

<b>Annexure-1</b>			
<b>Project :- 400 kV Switchyard at 5X800MW Yadadri TPS</b>			
<b>List of documents</b>			
<b>Sl. No.</b>	<b>Document No.</b>	<b>Description</b>	<b>No. of pages</b>
1	TB-2-387-510-001	Single line diagram	1
2	TB-0-387-510-002 (Sheet 1 of 2)	Layout Plan of 400 kV Switchyard	1
3	TB-0-387-510-002 (Sheet 2 of 2)	Sectional Elevation of 400 kV Switchyard	1
4	TB-3-387-316-008	Conceptual Control room building Layout	3
5	TB-3-387-316-009	Panel placement & trench layout in Control room	2
6	TB-0-387-316-005	Trench Layout outdoor	1
7	TB-0-387-316-013	Erection Key Diagram	5



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REF. DRG. NO.

SIGN. AND DATE

INVENTORY NO

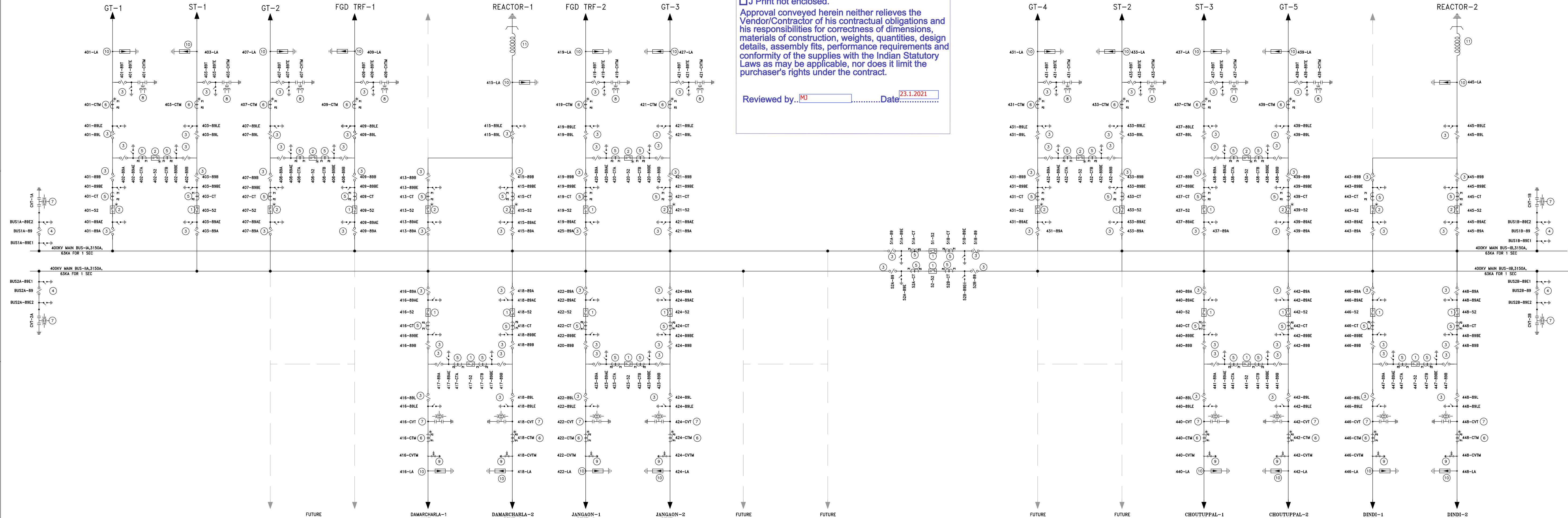
FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN MM.)

TATA CONSULTING ENGINEERS LIMITED  
VENDOR DOCUMENT REVIEW STATUS

- ☒ A Drawing/Document approved as submitted. Proceed with fabrication/construction.
- ☐ B Drawing/Document approved subjected to comments noted. Proceed with fabrication/construction considering our comments.
- ☐ C Our comments are noted on this marked up print.
- ☐ D Our comments are noted in memo attached to the forwarding transmittal letter No. \_\_\_\_\_, Dated: \_\_\_\_\_.
- ☐ E Correct original of this drawing/document to reflect our comments and resubmit for approval.
- ☐ F Correct original of this drawing/document to reflect our comments and resubmit for records.
- ☐ G Drawings/Documents of this category are for information only and not for approval. Information furnished on the drawing/document is noted.
- ☒ H Drawing/Document reviewed against our previous comments and other revisions highlighted and identified by the vendor.
- ☐ I Drawing/Document returned without review.
- ☐ J Print not enclosed.

Approval conveyed herein neither relieves the Vendor/Contractor of his contractual obligations and his responsibilities for correctness of dimensions, materials of construction, weights, quantities, design details, assembly fits, performance requirements and conformity of the supplies with the Indian Statutory Laws as may be applicable, nor does it limit the purchaser's rights under the contract.

Reviewed by: MJ .....Date: 23.1.2021



SCHEDULE OF EQUIPMENT:-

S.NO.	DESCRIPTION	SYMBOL	QTY
1	400KV, 3150A, 63KA FOR 3 SEC, 3PH, SF6 CIRCUIT BREAKER WITHOUT PIR WITHOUT CSD		19
2	400KV, 3150A, 63KA FOR 3 SEC, 3PH, SF6 CIRCUIT BREAKER WITHOUT PIR WITH CSD		14
3	400KV, 3150A, 63KA FOR 1 SEC, 3PH, HDB ISOLATOR MOTOR AS WELL AS MANUALLY OPERATED ELECTRICALLY GANGED WITH ONE EARTH SWITCH MOTOR OPERATED		96
4	400KV, 3150A, 63KA FOR 1 SEC 3PH, HDB ISOLATOR MOTOR AS WELL AS MANUALLY OPERATED ELECTRICALLY GANGED WITH TWO EARTH SWITCH MOTOR OPERATED		04
5	400KV, 3000A, 5 CORE, 63KA FOR 1 SEC, 1PH CURRENT TRANSFORMER		132
6	400KV, 3000A, 1 CORE, 63KA FOR 1 SEC, 1PH CURRENT TRANSFORMER (METERING)		54
7	400KV, 4400pF, 1PH, CAPACITIVE VOLTAGE TRANSFORMER (3 SECONDARY)		36
8	400KV 4400pF, 1PH, METERING CAPACITIVE VOLTAGE TRANSFORMER (2 SECONDARY) (FOR CT/ST/TSO CKT)		30
9	400KV 4400pF, 1PH, METERING CAPACITIVE VOLTAGE TRANSFORMER (1 SECONDARY) (FOR LINE CKT)		24
10	590KV, 20KA, 1-PH, METAL OXIDE GAPLESS TYPE CLASS- IV POLYMER SURGE ARRESTER (PRESSURE RELIEF CLASS 63KA @ 0.2 SEC.)		60
11	400KV, 125MVAR BUS REACTOR		02

SYSTEM PARAMETERS:-

DESCRIPTION	400KV
HIGHEST SYSTEM VOLTAGE (KV)	420
SYSTEM VOLTAGE (KV)	400±5%
FREQUENCY	50 Hz, +3% TO -5%
NO. OF PHASE	3
LIGHTNING IMPULSE WITHSTAND VOLTAGE(KVP)	1425
SWITCHING IMPULSES WITHSTAND VOLTAGE (KVP)	1050
P.F. WITHSTAND VOLTAGE (Kvrms)	630
CREEPAGE DISTANCE (mm)	10500
SYSTEM EARTHING	EFFECTIVELY EARTHED
AMBIENT TEMPERATURE	50 DEG. C.
SHORT CIRCUIT CURRENT	63KA FOR 1 SEC.
CORONA EXTINCTION VOLTAGE (MIN.)	320KV (rms)
MAX. RADIO INTERFERENCE POWER FOR FREQUENCY BETWEEN 0.5MHz & 2MHz AT 280Vrms	1000 microV

