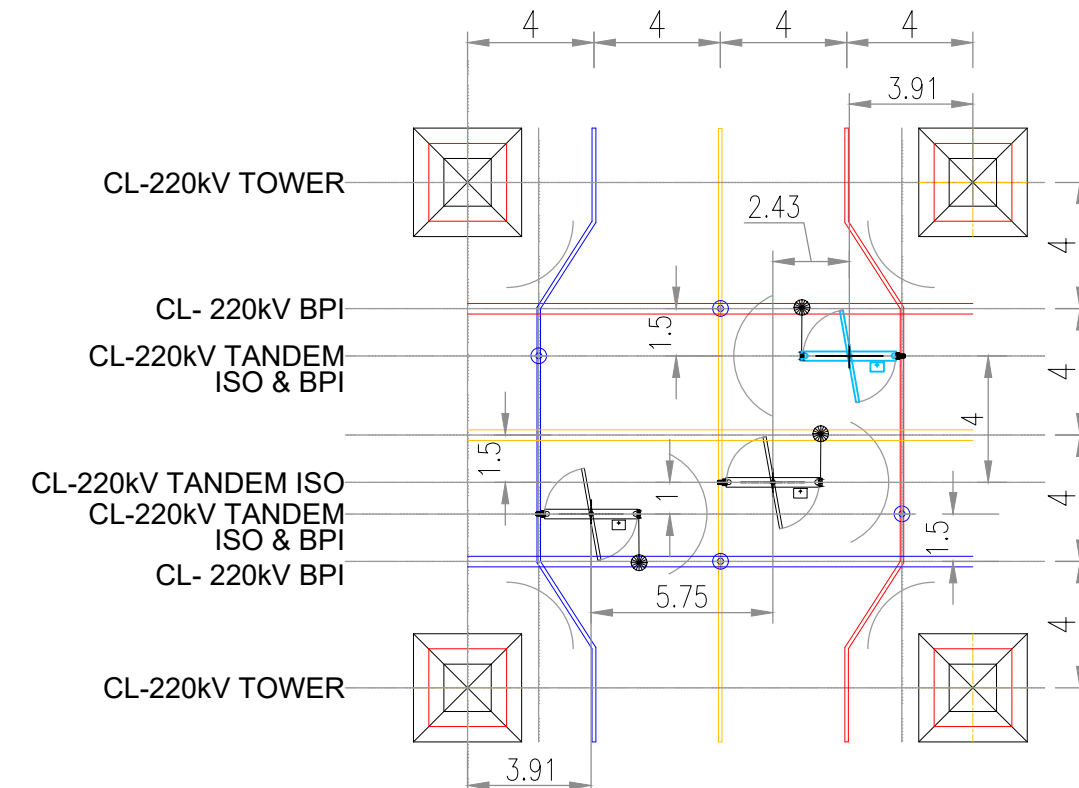
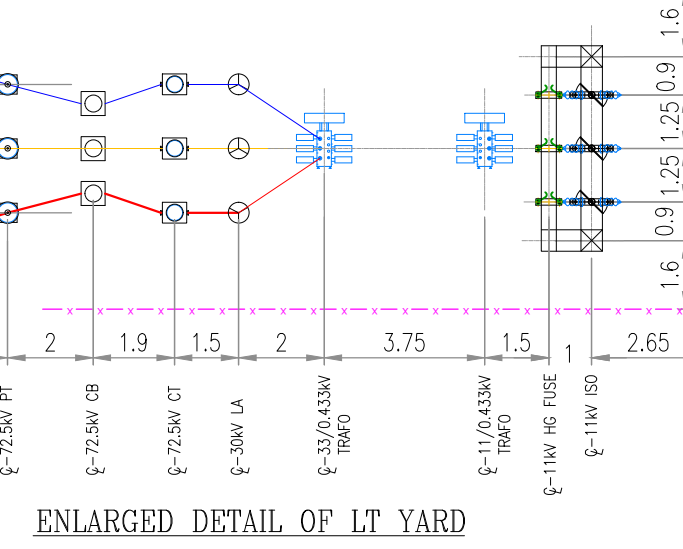
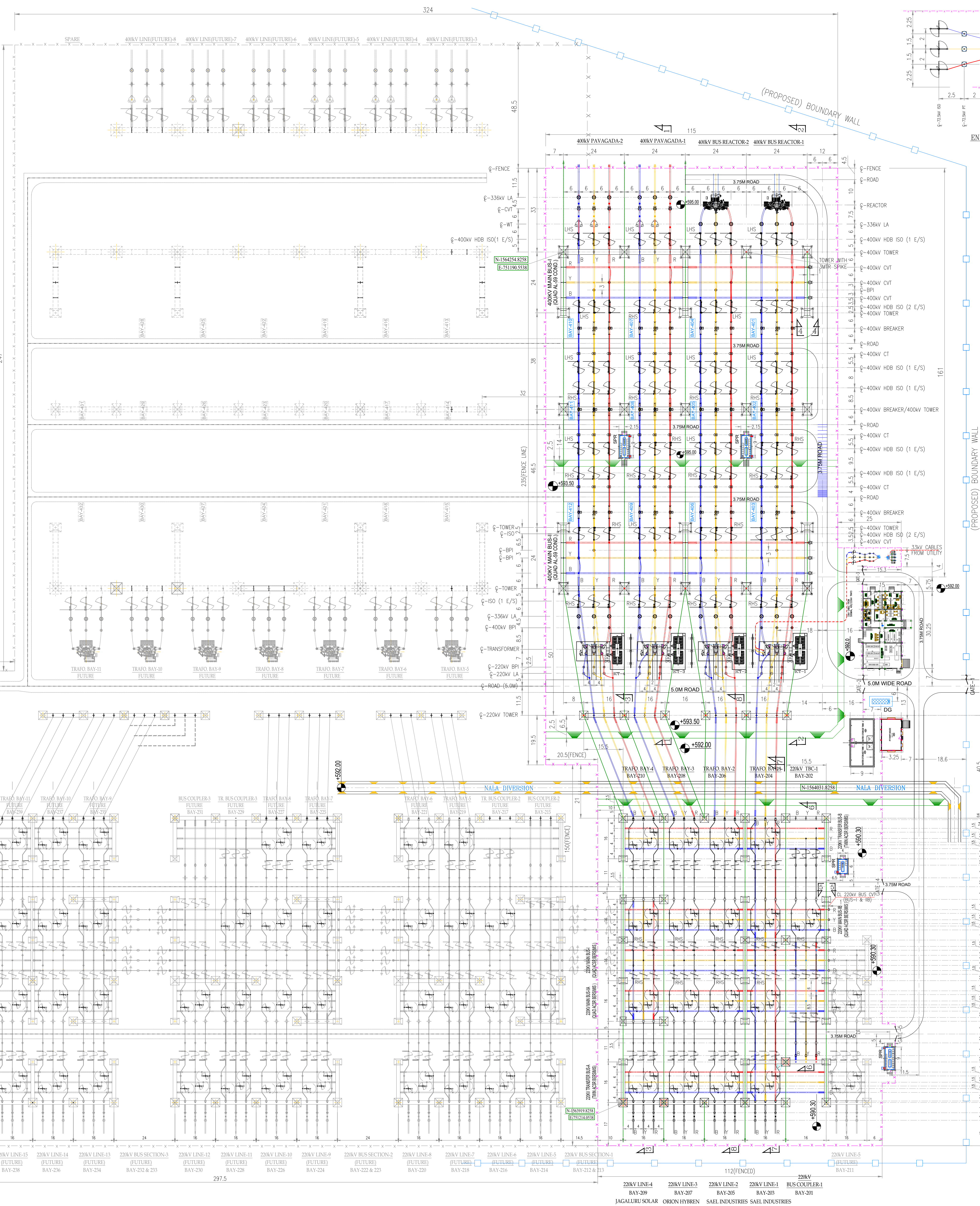
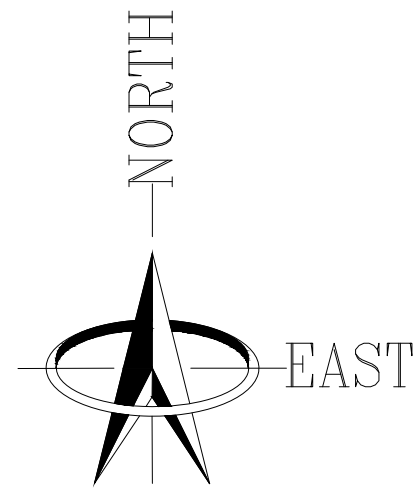




