RECORDING SYSTEM
AMU	CURRENT MERGING UNIT
VMU	VOLTAGE MERGING UNIT
DMU	DIGITAL MERGING UNIT
CMU	CONDITION MONITORING UNIT
BCU	BAY CONTROL UNIT
PROT	PROTECTIVE IED
BO	BINARY OUTPUT
BI	BINARY INPUT
I	INCOMING VOLTAGE
R	RUNNING VOLTAGE
KWH&KVARH	KILOWATT HOUR AND KILOVAR HOUR COMBINETER
○	INDICATING PROTECTION FUNCTION
—	WYE CONNECTED CURRENT TRANSFORMER
—	DELTA CONNECTED CURRENT TRANSFORMER
—	CURRENT TEST SWITCH
—	POTENTIAL TEST SWITCH
—	MCB LOCATED AT SWITCHYARD
—	MCB LOCATED AT THE ASSOCIATED BOARD
—	COPPER-WIRED CONNECTION
—	FIBER OPTIC CONNECTION
—	OPTICAL CURRENT TRANSFORMER



REFERENCE DRAWING
RANOT SUBSTATION
SINGLE LINE DIAGRAM DWG.NO. RA-S-1

- NOTES
1. CT. CONNECTED RATIO SHALL BE AS SHOWN ON THIS DRAWING.
 2. CONTACTS AND ALARM FROM SWITCHYARD DEVICES SHALL BE CONNECTED TO DIGITAL MERGING UNITS AND SHALL BE SENT TO PROCESS BUS IN COMPLIANCE WITH IEC 61850-9-2 STANDARD.
 3. ALL VMUs AND AMUs SHALL BE EQUIPPED WITH POTENTIAL AND CURRENT TEST SWITCHES RESPECTIVELY.
 4. METERING AND RELAYING DIAGRAM ON THIS DWG. IS USED AS A GUIDELINE. THE DRAWING CAN BE MODIFIED BY THE CONTRACTOR. HOWEVER, IT SHALL BE SUBMITTED TO EGAT FOR APPROVAL.
 5. TRANSFORMER DIFFERENTIAL RELAY (87K) SHALL BE 3-RESTRAINT MODEL TYPE.
 6. TAP POSITION TRANSDUCER SHALL BE PROVIDED TO CONNECT WITH CMU.

ได้ตรวจสอบแล้ว
ลงชื่อ.....
(นายรุตทฤษฎ์ รุจิธัญญ์)
วันที่.....
5/16/2023
กองวิศวกรรมระบบควบคุมและป้องกัน

FOR BIDDING ONLY



REV. NO.	JOB NO.	JOB DESCRIPTION	DRAWN	DESIGNED	VERIFIED	VALIDATED	RECOMMENDED	CONCURRED	APPROVED	DATE
2	TS12-16-S220	RENOVATED 115 kV DIGITAL SUBSTATION	-	-	-	-	-	-	-	-

ELECTRICITY GENERATING AUTHORITY OF THAILAND			
DRAWN	P.RAKNEUNG	VALIDATED	CHIEF, CONTROL AND PROTECTION SYSTEM ENGINEERING DEPARTMENT
DESIGNED	P.RAKNEUNG	RECOMMENDED	ASSISTANT DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION-1
VERIFIED		CONCURRED	DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION
APPROVED			ASSISTANT GOVERNOR - TRANSMISSION SYSTEM DEVELOPMENT
DRAWING NAME		RANOT SUBSTATION	
DESCRIPTION OF DETAIL DRAWING		115 kV METERING AND RELAYING DIAGRAM	
JOB NO.	REPLACING DWG. NO.	DWG. NO.	REV.
TS12-16-S220		RA-E-1	2