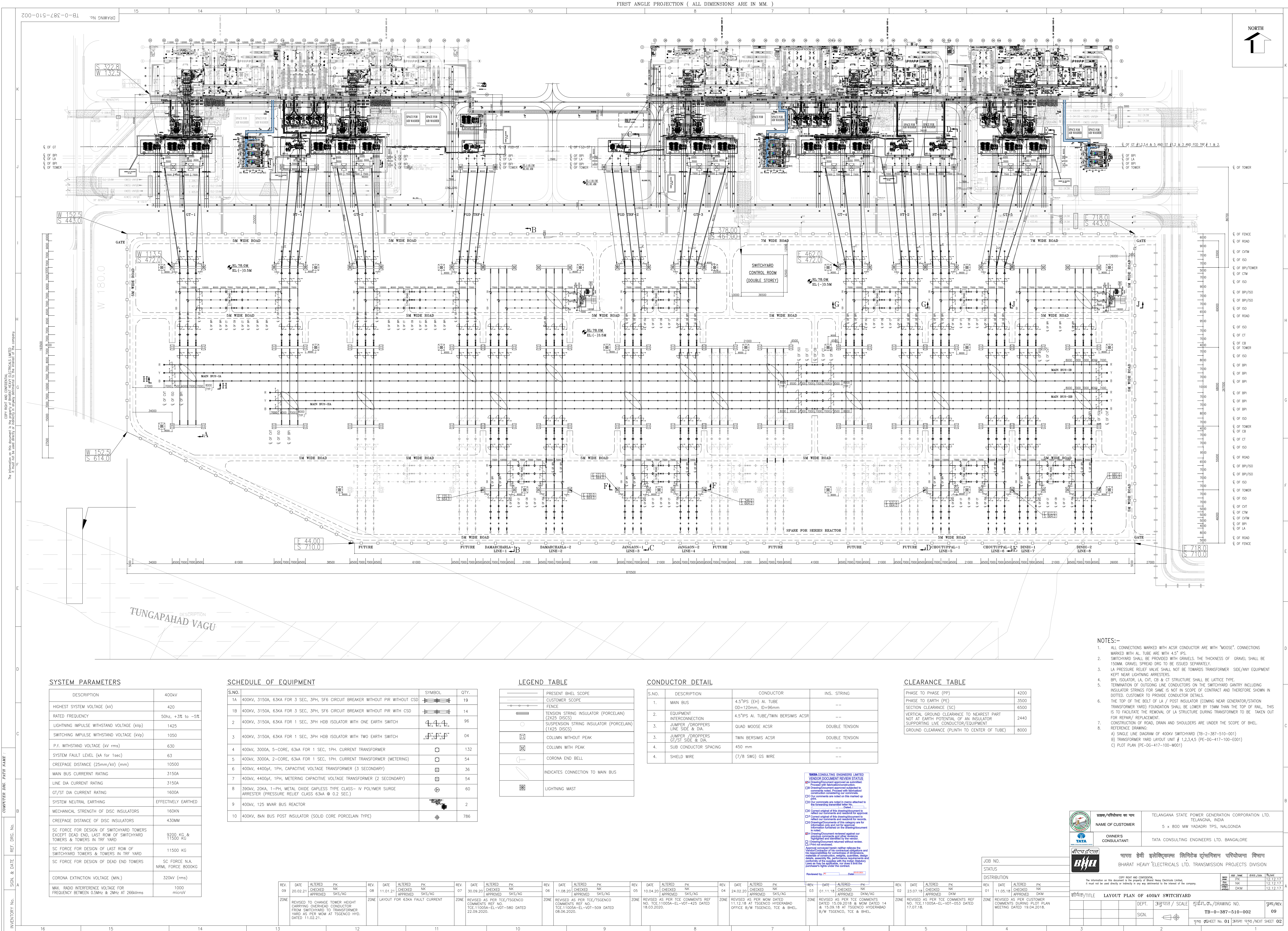
NOTE:-

- SYSTEM: 400KV, 3150A, 50Hz, 25mm/kV, 63 KA FOR 1 SEC, EFFECTIVELY EARTHED.
- OVERHEAD LINE CONNECTIONS - GT/ST/REACTOR BAYS (TWIN ACSR BERGIMS) - LINE BAYS (QUAD ACSR MOOSE)

	प्रमाण/परिचयन का नाम NAME OF CUSTOMER	TELANGANA STATE POWER GENERATION CORPORATION LTD. TELANGANA, INDIA 5 x 800 MW YADADRI TPS, NALGONDA
	OWNER'S CONSULTANT	TATA CONSULTING ENGINEERS LTD. BANGALORE
	भारत हेवी इलेक्ट्रिकल्स लिमिटेड ट्रांसमिशन परियोजना विभाग BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION	
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JOB NO. _____ STATUS _____ DISTRIBUTION _____		
REV. DATE ALTERED PK	REV. DATE ALTERED PK	REV. DATE ALTERED PK
05 13.01.21 CHECKED SKS APPROVED AG	04 27.01.20 CHECKED SKS APPROVED AG	03 29.10.18 CHECKED NK APPROVED DKM/RS
ZONE REVISED AS PER APPROVED LAYOUT PLAN OF 400KV SWITCHYARD. (TB-0-387-510-002 REV 08)	ZONE REVISED AS PER MOM DATED 15.12.18 AT TSGENCO OFFICE HYDERABAD.	ZONE REVISED AS PER CUSTOMER/CONSULTANT COMMENTS RECEIVED VIDE REF. NO. TCE. 11005A-EL-VOT-078 DATED 11.09.18 AND MOM DATED 24 & 25.07.18 AT TSGENCO OFFICE HYDERABAD.
REVISED AS PER CUSTOMER/CONSULTANT COMMENTS RECEIVED VIDE D.NO. 46 DATED 21.03.18.		
DEPT. जलपात / SCALE ड्राईंग, क./DRAWING NO. पुन:REV.		
SIGN.  TB-2-387-510-001 05		
पृष्ठ 05 SHEET No. 01 जगता पृष्ठ /NEXT SHEET 02		

SIZE-A0





SYSTEM PARAMETERS

DESCRIPTION	400KV
HIGHEST SYSTEM VOLTAGE (kV)	420
RATED FREQUENCY	50hz, +3% to -5%
LIGHTNING IMPULSE WITHSTAND VOLTAGE (kVp)	1425
SWITCHING IMPULSE WITHSTAND VOLTAGE (kVp)	1050
P.T. WITHSTAND VOLTAGE (kV rms)	630
SYSTEM FAULT LEVEL (kA for 1sec)	63
CREEPAGE DISTANCE (25mm/kV) (mm)	10500
MAIN BUS CURRENT RATING	3150A
LINE DIA CURRENT RATING	3150A
GT/ST DIA CURRENT RATING	1600A
SYSTEM NEUTRAL EARTHING	EFFECTIVELY EARTHED
MECHANICAL STRENGTH OF DISC INSULATORS	160KN
CREEPAGE DISTANCE OF DISC INSULATORS	430MM
SC FORCE FOR DESIGN OF SWITCHYARD TOWERS EXCEPT DEAD END, LAST ROW OF SWITCHYARD TOWERS & TOWERS IN TRF YARD	9200 KG. & 19500 KG
SC FORCE FOR DESIGN OF LAST ROW OF SWITCHYARD TOWERS & TOWERS IN TRF YARD	11500 KG
SC FORCE FOR DESIGN OF DEAD END TOWERS	SC FORCE N.A. NRML FORCE 8000KG
CORONA EXTINCTION VOLTAGE (MIN.)	320kV (rms)
MAX. RADIO INTERFERENCE VOLTAGE FOR FREQUENCY BETWEEN 0.5MHz & 2MHz AT 266Vrms	1000 microV

SCHEDULE OF EQUIPMENT

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8	390KV, 20KA, 1-PH, METAL OXIDE GAPLESS TYPE CLASS- IV POLYMER SURGE ARRESTER (PRESSURE RELIEF CLASS 63KA @ 0.2 SEC.)	60
9	400KV, 125 MWAR BUS REACTOR	2
10	400KV, 8KN BUS POST INSULATOR (SOLID CORE PORCELAIN TYPE)	786

LEGEND TABLE

	PRESENT BHEL SCOPE
	CUSTOMER SCOPE
	FENCE
	TENSION STRING INSULATOR (PORCELAIN) (2X25 DISCS)
	SUSPENSION STRING INSULATOR (PORCELAIN) (1X25 DISCS)
	COLUMN WITHOUT PEAK
	COLUMN WITH PEAK
	CORONA END BELL
	INDICATES CONNECTION TO MAIN BUS
	LIGHTNING MAST

CONDUCTOR DETAIL

S.NO.	DESCRIPTION	CONDUCTOR	INS. STRING
1.	MAIN BUS	4.5"IPS (EH) AL. TUBE OD=120mm, ID=96mm	---
2.	EQUIPMENT INTERCONNECTION	4.5"IPS AL. TUBE/TWIN BERSIMIS ACSR	---
3.	JUMPER /DROPPERS LINE SIDE & DIA.	QUAD MOOSE ACSR	DOUBLE TENSION
3.	JUMPER /DROPPERS GT/ST SIDE & DIA.	TWIN BERSIMIS ACSR	DOUBLE TENSION
4.	SUB CONDUCTOR SPACING	450 mm	---
4.	SHIELD WIRE	(7/8 SWG) GS WIRE	---

CLEARANCE TABLE

PHASE TO PHASE (PP)	4200
PHASE TO EARTH (PE)	3500
SECTION CLEARANCE (SC)	6500
VERTICAL GROUND CLEARANCE TO NEAREST PART NOT AT EARTH POTENTIAL OF AN INSULATOR SUPPORTING LINE CONDUCTOR/EQUIPMENT	2440
GROUND CLEARANCE (PLUNTH TO CENTER OF TUBE)	8000