TYPICAL DETAILS OF 220KV TANDEM ISOLATOR

BOQ: AUXILIARY SYSTEM			
SL.	EQUIPMENT	UNIT	NO
1.0 AUXILIARY SYSTEM FROM UTILITY			
1.1	110/43KV, 630kVA, 75kV BIL, 3-Phase Transformer	NOS	1
1.2	12KV Surge Arrestor (1-Phase)	NOS	3
1.3	12KV, 400A, TP, 25KA HG Fuse	SET	1
1.4	12KV, 400A, TP, 25KA DBR Isolator W/O E/Switch	SET	1
2.0 AUXILIARY SYSTEM FROM TENDERS OF 220KV TANDEM			
2.1	110/43KV, 630kVA, 25kV BIL, 3-Phase Transformer	SET	1
2.2	72.5kV, 650A, 31.5KA, Circuit Breaker (3-Phase)	SET	1
2.3	72.5kV, 500-1A, 25KA, 10VA, 0.5 Class Metering CT (1-Phase)	Nos	3
2.4	72.5kV, 650A, 31.5KA, 10VA, 0.5 Class, SP, 25KA Metering PT (1-Phase)	Nos	3
2.5	72.5kV, 650A, TP, 25KA DBR Isolator W/O E/Switch	Set	1
2.6	50KV Surge Arrestor (1-Phase)	Nos	3

400KV EQUIPMENT:

SL.NO.	LEGEND	DESCRIPTION	QUANTITY
01		AUTO TRANSFORMER, 3PH 500 MVA, 400/220/230KV Yn0d011, ONAN/ONAF/ONAF	04 Sets.
02		420kV, 3150A, 63kV for 1 Sec., 3-Phase, SF6 CIRCUIT BREAKER WITHOUT CSD W/O PIR	02 Sets.
03		420kV, 3150A, 63kV for 1 Sec., 3-Phase, SF6 CIRCUIT BREAKER WITH CSD W/O PIR	10 Sets.
04		420kV, 3150A, 63kV for 1 Sec., 3-Phase, HORIZONTAL DOUBLE BREAK MOTORIZED ISOLATOR WITH TWO MOTORIZED EARTH SWITCH	02 Sets.
05		420kV, 3150A, 63kV for 1 Sec., 3-Phase, HORIZONTAL DOUBLE BREAK MOTORIZED ISOLATOR WITH ONE MOTORIZED EARTH SWITCH	30 Sets.
06		CURRENT TRANSFORMER 420kV/6 CORE, 1 PH 3000-2000-500/1A, 63kV for 1 Sec. with 120% extended current rating	36 Nos.
07		CAPACITOR VOLTAGE TRANSFORMER, 420kV 3 CORE, 4400/8800 pF	12 Nos.
08		33kV, 220A, CLASS III, 1-PHASE, SURGE ARRESTOR	24 Nos.
09		420kV, 3150A, 0.5mH, 1-PHASE, WAVE TRAP	04 Nos.
10		125MVAR, 420kV, 3-PHASE, BUS REACTOR	02 Sets.
11		420kV, 1-PH, BUS POST INSULATOR, 8KN	28 Nos.