LIST OF PROTECTIVE IED (115 & 33 kv) *SEE NOTE 5

FEEDER	MU	PROTECTION FUNCTION
115 kv BUS	AMU401 DMU001 AMU501 DMU401 AMU601 DMU501 AMU701 DMU701 AMU801 DMU801 AMU9A01 DMU9A01 AMU9B01 DMU9B01	Primary Protection IED (87B) (95B) LOW IMPEDANCE } LOW IMPEDANCE FOR 12 FEEDERS NO SWITCHING ZONE
	AMU402 DMU002 AMU502 DMU402 AMU602 DMU502 AMU702 DMU702 AMU802 DMU802 AMU9A02 DMU9A02 AMU9B02 DMU9B02	Secondary Protection IED (87B) (95B) LOW IMPEDANCE
115 kv C-BANK NO.1	AMU9A01 DMU9A01 AMU9A03 VMU001	Primary Protection IED (60C) (51C) (51CG) (59C) (27C) (50BF)
	AMU9A02 DMU9A02 AMU9A03 VMU002	Secondary Protection IED (60C) (51C) (51CG) (59C) (27C) (50BF)
115 kv C-BANK NO.2	AMU9B01 DMU9B01 AMU9B03 VMU001	Primary Protection IED (60C) (51C) (51CG) (59C) (27C) (50BF)
	AMU9B02 DMU9B02 AMU9B03 VMU002	Secondary Protection IED (60C) (51C) (51CG) (59C) (27C) (50BF)
36 kv C-BANK NO.1	VMU501A DMU501A VMU501	Primary Protection IED (60CH) (60CL) (59C) + (BCU)
36 kv C-BANK NO.2	VMU502A DMU502A VMU501	Primary Protection IED (60CH) (60CL) (59C) + (BCU)

LIST OF PROTECTIVE IED (115 & 33 kv) *SEE NOTE 5

FEEDER	MU	PROTECTION FUNCTION
115 kv LINE NO.2 TO CHIANG YAI (SIR<4)	AMU401 VMU401 AMU401 DMU401 VMU001	Primary Protection IED (87L) (95L) (21BU) (67N) (50BF) (79) (25) E1 TELE
	AMU402 VMU402 DMU402 VMU002	Secondary Protection IED (21P) (67N) (50BF) (79) (25) TELE TELE TELE
115/33 kv KT1A	AMU501 AMU505 DMU501 DMU503 DMU505 VMU001	Primary Protection IED (87K) (95K) (51T) (51TG) (50BF) (51) (51G) (81) (27)
	AMU502 AMU506 DMU502 DMU504 DMU506 VMU002	Secondary Protection IED (87K) (95K) (51T) (51TG) (50BF) (51) (51G) (81) (27)
115 kv LINE NO.1 TO CHIANG YAI (SIR<4)	AMU601 VMU601 DMU601 VMU001	Primary Protection IED (87L) (95L) (21BU) (67N) (50BF) (79) (25) E1 TELE
	AMU602 VMU602 DMU602 VMU002	Secondary Protection IED (21P) (67N) (50BF) (79) (25) TELE TELE TELE
115/33 kv KT2A	AMU701 AMU705 DMU701 DMU703 DMU705 VMU001	Primary Protection IED (87K) (95K) (51T) (51TG) (50BF) (51) (51G) (81) (27)
	AMU702 AMU706 DMU702 DMU704 DMU706 VMU002	Secondary Protection IED (87K) (95K) (51T) (51TG) (50BF) (51) (51G) (81) (27)
115 kv LINE TO PEA (SIR<4)	AMU801 VMU801 DMU801 VMU001	Primary Protection IED (21P) (67N) (67) (67N) (81) (27) (50BF) (79) (25) TELE TELE TELE
	AMU802 VMU802 DMU802 VMU002	Secondary Protection IED (21P) (67N) (67) (67N) (81) (27) (50BF) (79) (25) TELE TELE TELE