NOTES:-

- ALL CONNECTIONS MARKED WITH ACSR CONDUCTOR ARE WITH "MOOSE". CONNECTIONS MARKED WITH AL. TUBE ARE WITH 4.5" IPS.
- SWITCHYARD SHALL BE PROVIDED WITH GRAVELS. THE THICKNESS OF GRAVEL SHALL BE 150MM. GRAVEL SPREAD DRG TO BE ISSUED SEPARATELY.
- LA PRESSURE RELIEF VALVE SHALL NOT BE TOWARDS TRANSFORMER SIDE/ANY EQUIPMENT KEPT NEAR LIGHTNING ARRESTERS.
- BPI, ISOLATOR, LA, CT, CB & CT STRUCTURE SHALL BE LATTICE TYPE.
- TERMINATION OF OUTGOING LINE CONDUCTORS ON THE SWITCHYARD GANTRY INCLUDING INSULATOR STRINGS FOR SAME IS NOT IN SCOPE OF CONTRACT AND THEREFORE SHOWN IN DOTTED. CUSTOMER TO PROVIDE CONDUCTOR DETAILS.
- THE TOP OF THE BOLT OF LA / POST INSULATOR (COMING NEAR GENERATOR/STATION TRANSFORMER YARD) FOUNDATION SHALL BE LOWER BY 15MM THAN THE TOP OF RAIL. THIS IS TO FACILITATE THE REMOVAL OF LA STRUCTURE DURING TRANSFORMER TO BE TAKEN OUT FOR REPAIR/ REPLACEMENT.
- CONSTRUCTION OF ROAD, DRAIN AND SHOULDERS ARE UNDER THE SCOPE OF BHEL.
- REFERENCE DRAWING:  
A) SINGLE LINE DIAGRAM OF 400KV SWITCHYARD (TB-2-387-510-001)  
B) TRANSFORMER YARD LAYOUT UNIT # 1,2,3,4,5 (PE-DG-417-100-001)  
C) PLOT PLAN (PE-DG-417-100-M001)

COMPUTER DSC PATH NAME :

REF. DRG. NO.

SGN. & DATE

INVENTORY NO.

JOB NO.

STATUS

DISTRIBUTION

REV. DATE ALTERED PK

01 11.01.18 CHECKED NK

02 23.07.18 CHECKED NK

03 01.11.18 CHECKED NK

04 24.02.20 CHECKED NK

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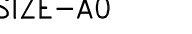
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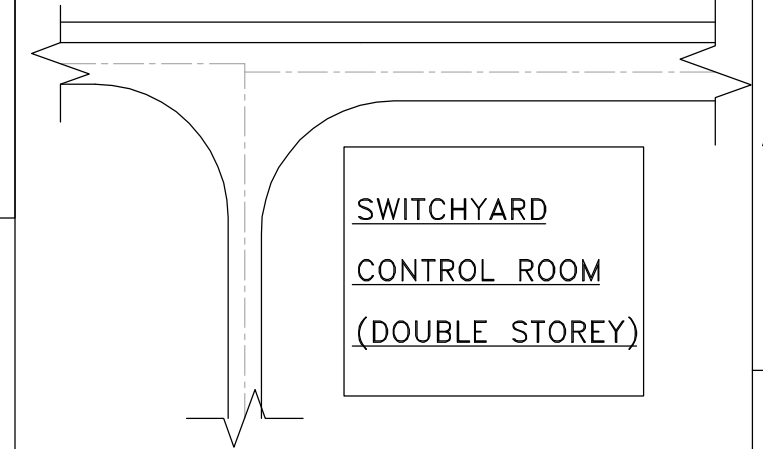
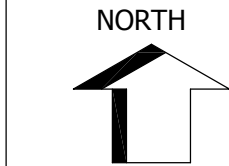
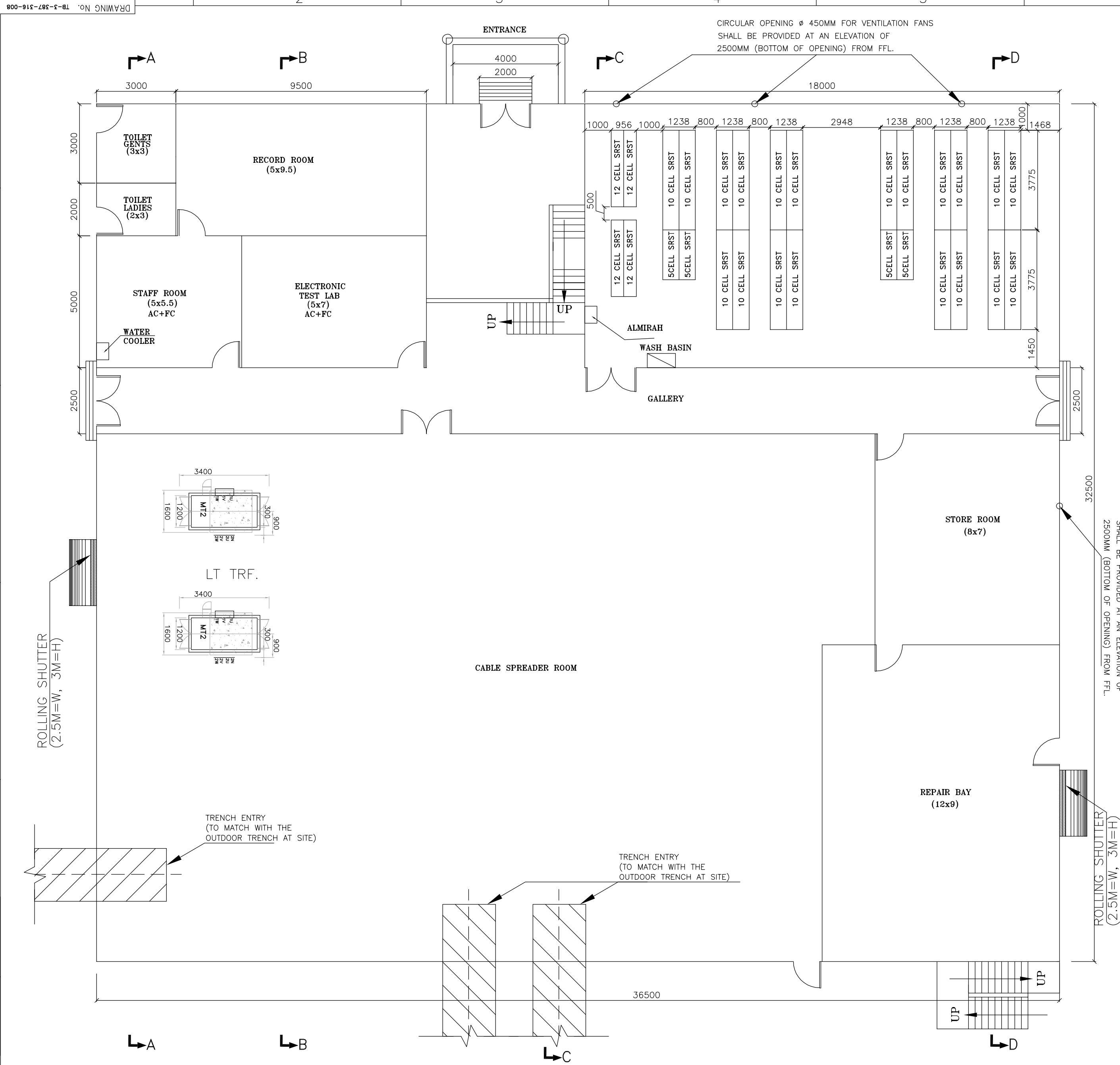
COMPUTER FILE NAME

REF. DRG. NO.

SIGN AND DATE

INVENTORY NO

FIRST ANGLE PROJECTION ( ALL DIMENSIONS ARE IN MM.)