220KV EQUIPMENT:

SL.NO.	LEGEND	DESCRIPTION	QUANTITY
01		245kV, 3000A, 50kA for 1 sec., 3-PHASE, SF6 CIRCUIT BREAKER.	01 Sets.
02		245kV, 1600A, 50kA for 1 sec., 3-PHASE, HORIZONTAL DOUBLE BREAK MOTORIZED ISOLATOR WITH TWO MOTORIZED EARTH SWITCH	09 Sets.
03		245kV, 3000A, 50kA for 1 sec., 3-PHASE, HORIZONTAL DOUBLE BREAK MOTORIZED ISOLATOR WITH ONE MOTORIZED EARTH SWITCH	02 Sets.
04		245kV, 1600A, 50kA for 1 sec., 3-PHASE, HORIZONTAL DOUBLE BREAK MOTORIZED ISOLATOR WITH ONE MOTORIZED EARTH SWITCH	09 Sets.
05		245kV, 1600A, 50kA for 1 sec., 3-PHASE, HORIZONTAL DOUBLE BREAK MOTORIZED TANDEM ISOLATOR WITHOUT EARTH SWITCH	17 Sets.
06		CURRENT TRANSFORMER 245kV, 2500A, 50kA for 1 sec., 1-PHASE with 120% extended current rating	03 Nos.
07		CAPACITOR VOLTAGE TRANSFORMER 245kV, 4400/8800 pF, 1-PHASE.	27 Nos.
08		216kV, 10kA, CLASS III, 1-PHASE, SURGE ARRESTOR	18 Nos.
09		245kV, 8kN, 1-PHASE, BUS POST INSULATOR	119 Nos.

BASIC SYSTEM PARAMETERS REQUIRED :-

SL.	PARAMETERS	400kV	220kV
01.	NOMINAL SYSTEM VOLTAGE, kV	400	220
02.	HIGHEST SYSTEM VOLTAGE, kV	420	245
03.	RATED FREQUENCY, Hz / NO. OF PH.	50/3	50/3
04.	RATED INSULATION LEVELS, kVp		
A	LIGHTNING IMPULSE WITHSTAND VOLT. i) Equipment Other than Transformer	1425	1050
	ii) Insulator String	1550	1050
B	SWITCHING IMPULSE WITHSTAND VOLT. DRY & WET, kVp	1050	-
C	1MIN. POWER FREQUENCY WITHSTAND (DRY & WET) VOLTAGE, kV RMS	DRY 630 WET 680	460
05.	CORONA EXTINCTION VOLTAGE, kV	320	-
06.	MAX. RADIO INTERFERENCE V FOR FR -EQUENCY BETWEEN 0.5 - 2.0 MHz	1000 MICRO V AT 266kV RMS	1000 MICRO V AT 156kV RMS
07.	MIN. CREEPAGE DISTANCE, mm/kV		
i) Equipment		25	25
ii) Insulator String		31	31
08.	MAX. FAULT LEVEL for 1 Sec., kA	63	50
09.	AMBIENT TEMP, DEG. CENTIGRADE	50	50
10.	EQPT. CURRENT CARRYING CAPACITY, A		
A	MAIN BUS	4000	3000
B	TRANSFER BUS	-	1600
C	LINE & TRANSFORMER BAY	3150	1600
D	BUS COUPLER	-	3000
E	TRANSFER BUS COUPLER	-	1600
F	BUS SECTIONALIZER	4000	3000
11.	MINIMUM CLEARANCES		
A	PHASE TO PHASE	4000	2100
B	PHASE TO EARTH	3500	2100
C	SECTIONAL CLEARANCE	6500	5000
D	GROUND CLEARANCE	8000	5500
E	SUB-CONDUCTOR SPACING	450	250

TABLE FOR CONDUCTORS

SL.	PARAMETERS	400kV	220kV
01.	CONDUCTOR USED		
A	MAIN BUS	QUAD AL59	QUAD ACSR BERSIMIS
B	TRANSFER BUS	-	TWIN ACSR BERSIMIS
C	JACK BUS IN LINE BAY	QUAD AL59	-
D	JACK BUS IN BUS COUPLER & BUS COUPLER INTERCONNECTION	-	QUAD ACSR BERSIMIS
E	JACK BUS IN 220KV TRAF0 BAY & TR. BUS INTERCONNECTION	-	TWIN ACSR BERSIMIS
F	JACK BUS - 400KV TRAF0 BAY & REACTOR BAY	TWIN AL59	-
G	EQPT. INTERCONNECTION	4.5" EH IPS AL. TUBE/QUAD/TWIN AL59, AS SHOWN	4.0"/4.5" EH IPS AL. TUBE/QUAD/TWIN BERSIMIS AS SHOWN