LEGEND	DESCRIPTION
87B	BUSBAR DIFFERENTIAL PROTECTION
95B	BUS WIRE SUPERVISION PROTECTION
21P, 21BU	DISTANCE PROTECTION
67N	DIRECTIONAL EARTH FAULT RELAY
67/67N	DIRECTIONAL OVERCURRENT RELAY
87L	CURRENT DIFFERENTIAL PROTECTION
51/51TG	TRANSFORMER OVERCURRENT RELAY
81	OVERCURRENT RELAY
27	UNDER-FREQUENCY RELAY
27	UNDERVOLTAGE RELAY
25	SYNCHRO-CHECK RELAY
79	AUTORECLOSURE DEVICE
50BF	BREAKER FAILURE PROTECTION
PIT	PERMISSIVE TRANSFER TRIP
DEF	DIRECTIONAL EARTH FAULT
DTT	DIRECT TRANSFER TRIP
E1	E1 INTERFACE
TELE	TELE PROTECTION
FRS	FAULT RECORDING SYSTEM
AMU	CURRENT MERGING UNIT
VMU	VOLTAGE MERGING UNIT
DMU	DIGITAL MERGING UNIT
CMU	CONDITION MONITORING UNIT
BCU	BAY CONTROL UNIT
PROT	PROTECTIVE IED
BO	BINARY OUTPUT
BI	BINARY INPUT
I	INCOMING VOLTAGE
R	RUNNING VOLTAGE
KWH&KVARRH	KILOWATT HOUR AND KILOVAR HOUR COMBIMETER
○	INDICATING PROTECTION FUNCTION
—	WYE CONNECTED CURRENT TRANSFORMER
—	DELTA CONNECTED CURRENT TRANSFORMER
—	CURRENT TEST SWITCH
—	POTENTIAL TEST SWITCH
—	MCB LOCATED AT SWITCHYARD
—	MCB LOCATED AT THE ASSOCIATED BOARD
—	COPPER-WIRED CONNECTION
—	FIBER OPTIC CONNECTION
—	OPTICAL CURRENT TRANSFORMER

REFERENCE DRAWING
RANOT SUBSTATION
SINGLE LINE DIAGRAM DWG.NO. RA-S-1

- NOTES
- CONTACTS AND ALARM FROM SWITCHYARD DEVICES SHALL BE CONNECTED TO DIGITAL MERGING UNITS AND SHALL BE SENT TO PROCESS BUS IN COMPLIANCE WITH IEC 61850-9-2 STANDARD.
 - ALL VMUs AND AMUs SHALL BE EQUIPPED WITH POTENTIAL AND CURRENT TEST SWITCHES RESPECTIVELY.
 - METERING AND RELAYING DIAGRAM ON THIS DWG. IS USED AS A GUIDELINE. THE DRAWING CAN BE MODIFIED BY THE CONTRACTOR. HOWEVER, IT SHALL BE SUBMITTED TO EGAT FOR APPROVAL.
 - TRANSFORMER DIFFERENTIAL RELAY (87K) SHALL BE 6-RESTRAINT MODEL TYPE FOR 230/115 kv TIE TRANSFORMER AND 3-RESTRAINT MODEL TYPE FOR 115/22 kv LOADING TRANSFORMER.
 - THE PROPOSED MULTI-FUNCTION PROTECTIVE IEDs CAN BE ANY TYPE/MODEL IN "EGAT ACCEPTED RELAY LIST" REGARDLESS THE SCHEME.
 - TO CONFIRM THE ADDITIONAL FUNCTIONS (BESIDE THE CERTIFIED SCHEMES), TYPE TEST REPORTS AND SUPPLY RECORDS SHALL BE SUBMITTED FOR APPROVAL.
 - REQUIRED SUPPLY RECORDS SHALL SHOW "HAVING THE SUCCESSFUL OPERATION OF AT LEAST ONE(1) YEAR IN AT LEAST TWO(2) SUBSTATIONS WITH NOMINAL SYSTEM VOLTAGE OF 110 kv OR ABOVE".
 - AFTER BID EVALUATION PHASE, THOSE IEDs SHALL BE TESTED AS REQUIRED BY EGAT.