KEY PLAN

NOTES:-

1. ALL DIMENSIONS ARE IN MM. DIMENSIONS SPECIFIED FOR ROOMS ARE IN METRES.
2. -0.50M SHALL BE READ AS FGL OF SWITCHYARD.
3. 400KV SWITCHYARD CONTROL ROOM BUILDING IS A DOUBLE STOREY BUILDING WITH TRENCHES BELOW FLOOR LEVEL FOR CABLE LAYING.
4. CASSETTE TYPE AC WITH FALSE CEILING (AC+FC) SHALL BE PROVIDED IN STAFF ROOM & ELECTRONIC TEST LAB AT GROUND FLOOR AND OFFICE ROOM'S & CONFERENCE ROOM ON FIRST FLOOR. CONTROL ROOM ON THE FIRST FLOOR SHALL BE PACKAGED AIR-CONDITIONED WITH FALSE CEILING. OTHER PARTS OF BUILDING SHALL BE NON AIR-CONDITIONED & WITH NO FALSE CEILING. UNDER DECK INSULATION SHALL BE PROVIDED FOR AC AREAS.
5. DIMENSIONS AND ARRANGEMENT OF PANELS INSIDE CONTROL ROOM BUILDING ARE INDICATIVE AND SHALL BE FINALISED DURING DETAILED ENGINEERING.
6. LT SWITCHGEAR ROOM, BATTERY ROOM, PANTRY, TOILETS AND STORE ROOM SHALL BE PROVIDED WITH EXHAUST AIR FANS.
7. ALL ROOM EXCEPT AHU ROOM SHALL BE PROVIDED WITH WINDOW.
8. ALL THE DIMENSIONS OF THE ROOMS ARE WALL CENTRE TO CENTRE DIMENSIONS.
9. SEPARATE DRAWING SHALL BE SUBMITTED FOR DETAILED ARCHITECTURE AND TRENCH LAYOUT OF CONTROL ROOM BUILDING.
10. PROTECTION/BAY CONTROL PANELS WILL BE LOCATED IN OUTDOOR SWITCHYARD AC KIOSK.
11. ALUMINIUM GLAZED WINDOW SHALL BE PROVIDED IN CONTROL ROOM TO HAVE A CLEAR VIEW OF SWITCHYARD EQUIPMENTS.
12. PROTECTIVE GRILL SHALL BE PROVIDED FOR ALL THE GLASS WINDOWS FACING SWITCHYARD.
13. BATTERY ROOM AND SWITCHGEAR ROOM DOOR SHALL BE FIRE-PROOF TYPE.
14. ACID SPILL PROOF TYPE OF FLOORING SHALL BE PROVIDED IN BATTERY ROOM.

<b>TATA CONSULTING ENGINEERS LIMITED</b>	
<b>VENDOR DOCUMENT REVIEW STATUS</b>	
<input type="checkbox"/> A Drawing/Document approved as submitted. Proceed with fabrication/construction.	
<input type="checkbox"/> B Drawing/Document approved subjected to comments noted. Proceed with fabrication/construction considering our comments.	
<input type="checkbox"/> C Our comments are noted on this marked up print.	
<input type="checkbox"/> D Our comments are noted in memo attached to the forwarding transmittal letter No. ....Dated:..	
<input type="checkbox"/> E Correct original of this drawing/document to reflect our comments and resubmit for approval.	
<input type="checkbox"/> F Correct original of this drawing/document to reflect our comments and resubmit for records.	
<input checked="" type="checkbox"/> G Drawings/Documents of this category are for information only and not for approval. Information furnished on the drawing/document is noted.	
<input type="checkbox"/> H Drawing/Document reviewed against our previous comments and other revisions highlighted and identified by the vendor.	
<input type="checkbox"/> I Drawing/Document returned without review.	
<input type="checkbox"/> J Print not enclosed.	
Approval conveyed herein neither relieves the Vendor/Contractor of his contractual obligations and his responsibilities for correctness of dimensions, materials of construction, weights, quantities, design details, assembly fits, performance requirements and conformity of the supplies with the Indian Statutory Laws as may be applicable, nor does it limit the purchaser's rights under the contract.	
Reviewed by: <u>PK</u> .....Date: <u>03.7.2020</u>	

प्रकल्प/परियोजना का नाम	TELANGANA STATE POWER GENERATION CORPORATION LTD. TELANGANA, INDIA
NAME OF CUSTOMER	5 x 800 MW YADADRI TPS, NALGONDA
OWNER'S CONSULTANT:	TATA CONSULTING ENGINEERS LTD. BANGALORE
भारत हेवी इलेक्ट्रिकल्स लिमिटेड का लोगो	भारत हेवी इलेक्ट्रिकल्स लिमिटेड का लोगो
BHHL	BHHL
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JOB NO.			
STATUS			
DISTRIBUTION			
REV.	DATE	ALTERED	NK
01	27.09.18	CHECKED	NK
		APPROVED	DKM
REVISED AS PER TCE COMMENTS DATED 26.09.18.			

REV.	DATE	ALTERED	NK
05	30.06.20	CHECKED	NK
		APPROVED	SKS
REVISED AS PER TCE/TSGENCO COMMENTS DATED 03.06.2020.			

REV.	DATE	ALTERED	NK
04	15.05.20	CHECKED	NK
		APPROVED	AG
REVISED AS PER TCE/TSGENCO COMMENTS DATED 05.05.2020.			

REV.	DATE	ALTERED	NK
03	27.04.20	CHECKED	NK
		APPROVED	AG
REVISED AS PER MOM DATED 17.12.18.			

REV.	DATE	ALTERED	NK
02	14.11.18	CHECKED	NK
		APPROVED	DKM
REVISED AS PER TCE/TSGENCO COMMENTS DATED 26.10.18.			

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प्रकल्प/परियोजना का नाम	CONCEPTUAL 400 KV SWITCHYARD CONTROL ROOM BUILDING LAYOUT
DEPT.	उत्तुपार / SCALE
SIGN.	ड्राईंग.क./DRAWING NO.
	TB-3-387-316-008
पृष्ठ नं./SHEET No. 01	अगला पृष्ठ/NEXT SHEET 02



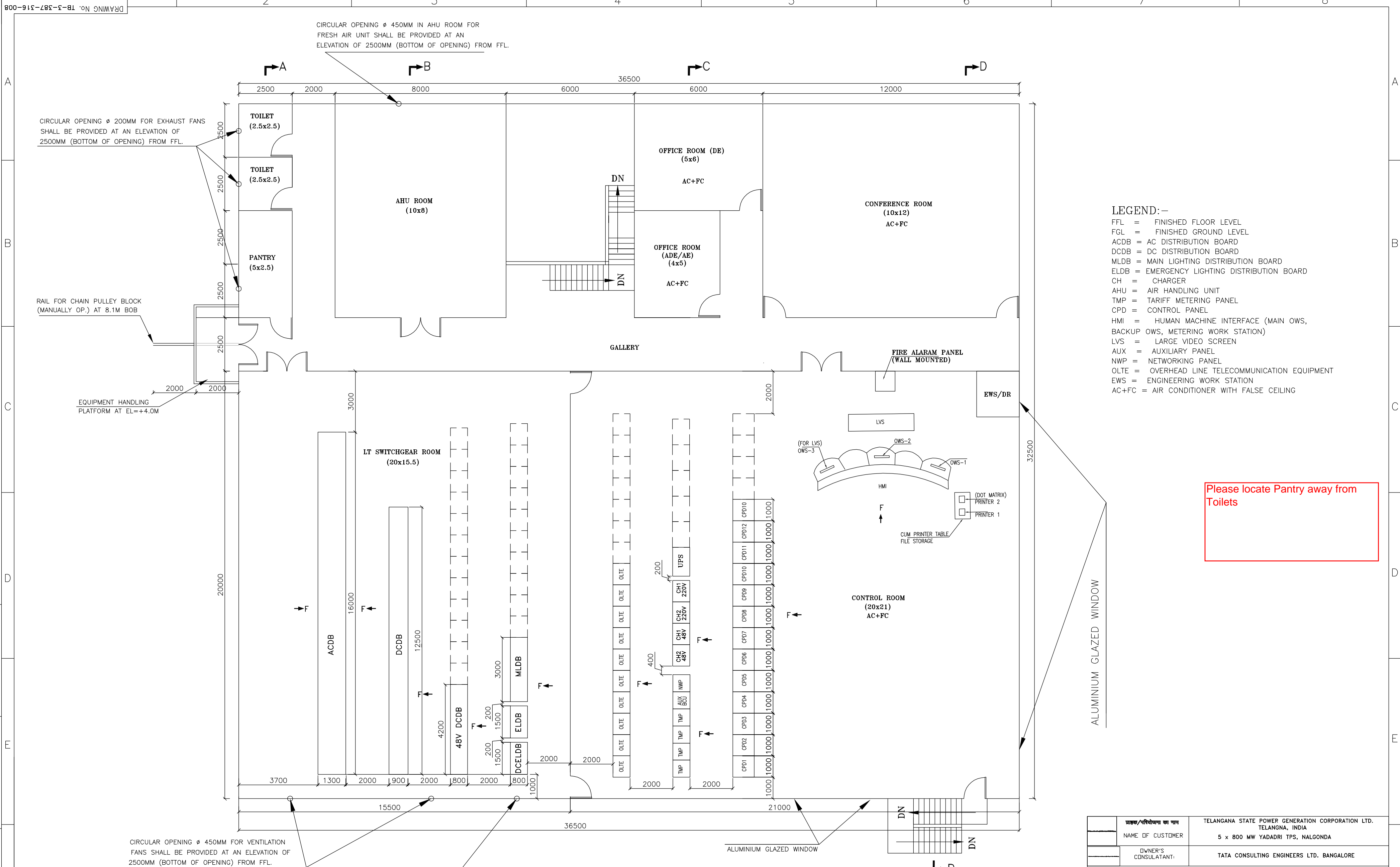
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REF. DRG. NO. COMPUTER FILE NAME

SIGN. AND DATE

INVENTORY NO

FIRST ANGLE PROJECTION ( ALL DIMENSIONS ARE IN MM.)