GENERAL NOTES

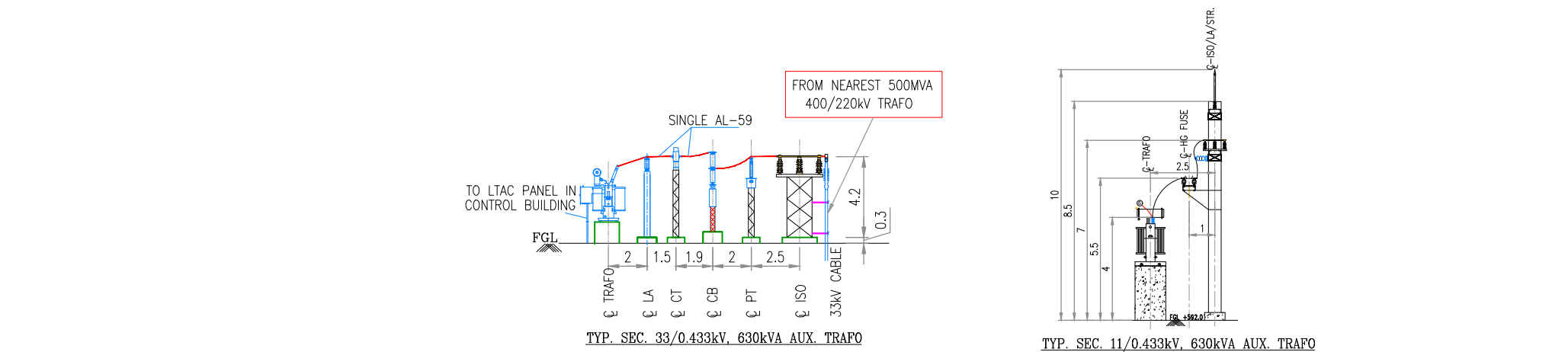
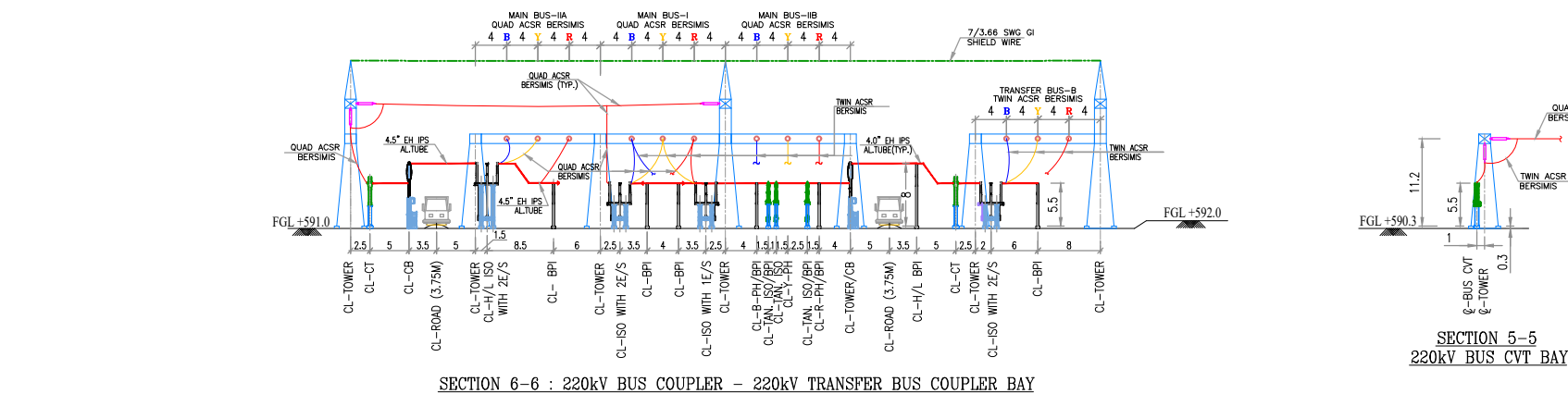
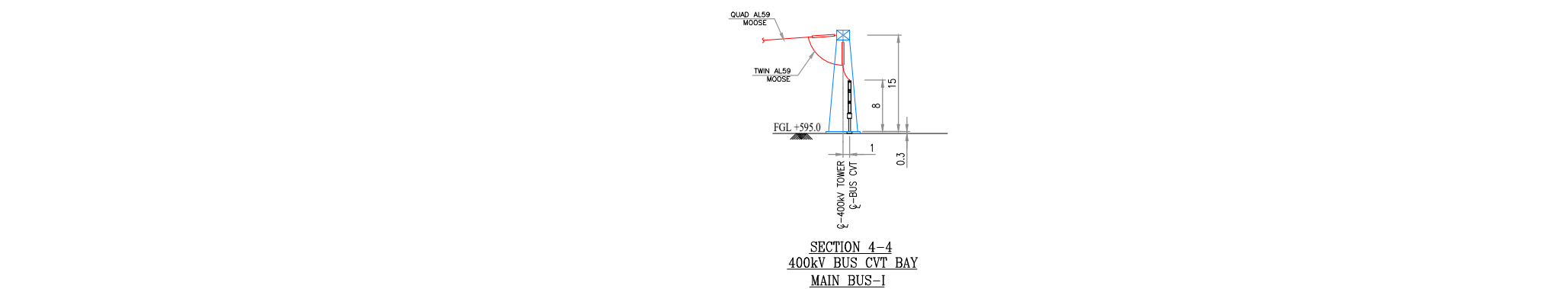
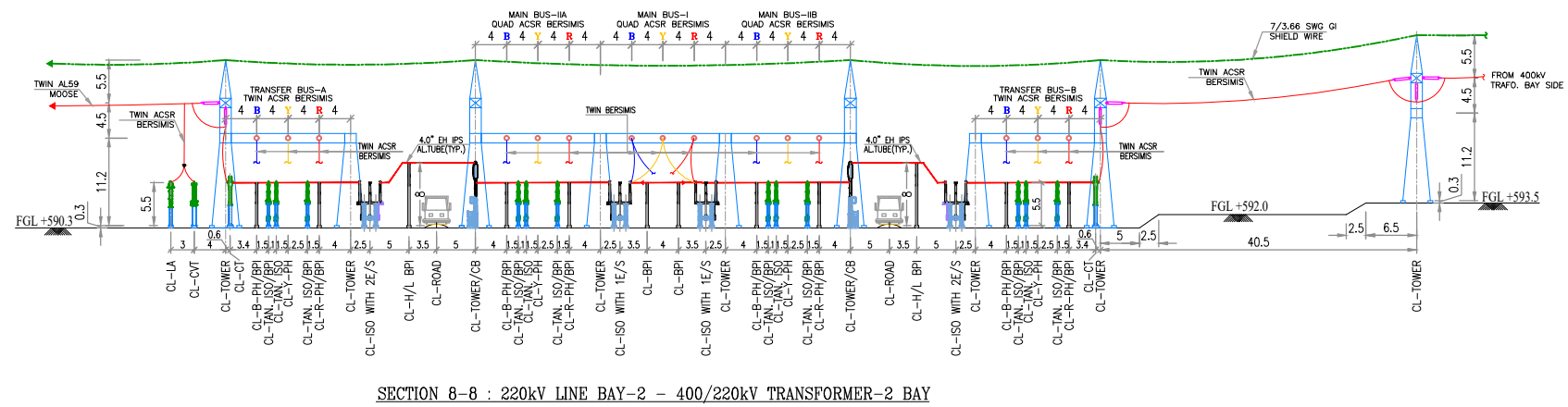
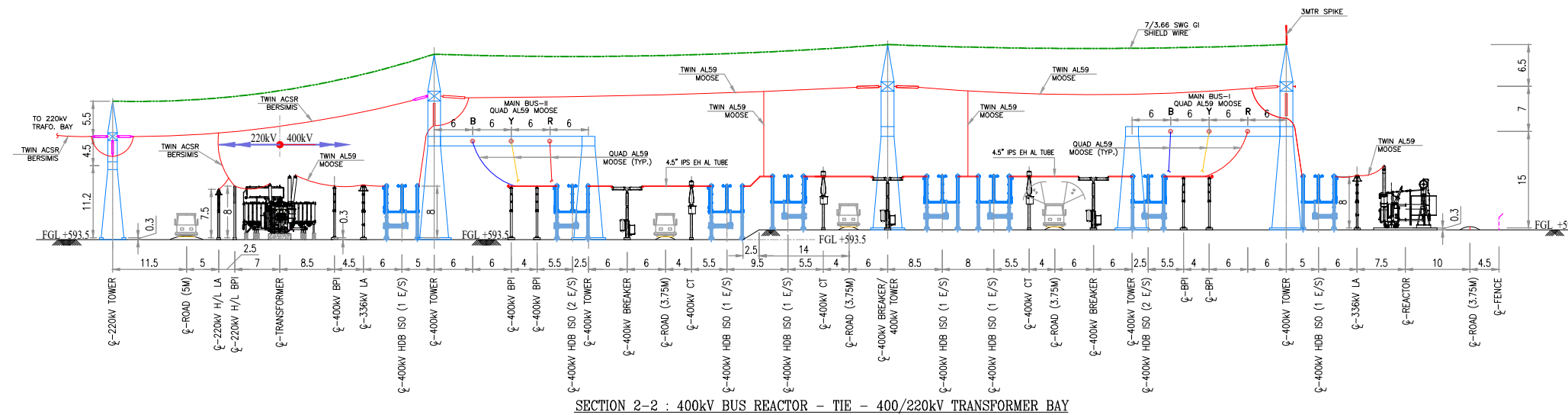
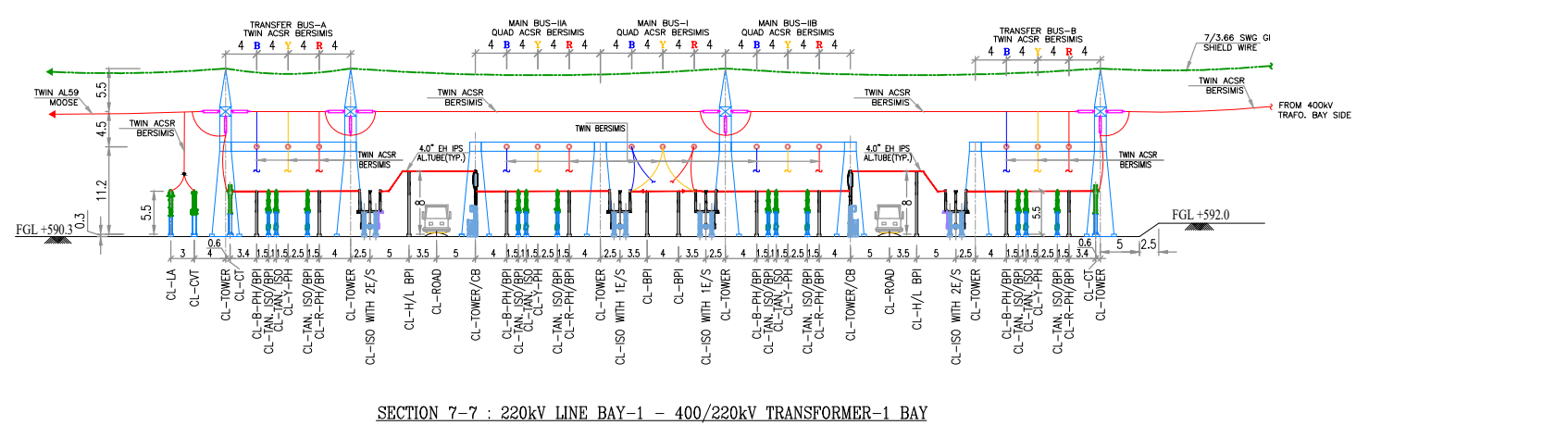
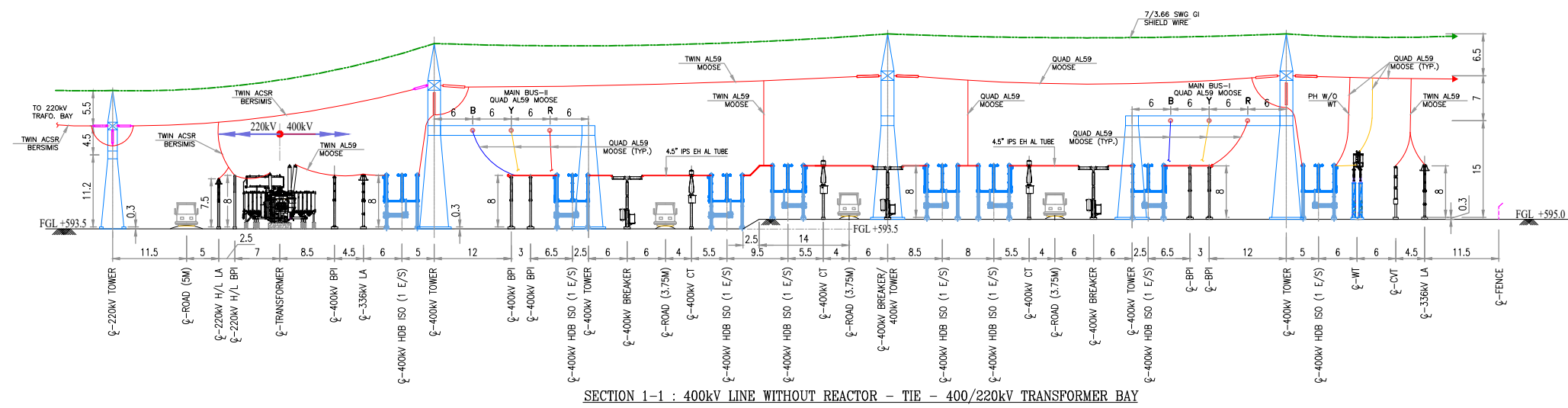
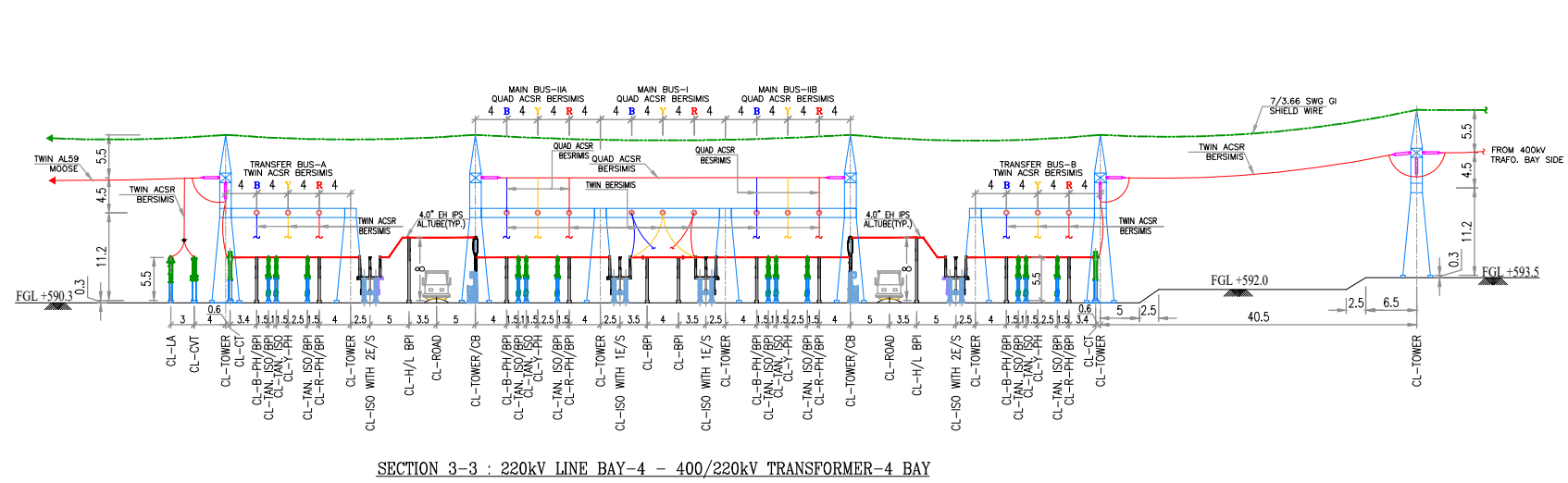
01. ALL DIMENSIONS & LEVELS IN MTR UNLESS NOTED OTHERWISE. FOR UNDERSTANDING FGL IN VARIOUS AREA UNDER PHASE-I, REFER SPOT LEVELS/CONTOUR AS PER APPD. SURVEY DRG. HOWEVER, FGL IS ONLY PROPOSED FOR AREA WITHIN FENCE OF PHASE-1 & THE BUILDING AREA.
02. FOR UNDERSTANDING THE COMPLETE PLOT BOUNDARY, NEAREST EXISTING MAIN ROAD OUTSIDE BOUNDARY WALL, MAIN GATE ON BOUNDARY WALL, MAIN GATE TO BUILDING AREA, SECURITY ROOM NEAR MAIN GATE, REFER DRG.NO. REC/KRPA/C-LV-DRG/OGA-44 - OVERALL PLAN GA-LAYOUT PLAN OF S/S WITH TOWERS/TRAF0 SHOWING FGL AND SLOPES/SLOPE PROTECTION DETAILS. THE OUTLINE OF SITE LEVELING AREA UNDER PHASE-1 IS SHOWN AS A-B-C-.....-K. THIS DRG. TO BE ALSO REFERRED FOR - A. COORDINATES FOR SURVEY WORK DURING CONSTRUCTION. B. UNDERSTANDING LEVEL FOR NATURAL GROUNDING FOR CIVIL WORKS. C. UNDERSTANDING LEVELS OF DIFFERENT LOCATION OF BOUNDARY WALL(PRE-CAST BOUGHT OUT TYPE).