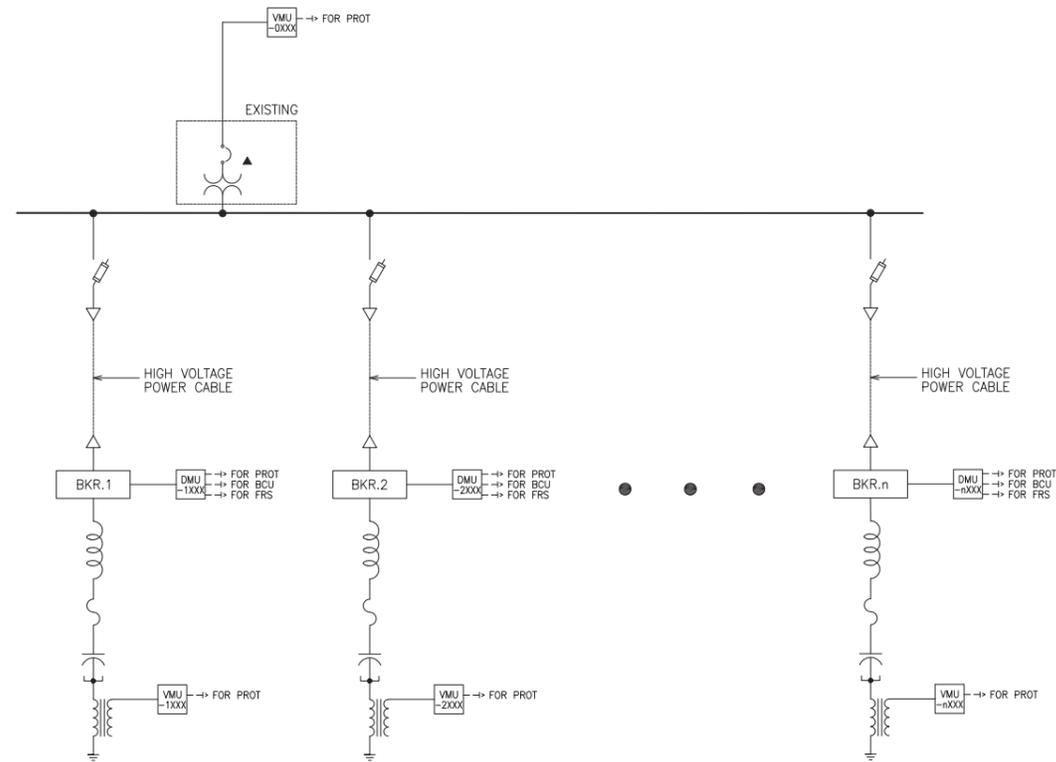
ได้ตรวจสอบแล้ว
ลงชื่อ.....
(นายรศทนาย รุจิธัญญ์ธรร)