- LEGEND:-
- FFL = FINISHED FLOOR LEVEL
  - FGL = FINISHED GROUND LEVEL
  - ACDB = AC DISTRIBUTION BOARD
  - DCDB = DC DISTRIBUTION BOARD
  - MLDB = MAIN LIGHTING DISTRIBUTION BOARD
  - ELDB = EMERGENCY LIGHTING DISTRIBUTION BOARD
  - CH = CHARGER
  - AHU = AIR HANDLING UNIT
  - TMP = TARIFF METERING PANEL
  - CPD = CONTROL PANEL
  - HMI = HUMAN MACHINE INTERFACE (MAIN OWS, BACKUP OWS, METERING WORK STATION)
  - LVS = LARGE VIDEO SCREEN
  - AUX = AUXILIARY PANEL
  - NWP = NETWORKING PANEL
  - OLTE = OVERHEAD LINE TELECOMMUNICATION EQUIPMENT
  - EWS = ENGINEERING WORK STATION
  - AC+FC = AIR CONDITIONER WITH FALSE CEILING

NOTE: LOCATION & SIZE OF OPENINGS ARE TENTATIVE. FINAL LOCATION SHALL BE SHOWN IN MECHANICAL DRAWINGS.

REV. 05	DATE 30.06.20	ALTERED CHECKED APPROVED	NK SKS AG	REV. 04	DATE 15.05.20	ALTERED CHECKED APPROVED	NK SKS AG	REV. 03	DATE 27.04.20	ALTERED CHECKED APPROVED	NK SKS AG	REV. 02	DATE 14.11.18	ALTERED CHECKED APPROVED	NK NK DM/AG	REV. 01	DATE 27.09.18	ALTERED CHECKED APPROVED	NK NK DM
ZONE	REVISED AS PER TCE/TSGENCO COMMENTS DATED 03.06.2020.			ZONE	REVISED AS PER TCE/TSGENCO COMMENTS DATED 05.05.2020.			ZONE	REVISED AS PER MOM DATED 17.12.18.			ZONE	REVISED AS PER TCE/TSGENCO COMMENTS DATED 26.10.18.			ZONE	REVISED AS PER TCE COMMENTS DATED 26.09.18.		

JOB NO.			
STATUS			
DISTRIBUTION			
REV.	DATE	ALTERED	PK
01	27.09.18	CHECKED	NK
		APPROVED	DKM
ZONE			
	REVISED AS PER TCE COMMENTS DATED 26.09.18.		

PROJECT/CLIENT NAME		TELANGANA STATE POWER GENERATION CORPORATION LTD. TELANGANA, INDIA	
NAME OF CUSTOMER		5 x 800 MW YADADRI TPS, NALGONDA	
OWNER'S CONSULTANT:		TATA CONSULTING ENGINEERS LTD. BANGALORE	
PROJECT NAME		భారత్ హెవీ ఇలెక్ట్రికల్స్ లిమిటెడ్ ట్రాన్సిమిషన్ ప్రాజెక్ట్స్ విభాగం	
PROJECT NAME		BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION	
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DATE 19/02/18		DATE 19/02/18	
DATE 19/02/18		DATE 19/02/18	
PROJECT/TITLE		CONCEPTUAL 400 KV SWITCHYARD CONTROL ROOM BUILDING LAYOUT	
DEPT.		అనుబంధ / SCALE	
SIGN.		ట్రాఫ్.కా./DRAWING NO.	
		TB-3-387-316-008	
		పేజీ/కా. SHEET No. 02	
		మొత్తం పేజీ/NEXT SHEET 03	

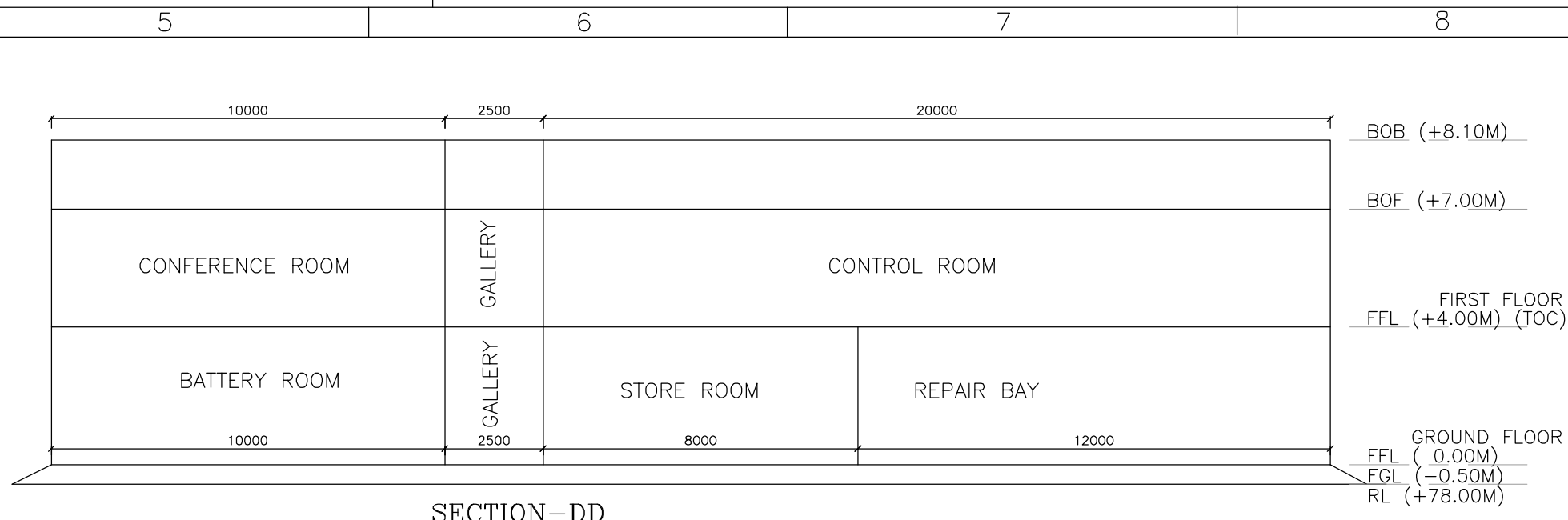
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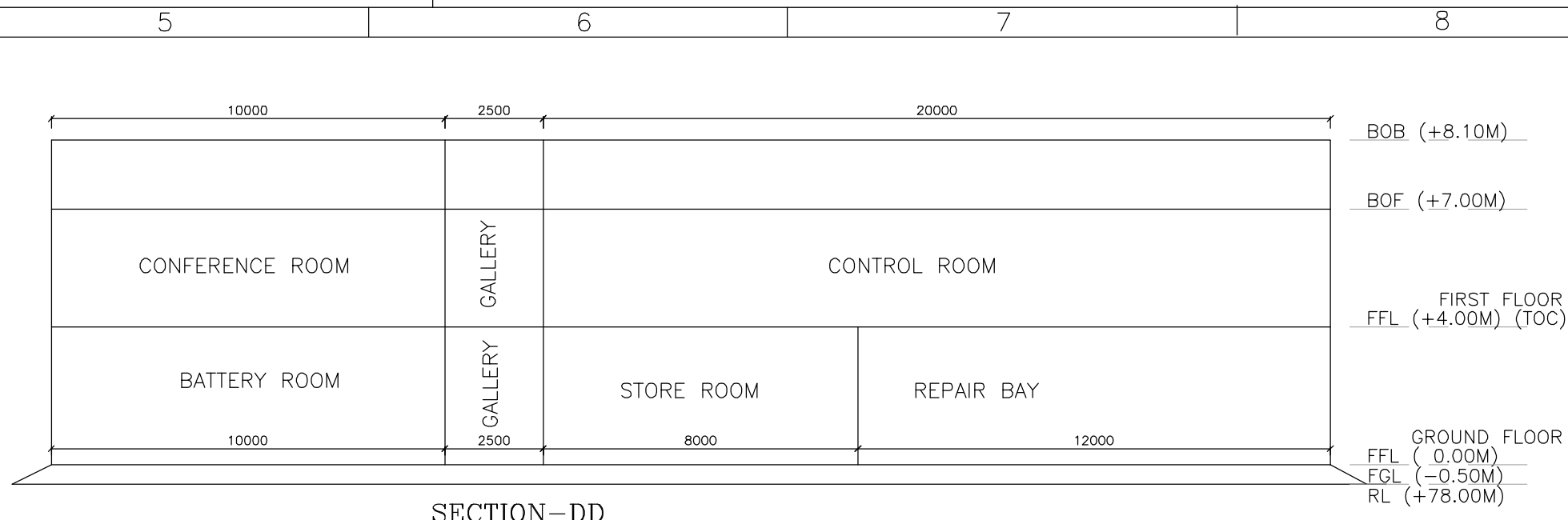
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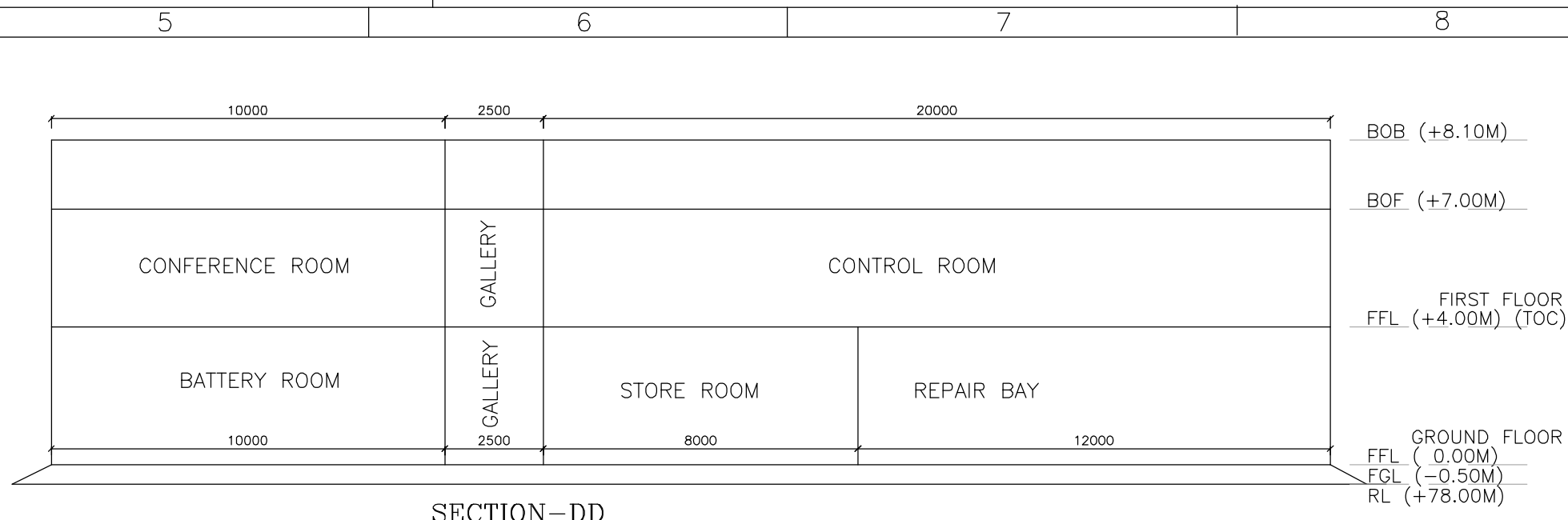
INVENTORY NO