03. AS PER APPD. SURVEY DRG., THERE EXISTS A KACHOHA NALLAH FLOWING THRO' SITE IN NATURAL SLOPE. THIS DRG. SHOWS THE SCOPE OF NEW PUCCA NALLAH/IRRI/CHANNEL TO BE BUILT UNDER PRESENT SCOPE TO DIVERT THE EXISTING FROM INTERFERENCE IN 220KV BAYS AND TRAF0 MEETING THE SAME KACHOHA NALLAH AGAIN BEYOND FENCE ON EAST SIDE. FOR DETAILS OF NEW DRAINAGE CHANNEL, REF. ABOVE OGA DRG.
04. FOR BASIC SYSTEM PARAMETERS/CLEARANCES & CONDUCTOR DETAILS, REFER TABLE PROVIDED IN THIS DRG.
05. FOLLOWING DETAILS SHOWN TO REMAIN HOLD TILL FURTHER CLEARANCE :- A. 400 & 220KV LINE SIDE EQUIPMENTS TILL FINALIZATION OF DEAD END T/L TOWER. B. LA & BPI ON BOTH 400 & 220KV SIDE OF 500 MVA POWER TRANSFORMER TILL RELEASE OF TRANSFORMER DRG. C. 220KV TANDEM ISOLATORS & ASSOCIATED BPI TILL APPROVAL OF OGA DRG. OF 220KV TANDEM ISOLATOR.
06. FOR SINGLE LINE DIAGRAM, REFER DRG. NO. REC/KRPA/TU/E-SYD-DRG/SLD-001. FOLLOWING DOC. TO BE READ IN CONJUNCTION TO THIS DRG. :- A. DESIGN OF DIRECT STROKE LIGHTNING PROTECTION & ASSOCIATED DRG. B. BOQ FOR ALL MAJOR SWITCH GEAR EOP. & TRANSFORMERS IN SINGLE LINE DIAGRAM. C. CRECTION KEY DIAGRAM FOR BOQ OF ALL MAJOR ITEMS TO BE SUPPLIED EXCEPT CABLES & EARTHING MATERIALS. D. ELEC. LAYOUT - PLAN OF CONTROL ROOM BUILDING ALONG WITH T/L SLD FOR ALL AC/DC PANEL, BATTERIES/CHARGERS. E. EARTHING DESIGN & ALLIED EARTH MAT LAYOUT DRG. FOR BOQ OF EARTHING MATERIALS. F. TYP. EARTHING DETAILS FOR UNDERSTANDING