วันที่.....5/16/2023
กองวิศวกรรมระบบควบคุมและป้องกัน

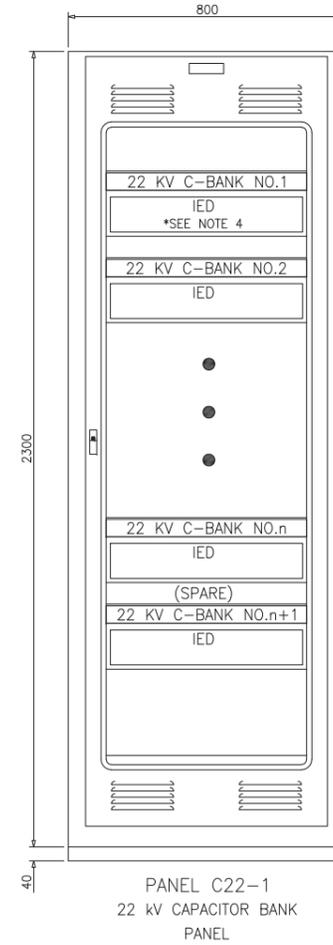
FOR BIDDING ONLY



ELECTRICITY GENERATING AUTHORITY OF THAILAND											DRAWING NAME										
DRAWN P.RAKNEUNG						VALIDATED CHIEF, CONTROL AND PROTECTION SYSTEM ENGINEERING DEPARTMENT					RANOT SUBSTATION										
DESIGNED P.RAKNEUNG						RECOMMENDED ASSISTANT DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION-1					DESCRIPTION OF DETAIL DRAWING										
VERIFIED						CONCURRED DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION					LIST OF PROTECTIVE IED AND SIGNAL DIAGRAM										
APPROVED						ASSISTANT GOVERNOR - TRANSMISSION SYSTEM DEVELOPMENT					DATE										
REV.NO.	JOB NO.	JOB DESCRIPTION							DRAWN	DESIGNED	VERIFIED	VALIDATED	RECOMMENDED	CONCURRED	APPROVED	DATE	JOB NO.	REPLACING DWG.NO.	DWG.NO.	2	REV.
2	TS12-16-S220	RENOVATED 115 kv DIGITAL SUBSTATION							-	-	-	-	-	-	-	-	TS12-16-S220		RA-E-1	2	2



SINGLE LINE DIAGRAM



PANEL C22-1
22 KV CAPACITOR BANK
PANEL

NOTES

- PANELS SHOWN IN THIS DRAWING ARE SWING RACK TYPE SWITCHBOARD AS SHOWN IN DWG.NO. TP-E-10.1
- QUANTITY OF IEDs INSTALLED IN PANEL SHALL NOT BE MORE THAN SIX(6) IEDs/PANEL.
- n IS NUMBER OF ACTUAL CAPACITOR BANK IN SUBSTATION.
- 22 KV C-BNAK CONTROL & PROTECTION DESIGN CRITERIA IS REFERED TO TP-E-20.1

ได้ตรวจสอบแล้ว
ลงชื่อ.....
(นายรุตหาญ รุจิชัยธาร)
วันที่.....
5/16/2023
กองวิศวกรรมระบบควบคุมและป้องกัน



DO NOT AMEND MANUALLY

#####Filename
#####Date
#####Name

REV.NO.	JOB NO.	JOB DESCRIPTION	DRAWN	DESIGNED	VERIFIED	VALIDATED	RECOMMENDED	CONCURRED	APPROVED	DATE
2	-	REVISED 22 KV AND 33 KV CAPACITOR BANK CONTROL & PROTECTION DESIGN CRITERIA	P.ACHITAPOL	P.ACHITAPOL	-	-	-	-	-	-
1	-	REVISED 22 KV AND 33 KV CAPACITOR BANK CONTROL & PROTECTION DESIGN CRITERIA	P.ACHITAPOL	P.ACHITAPOL	-	-	-	-	-	-
-	-	DIGITAL SUBSTATION SYSTEM DETAIL OF PANEL CONSTRUCTION 22 KV AND 33 KV CAPACITOR BANK SINGLE LINE DIAGRAM	P.PRIYAWAT	K.NAPAT	-	-	-	-	-	-

ELECTRICITY GENERATING AUTHORITY OF THAILAND									
DRAWN P.ACHITAPOL			VALIDATED			DRAWING NAME			TYPICAL DRAWING
DESIGNED P.ACHITAPOL			RECOMMENDED			DESCRIPTION OF DETAIL DRAWING			DIGITAL SUBSTATION SYSTEM DETAIL OF PANEL CONSTRUCTION
VERIFIED			CONCURRED			JOB NO.			REPLACING DWG.NO.
APPROVED			DATE			DWG.NO.			TP-E-20.6
ASSISTANT GOVERNOR - TRANSMISSION SYSTEM DEVELOPMENT									
DATE									
2 REV.									
3 2									