SECTION-DD



SECTION-BB




SECTION-CC

LEGEND  
FGL: FINISHED GROUND LEVEL  
FFL: FINISHED FLOOR LEVEL  
TOC: TOP OF CONCRETE  
BOF: BOTTOM OF FALSE CEILING  
BOB: BOTTOM OF BEAM

NOTE: GROUND FLOOR LINTLE FOR WINDOWS SHALL BE AT 2.1M LEVEL.

REV. 05	DATE 30.06.20	ALTERED CHECKED NK SKS AG	REV. 04	DATE 15.05.20	ALTERED CHECKED NK SKS AG	REV. 03	DATE 27.04.20	ALTERED CHECKED NK SKS AG	REV. 02	DATE 14.11.18	ALTERED CHECKED NK SKS APPROVED DKM/AG	REV. 01	DATE 27.09.18	ALTERED CHECKED NK SKS APPROVED DKM
ZONE			ZONE			ZONE			ZONE			ZONE		
REVISED AS PER TCE/TSGENCO COMMENTS DATED 03.06.2020.			REVISED AS PER TCE/TSGENCO COMMENTS DATED 05.05.2020.			REVISED AS PER MOW DATED 17.12.18.			REVISED AS PER TCE/TSGENCO COMMENTS DATED 26.10.18.			REVISED AS PER TCE COMMENTS DATED 26.09.18.		

<div>प्राइम/परिचयक का नाम</div>		TELANGANA STATE POWER GENERATION CORPORATION LTD. TELANGANA, INDIA													
<div>NAME OF CUSTOMER</div>		5 x 800 MW YADADRI TPS, NALGONDA													
<div>OWNER'S CONSULTANT:</div>		TATA CONSULTING ENGINEERS LTD. BANGALORE													
<div>निर्यात ईएल</div> <div>BHEL</div>		भारत हेवी इलेक्ट्रिकल्स लिमिटेड टांटा विद्युत निगम परियोजना विभाग BHARAT HEAVY ELECTRICALS LTD. TATA ELECTRICITY PROJECTS DIVISION													
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<div>शीट/TITLE</div>		CONCEPTUAL		400 KV SWITCHYARD		CONTROL ROOM BUILDING LAYOUT									
<div>DEPT.</div>		<div>उत्तुपात / SCALE</div>		<div>डाईंग. क्र./DRAWING NO.</div>											
<div>SIGN.</div>		<div></div>		<div>TB-3-387-316-008</div>		05									
				<div>पृष्ठ संश्लेष No. 03</div>		<div>अगला पृष्ठ/NEXT SHEET</div>									



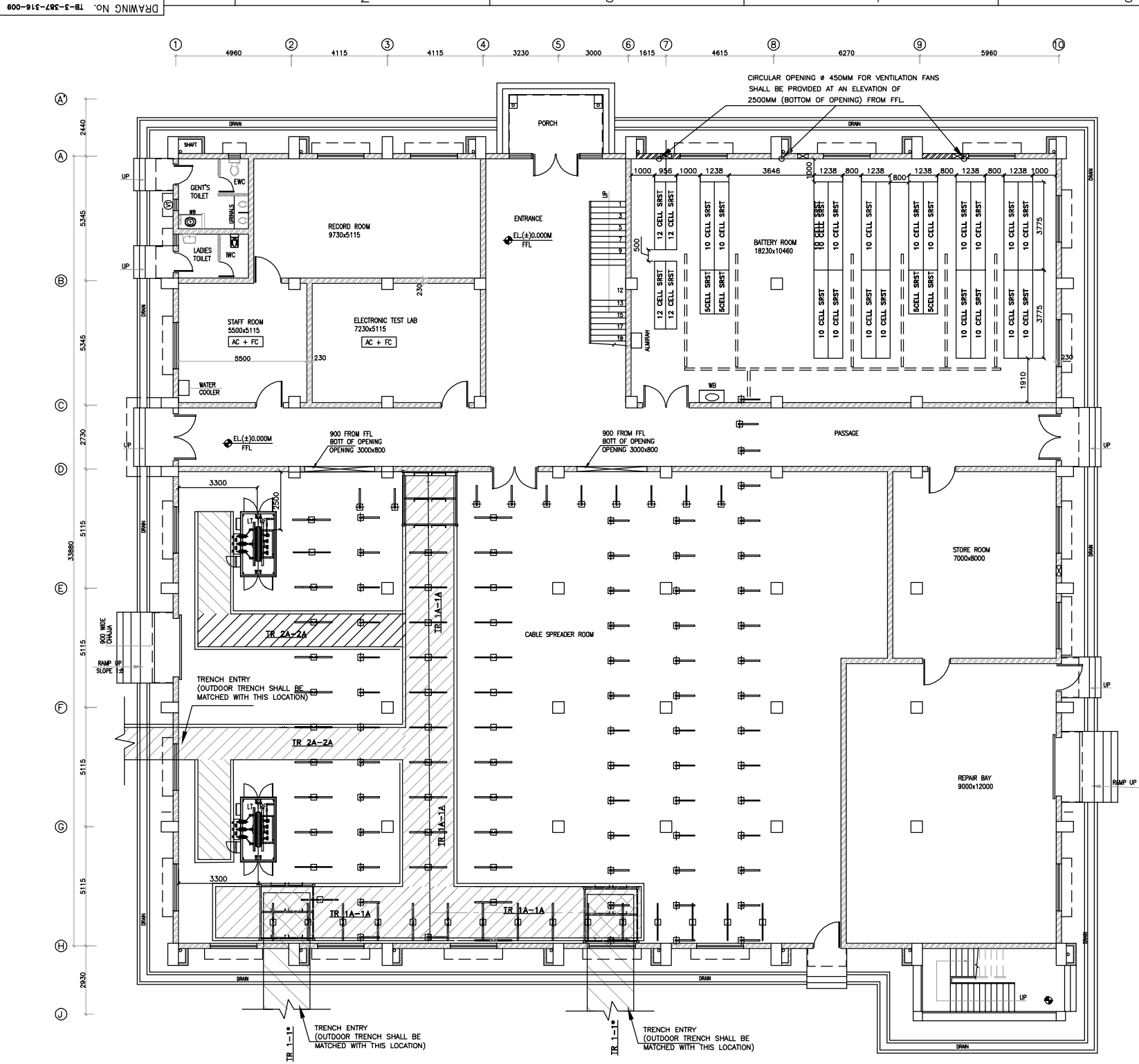
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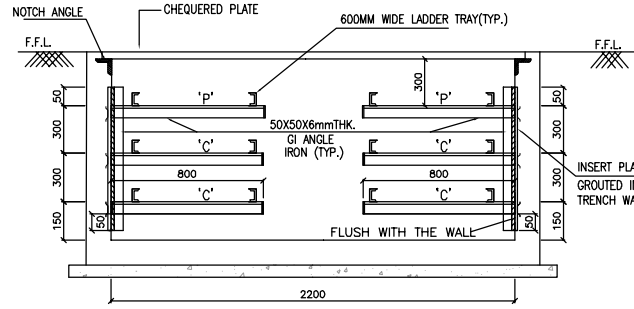
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SIGN. AND DATE