PROCEDURE OF EARTHING CONNECTION TO ALL & SUNDRIES. G. ELEC. LAYOUT - PLAN OF SPR BUILDING FOR BOQ OF ALL CONTROL, RELAY, METERING & COMMUNICATION PANELS. HOWEVER, FOR SA/S/SAUX PANELS, REFER DRG. IN SL D ABOVE. H. OUTDOOR CABLE TRENCH LAYOUT FOR BOQ OF EARTHING MATERIALS REQUIRED IN CABLE TRENCH. HOWEVER, FOR BOQ OF TRENCH MATERIALS INSIDE CONTROL ROOM BUILDING & SPR, REFER RESPECTIVE DRG. I. STRUCTURAL LAYOUT DRG. FOR COMPLETE BOQ OF ALL GANTRY STRUCTURES. FOR EQUIPMENT SUPPORT STRUCTURES, A SEPARATE LIST/BOQ TO BE PREPARED FOR ISSUANCE TO MANUFACTURER.
07. LT SYSTEM SLD/ILLUMINATION A. A SEPARATE SLD TO BE PREPARED FOR COMPLETE AC & DC POWER & ALLIED CABLING SYSTEM WHICH MUST BE CAPABLE SERVE THE REQUIREMENT OF ALL FUTURE BAYS SHOWN HERE. THERE WILL BE NO FURTHER EXPANSION OF THIS SYSTEM. B. THIS LT SLD(ALONG WITH ALLIED SPEC) TO BE ISSUED TO RESPECTIVE MANUFACTURER OF LT PANELS/BATTERIES etc. AS WELL AS FOR ILLUMINATION SYSTEM.
08. FIRE FIGHTING SYSTEM A. THIS DRG. SHOWS TENTATIVE LOCATION OF ALL TRANSFORMERS/REACTORS, CONTROL ROOM BUILDING & SPR. IT ALSO INDICATES THE LOCATION OF FIRE WATER TANK & FIRE FIGHTING PUMP HOUSE. ALL 400/220KV POWER TRANSFORMERS & REACTORS IN PRESENT/FUTURE SCOPE ARE TO BE COVERED BY THE FIRE FIGHTING SYSTEM(HIGH VELOCITY WATER SPRAY AND/OR NITROGEN BASED FIRE DETECTION/AVOIDANCE