MAIN & TRANSFER

LEGEND	DESCRIPTION
MUC1	MERGING UNIT CUBICLE TYPE 1 FOR PT BUS IN BREAKER AND A HALF BUS & DOUBLE MAIN AND TRANSFER ARRANGEMENT
MUC2	MERGING UNIT CUBICLE TYPE 2 FOR PT BUS IN GIS BREAKER AND A HALF ARRANGEMENT
MUC3	MERGING UNIT CUBICLE TYPE 3 FOR PT BUS AND BUS COUPLE IN DOUBLE BUS SINGLE BREAKER
MUC4	MERGING UNIT CUBICLE TYPE 4 FOR PT BUS AND TIE BREAKER IN MAIN AND TRANSFER ARRANGEMENT
MUC5	MERGING UNIT CUBICLE TYPE 5 FOR LINE TO EGAT, LINE TO PEA AND LINE FOR C-BANK FEEDER
MUC6	MERGING UNIT CUBICLE TYPE 6 FOR HIGH-SIDED AND LOW SIDED TIE TRANSFORMER, HIGH-SIDED LOADING TRANSFORMER TO SWITCHGEAR
MUC7	MERGING UNIT CUBICLE TYPE 7 FOR MIDDLE BREAKER IN BREAKER AND HALF ARRANGEMENT, HIGH-SIDED LOADING TRANSFORMER
MUC8	MERGING UNIT CUBICLE TYPE 8 FOR LOW-SIDED LOADING TRANSFORMER
MUC9	MERGING UNIT CUBICLE TYPE 9 FOR TIE TRANSFORMER
MUC10	MERGING UNIT CUBICLE TYPE 10 FOR LOADING TRANSFORMER
MUC11	MERGING UNIT CUBICLE TYPE 11 FOR 230,115 KV C-BANK
MUC12	MERGING UNIT CUBICLE TYPE 12 FOR 3*22 KV C-BANK
MUC13	MERGING UNIT CUBICLE TYPE 13 FOR SWITCHGEAR