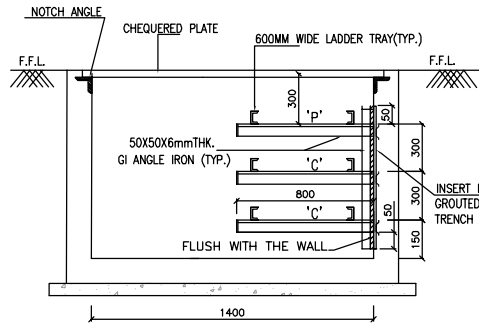
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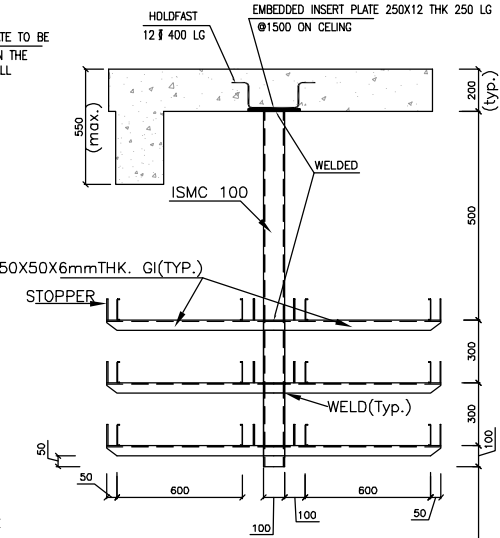
GROUND FLOOR PLAN



TR 1A-1A



TR 2A-2A



F.F.L. (CABLE SPREADER ROOM FLOOR LEVEL)  
TYPICAL DETAIL OF UNDERHUNG CABLE RACK

NOTE:-

- ALL DIMENSIONS ARE FROM THE INSIDE FACE OF THE WALLS.
- CABLE RACKS/INSERTS PLATE SHALL BE FIXED AT EVERY 1500 MM INTERVAL IN TRENCHES INSIDE CABLE SPREADER ROOM.
- THIS DRAWING IS TO BE REFERRED FOR TRENCH LAYOUT & PANEL PLACEMENT DETAILS ALSO.
- AUXILIARY POWER CABLES SHALL BE LAID IN TOP TIERS AND CONTROL CABLES IN BOTTOM TIERS (AS SHOWN IN TRENCH SECTION DRAWING).
- ALL OTHER DETAILS PERTAINING TO CIVIL WORKS SHALL BE REFLECTED IN THE RESPECTIVE CIVIL DRAWINGS.
- CHEQUERED PLATE TO BE PROVIDED FOR THE TRENCHES INSIDE THE CABLE SPREADER ROOM.
- PANELS COMING ON CUTOUTS SHALL BE SUPPORTED ON CHANNELS FIXED OVER CUTOUTS FLUSHED WITH F.F.L. 50MM FRONT SIDE OF PANEL SHALL BE SUPPORTED ON FINISHED FLOOR LEVEL.
- DETAILED ARRANGEMENT OF CABLE ENTRY IN CABLE SPREADER ROOM SHALL BE SHOWN IN CIVIL DRAWING.
- 11kV CABLE SHALL BE PLACED IN MULTI LAYER ON 2.5M LONG GI TRAY SUPPORTED ON RACK (GI ANGLE).
- FIBER OPTIC CABLE INSIDE CONTROL ROOM SHALL BE LAID IN 50mm DIA GI PIPE AND SAME SHALL BE ROUTED THROUGH BOTTOM OF CABLE TRENCH. 50mm DIA GI PIPE USED FOR FIBER OPTICS CABLES SHALL BE SUITABLY CLAMPED TO AVOID MOVEMENT.
- CONTROL CABLE SHALL BE LAID IN MULTILAYERS IN EACH TRAY.
- LONGITUDINAL SLOPE IN CABLE TRENCH SHALL BE TYPICALLY 1:500.
- CABLE TRAYS SHALL BE TACK WELDED WITH HORIZONTAL CABLE SUPPORT RACK ANGLE.
- THE PORTION OF GALVANISED STEEL, WHICH IF REQUIRED UNDERGOES ANY WELDING AT SITE SHALL BE COATED WITH TWO COATS OF COLD GALVANISING ANTI-CORROSIVE PAINT AFTER WELDING.
- FOUNDATION DETAILED OF 1600kVA DRY TYPE TRANSFORMER SHALL BE SHOWN IN CIVIL DRAWING.
- 1600kVA DRY TYPE TRANSFORMER LOCATION SHALL BE CHANGED AS PER ACDB INCMDR LOCATION.
- LOCATION OF OUTDOOR TRENCH SHALL BE CHANGED AS PER CONTROL BUILDING ENTRY LOCATION.

**TATA CONSULTING ENGINEERS LIMITED**  
**VENDOR DOCUMENT REVIEW STATUS**

☒ A Drawing/Document approved as submitted. Proceed with fabrication/construction.

☐ B Drawing/Document approved subjected to comments noted. Proceed with fabrication/construction considering our comments.

☐ C Our comments are noted on this marked up print.

☐ D Our comments are noted in memo attached to the forwarding transmittal letter No. \_\_\_\_\_ Dated: \_\_\_\_\_

☐ E Correct original of this drawing/document to reflect our comments and resubmit for approval.

☐ F Correct original of this drawing/document to reflect our comments and resubmit for records.

☐ G Drawings/Documents of this category are for information only and not for approval. Information furnished on the drawing/document is noted.

☒ H Drawing/Document reviewed against our previous comments and other revisions highlighted and identified by the vendor.

☐ I Drawing/Document returned without review.

☐ J Print not enclosed.

Approval conveyed herein neither relieves the Vendor/Contractor of his contractual obligations and his responsibilities for correctness of dimensions, materials of construction, weights, quantities, design details, assembly fits, performance requirements and conformity of the supplies with the Indian Statutory Laws as may be applicable, nor does it limit the purchaser's rights under the contract.

Reviewed by: [Signature] Date: 23.1.2021

REV.	DATE	ALTERED	NK	SKS	APPROVED	AG	REV.	DATE	ALTERED	NK	SKS	APPROVED	AG
02	25.09.20	CHECKED	SKS	APPROVED	AG		01	03.08.20	CHECKED	SKS	APPROVED	AG	
ZONE	REVISED AS PER TCE/TSGENCO COMMENTS DATED 21.08.2020						ZONE	REVISED AS PER TCE/TSGENCO COMMENTS DATED 03.06.2020					

	STATE POWER GENERATION CORPORATION LTD. TELANGANA, INDIA
NAME OF CUSTOMER	5 x 800 MW YADADRI TPS, NALGONDA
OWNER'S CONSULTANT:	TATA CONSULTING ENGINEERS LTD. BANGALORE
	भारत हेवी इलेक्ट्रिकल्स लिमिटेड दूरस्थितन परियोजना विभाग BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION
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शीट/TITLEPANEL PLACEMENT & TRENCH LAYOUT IN 400KV SWITCHYARD CONTROL ROOM BLDG.	
DEPT.	उत्पादन / SCALE
SIGN.	ड्राईंग. क./DRAWING NO.
पृष्ठ	TB-3-387-316-009
कृपया पृष्ठ	01
अगला पृष्ठ	NEXT SHEET 02