SYSTEM, AS PER CEA'S MANUAL ON TRANSFORMER). IN ADDITION, FIRE DETECTION & ALARM SYSTEM TO BE ALSO DESIGNED BY MECH. ENGG. FOR CONTROL ROOM BUILDING & SPR. B. OUTDOOR YARD PIPE NETWORK, PUMPS & WATER FLOW TO BE DESIGNED SUCH THAT REQUIRED WATER PRESSURE CAN BE GENERATED IN THE FARTHEST TRANSFORMER/REACTORS IN FUTURE.
09. AIR CONDITIONING & VENTILATION SYSTEM FOR SPR & CONTROL ROOM BUILDING A. VENTILATION SYSTEM TO BE PROVIDED IN AC/DC ROOM. AIR CONDITIONING TO BE PROVIDED FOR SA/SAUX PANEL & BATTERY ROOM, CONFERENCE ROOM, IN-CHARGE ROOM, OFFICE ROOM IN CONTROL ROOM BUILDING & ALL SPR. B. THESE ARE TO BE DESIGNED BASED ON SEPARATE TECH. SPEC. BY MECHANICAL ENGINEERS/CONSULTANT.
10. OTHER DETAILS A. ALL ROADS TO BE OF SINGLE LANE-3.75M WIDE. HOWEVER, FOR THE PULLER OF TRAF0 TRAILER TO TURN ROUND, A SP-ACE OF 15M LENGTH OF ROAD TO BE MADE OF TOP OF ROAD AS SHOWN IN THIS DRG. LEVEL OF TOP OF ROAD +200MM AT ALL LOCATIONS. HOWEVER, RAIL CUM ROAD TOP TO BE +300mm & HENCE, NEAR THE SAME, ROAD TO BE RAISED BY SLOPE(NOT EXCEEDING 1:60). CURVATURE ON ROAD TO BE MIN. 7.0M FOR TRAF0 ROAD & 4.0M FOR ALL OTHERS. B. BORE WELL LOCATION TO BE NEAR FFPH BUILDING BUT TO BE DECIDED SUITABLY AT SITE. CAPACITY OF BORE WELL/PUMP AS DECIDED THRO' FIRE FIGHTING SYSTEM DESIGN.
11. REFER SHEET 02 OF 02 FOR SECTIONAL DETAILS.