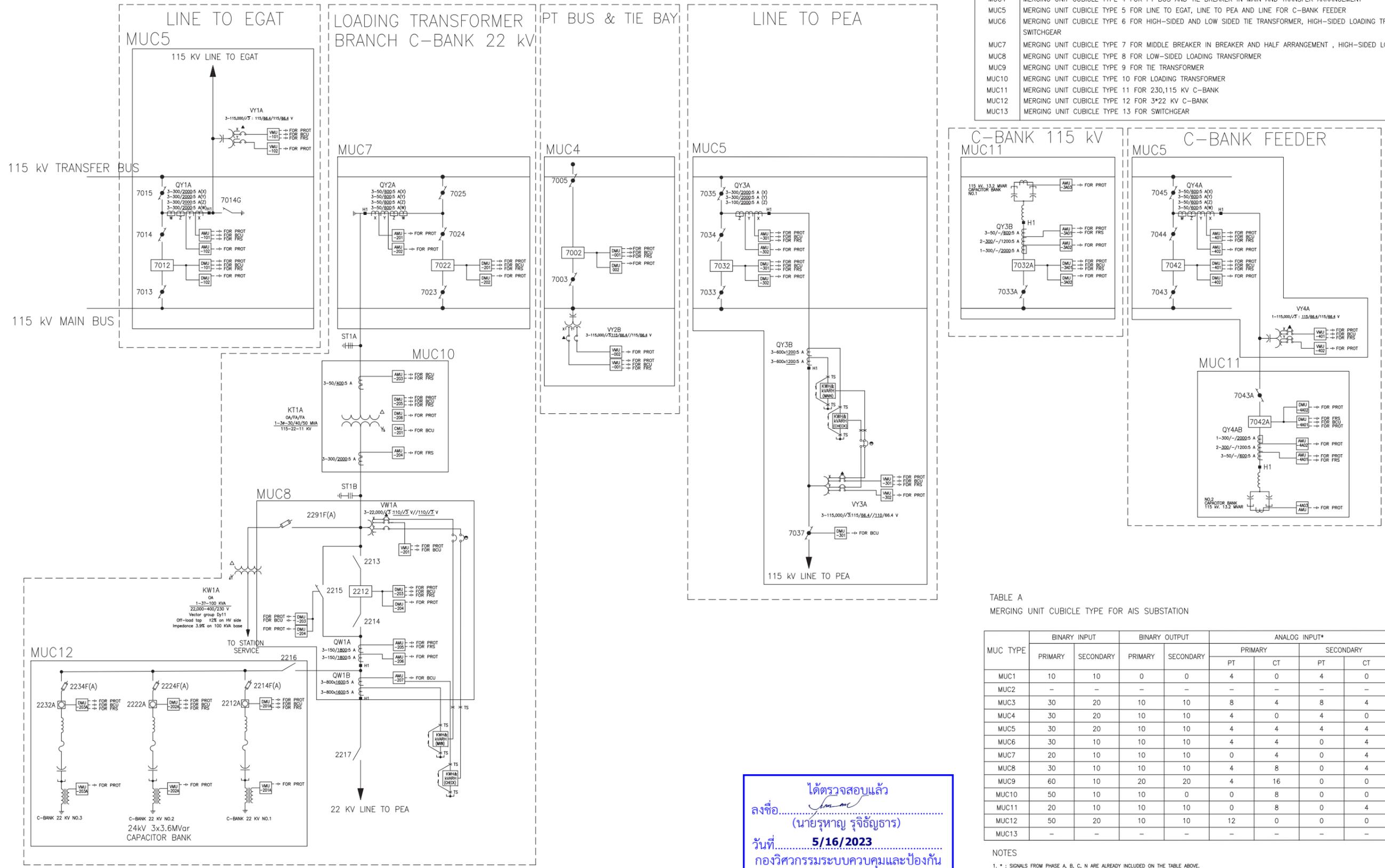


TABLE A
MERGING UNIT CUBICLE TYPE FOR AIS SUBSTATION

MUC TYPE	BINARY INPUT		BINARY OUTPUT		ANALOG INPUT*				MILLIAMP INPUT (MI)*
	PRIMARY	SECONDARY	PRIMARY	SECONDARY	PRIMARY		SECONDARY		PRIMARY
					PT	CT	PT	CT	
MUC1	10	10	0	0	4	0	4	0	0
MUC2	-	-	-	-	-	-	-	-	-
MUC3	30	20	10	10	8	4	8	4	0
MUC4	30	20	10	10	4	0	4	0	0
MUC5	30	20	10	10	4	4	4	4	0
MUC6	30	10	10	10	4	4	0	4	0
MUC7	20	10	10	10	0	4	4	4	0
MUC8	30	10	10	10	4	8	0	4	0
MUC9	60	10	20	20	4	16	0	0	8
MUC10	50	10	10	0	0	8	0	0	8
MUC11	20	10	10	10	0	8	0	4	0
MUC12	50	20	10	10	12	0	0	0	0
MUC13	-	-	-	-	-	-	-	-	-

NOTES
 1. * : SIGNALS FROM PHASE A, B, C, N ARE ALREADY INCLUDED ON THE TABLE ABOVE.
 2. ALL VMU AND AMU SHALL BE EQUIPPED WITH POTENTIAL AND CURRENT TEST SWITCHES RESPECTIVELY.
 3. METERING AND RELAYING DIAGRAM ON THIS DWG. IS USED AS A GUIDELINE. THE DRAWING CAN BE MODIFIED BY THE CONTRACTOR. HOWEVER, IT SHALL BE SUBMITTED TO EGAT FOR APPROVAL.

ได้ตรวจสอบแล้ว
 ลงชื่อ.....
 (นายรพีพร รุจิธัญญาร)
 วันที่..... 5/16/2023
 กองวิศวกรรมระบบควบคุมและป้องกัน



REVNO.	JOB NO.	JOB DESCRIPTION	DRAWN	DESIGNED	VERIFIED	VALIDATED	RECOMMENDED	CONCURRED	APPROVED	DATE
1	-	REVISE MERGING UNIT CUBICLE TYPE	P.ACHITAPOL	P.ACHITAPOL	-	-	-	-	-	-
-	-	MERGING UNIT CUBICLE TYPE	P.ACHITAPOL	P.ACHITAPOL	-	-	-	-	-	-

ELECTRICITY GENERATING AUTHORITY OF THAILAND									
DRAWN					DRAWING NAME				
P.ACHITAPOL					TYPICAL DRAWING				
DESIGNED					DESCRIPTION OF DETAIL DRAWING				
P.ACHITAPOL					MERGING UNIT CUBICLE TYPE				
VERIFIED					JOB NO.				
P.ACHITAPOL					REPLACING DWG.NO.				
APPROVED					DWG.NO.				
DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION					TP-E-20.9				
DATE					REV.				
					1				