REFERENCE DOCUMENTS

Single Line Diagram 400 kV & 220 KV SS (With BOQ)	REC/KRPA/TU/E-SYD-DRG/SLD-001
Protection Single Line Diagram 400 kV & 220 KV SS	REC/KRPA/TU/E-SYD-DRG/PSLD-002
Electrical Layout - Plan & Section	REC/KRPA/TU/E-SYD-DRG/EL-003
Structural Layout - Plan and Section	REC/KRPA/TU/E-SYD-DRG/STR-004
DSLPL Layout - Plan and Section	REC/KRPA/TU/E-SYD-DRG/DSLPL-005
Electrical Layout : Control Room Building	REC/KRPA/TU/E-SYD-DRG/CRB-006
Electrical Layout : SPR Building	REC/KRPA/TU/E-SYD-DRG/SPR-007
Earthing Layout	REC/KRPA/TU/E-SYD-DRG/EM-008
Typical Equipment Earthing Details	REC/KRPA/TU/E-SYD-DRG/EME-009
Single Line Diagram of AC & DC Auxiliary systems (If Required)	REC/KRPA/TU/E-SYD-DRG/LTSLD-010
Clearance Diagram 400 kV & 220kV	REC/KRPA/TU/E-SYD-DRG/CD-011
Erection Key Diagram-Layout Plan & Section	REC/KRPA/TU/E-SYD-DRG/EKD-012
Cable Trench Layout - Outdoor Yard	REC/KRPA/TU/E-SYD-DRG/CR-013

G R INFRAPROJECTS LIMITED SECTOR-18, GURUGRAM (122015)	
TUMKUR-II REZ POWER TRANSMISSION LIMITED	
Approval status	
A: APPROVED	☒
B: APPROVED SUBJECT TO INCORPORATION OF COMMENTS	☐
C: RESUBMIT FOR APPROVAL AFTER INCORPORATING COMMENTS	☐
D: FOR INFORMATION & RECORD	☐
E: NOT APPROVED	☐
THIS APPROVAL SHALL NOT RELIEVE THE CONTRACTOR FROM ITS CONTRACTUAL OBLIGATIONS	
DATE-07-08-25	SIGN

		Name				CUSTOMER	TUMKUR-II REZ POWER TRANSMISSION LIMITED (A WHOLLY OWNED SUBSIDIARY OF GR INFRA PROJECTS LTD., GURUGRAM, HARYANA)				
R2	BAY NAME & NUMBERING PRESENT & FUTURE SCOPE	Date					OWNER'S ENGINEER	BONA FANG ZHENG PRIVATE LIMITED ,KOLKATA, WEST BENGAL			
		Sign.									
		Name	K.R	S.P	V.M						
		Date	07-08-25	07-08-25	07-08-25						
R1	SECOND ISSUE CHANGE THE LOCATION OF 220kV TBC-1 BPI	Sign.				PROJECT STATION	TRANSMISSION SCHEME FOR INTEGRATION OF TUMKUR-II REZ IN KARNATAKA ESTABLISHMENT OF 400/220kV, 4X500MVA POOLING STATION NEAR TUMKUR, KARNATAKA				
		Name	A.B	V.S	V.M						
		Date	07-07-25	14-07-25	14-07-25						
		Sign.									
R0	FIRST ISSUE	Name	A.B	V.S	V.M	REF NO	RECPDCL/TBCB/TUMKUR-II/2024-2025/1594 DATED 12.08.2024.				
		Date	28-01-25	28-01-25	28-01-25						
		Sign.									
REV.	DESCRIPTION	Name	A.B	V.S	V.M	FOR APPROVAL	DRG. TITLE	400/220kV POOLING STN. NEAR TUMKUR : ELECTRICAL LAYOUT - PLAN & SECTION			
		Date	28-01-25	28-01-25	28-01-25						
		Sign.									
						CLIENT	 G R INFRAPROJECTS LTD. 2nd Floor, Novus Tower, Plot No. 18, Phase-IV, Udyog Vihar, Sector-18, Gurugram, Haryana-122015, India	DRAWING No.		SHEET	SCALE
									1 OF 2	NTS	
								REC/KRPA/TU/E-SYD-DRG/EL-003		REV. R2	DATE 07.08.25



G R INFRAPROJECTS LIMITED SECTOR-18, GURUGRAM (122015)	
TUMKUR-II REZ POWER TRANSMISSION LIMITED Approval status: ☒ APPROVED A: APPROVED B: APPROVED SUBJECT TO INCORPORATION OF COMMENTS C: RESUBMIT FOR APPROVAL AFTER INCORPORATING COMMENTS D: FOR INFORMATION & RECORD E: NOT APPROVED THIS APPROVAL SHALL NOT RELIEVE THE CONTRACTOR FROM ITS CONTRACTUAL OBLIGATIONS DATE-07-08-25 SIGN	

REV.	DESCRIPTION	DRAWN/DATE	CHECKED	APPRD.	STATUS	CUSTOMER	OWNER'S ENGINEER	PROJECT	STATION	REF NO	DRG. TITLE	CLIENT	DRAWING No.	SHEET 2 OF 2	SCALE NTS	DATE 07.08.25
R2	BAY NAME & NUMBERING PRESENT & FUTURE SCOPE	K.R	S.P	V.M		TUMKUR-II REZ POWER TRANSMISSION LIMITED (A WHOLLY OWNED SUBSIDIARY OF GR INFRA PROJECTS LTD., GURUGRAM, HARYANA)	BONA FANG ZHENG PRIVATE LIMITED, KOLKATA, WEST BENGAL	TRANSMISSION SCHEME FOR INTEGRATION OF TUMKUR-II REZ IN KARNATAKA	ESTABLISHMENT OF 400/220kV, 4X500MVA POOLING STATION NEAR TUMKUR, KARNATAKA	RECPDCL/TBCB/TUMKUR-II/2024-2025/1594 DATED 12.08.2024.	400/220kV POOLING STN. NEAR TUMKUR : ELECTRICAL LAYOUT - PLAN & SECTION	GRI G R INFRAPROJECTS LTD. 2nd Floor, Naras Tower, Plot No. 18, Phase-IV, Udyog Vihar, Sector-18, Gurugram, Haryana-122015, India.	REC/KRPA/TU/E-SYD-DRG/EL-003			
R1	SECOND ISSUE CHANGE THE LOCATION OF 220kV TBC-1 BPI	A.B	V.S	V.M												
R0	FIRST ISSUE	A.B	V.S	V.M												