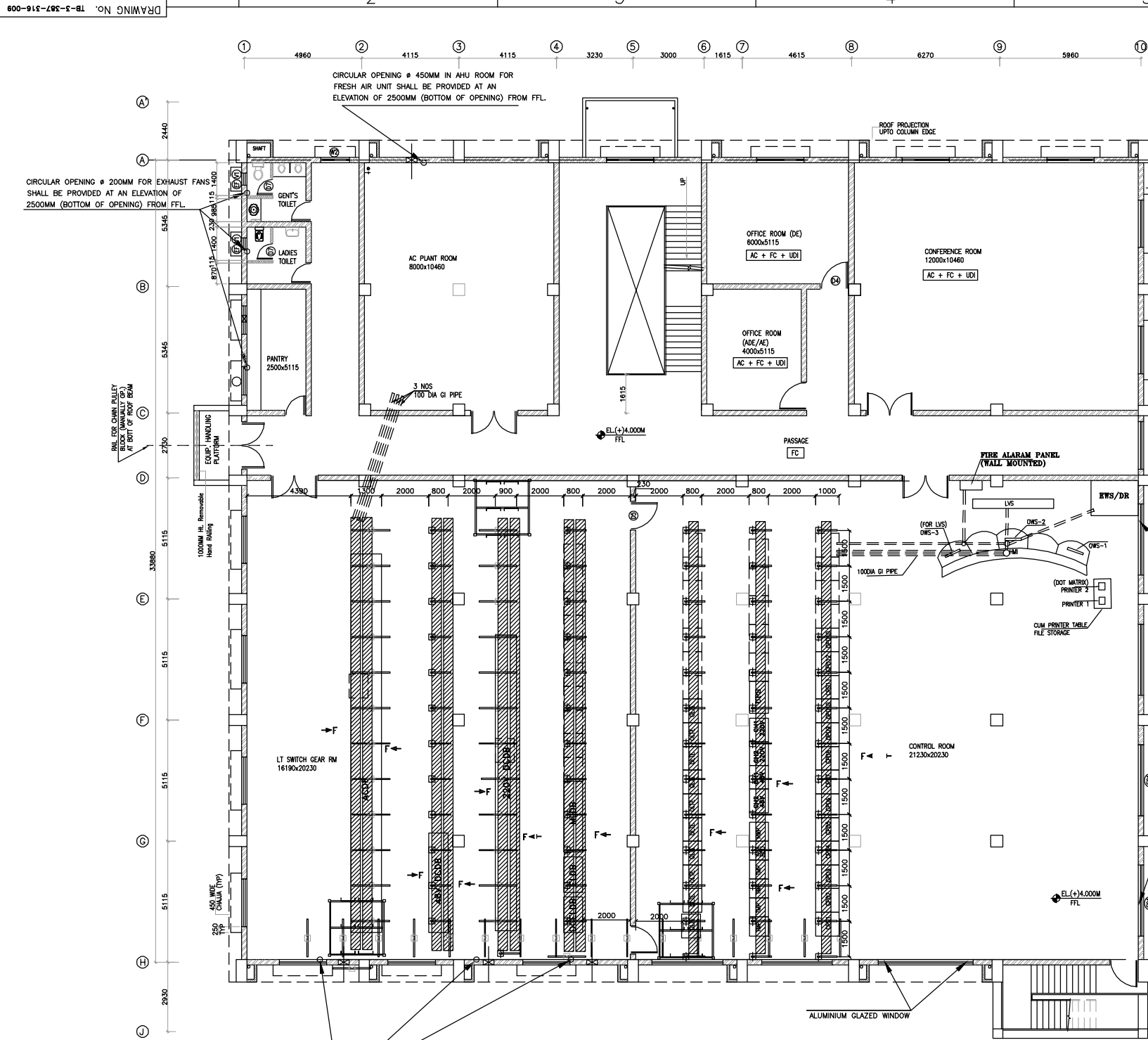
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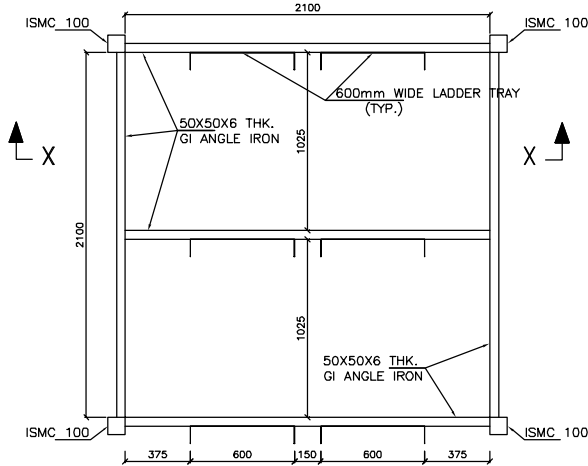
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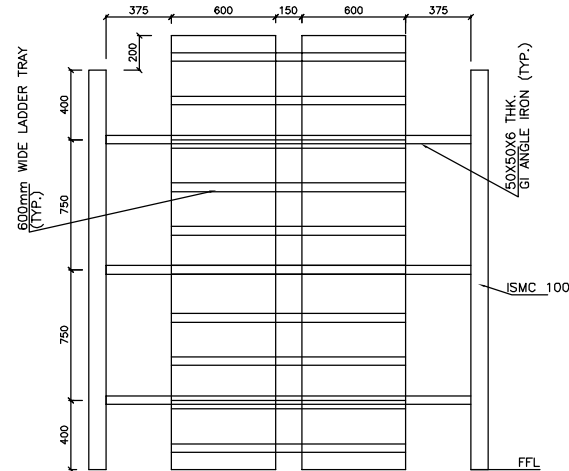
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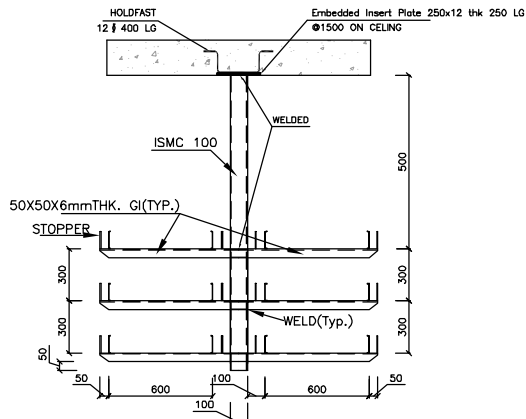
FIRST FLOOR PLAN



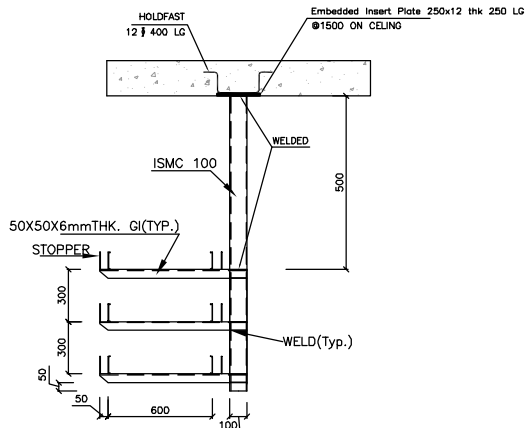
DETAIL-C



SECTION-XX



DETAIL-A



DETAIL-B

LEGEND-

- PMCC = POWER CUM MOTOR CONTROL CENTER
- LT TRF. = 1600kVA DRY TRANSFORMER
- ACDB = AC DISTRIBUTION BOARD
- DCDB = DC DISTRIBUTION BOARD
- EPDB = EMERGENCY POWER DISTRIBUTION BOARD
- MLDB = MAIN LIGHTING DISTRIBUTION BOARD
- ELDB = EMERGENCY LIGHTING DISTRIBUTION BOARD
- FGL = FINISHED FLOOR LEVEL
- FGL = FINISHED GROUND LEVEL
- F = FRONT
- CABLE TRAY

REV.	DATE	ALTERED	NK
02	25.09.20	CHECKED	SKS
01	03.08.20	CHECKED	SKS
01	03.08.20	APPROVED	AG

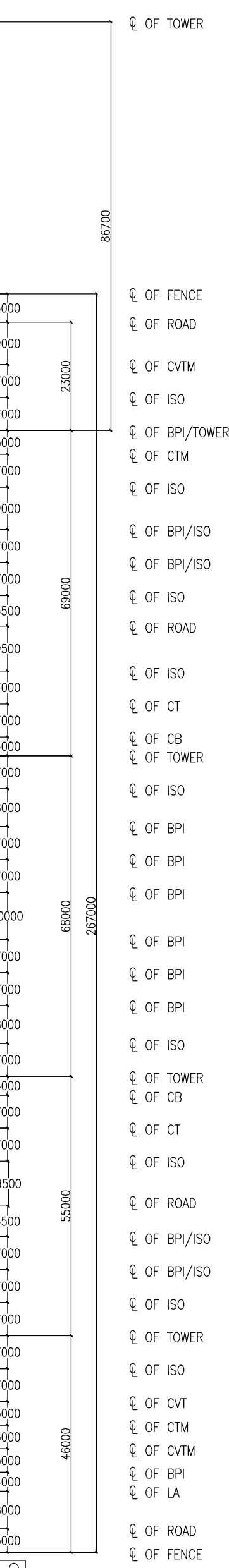
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REV.	DATE	ALTERED	NK
01	03.08.20	CHECKED	SKS
01	03.08.20	APPROVED	AG

REVISED AS PER TCE/TSGENCO COMMENTS DATED 03.06.2020

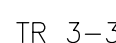
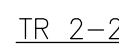
	<b>STATE POWER GENERATION CORP. LTD.</b> NAME OF CUSTOMER 5 x 800 MW YADARI TPS, NALGONDA
<b>TATA CONSULTING ENGINEERS LTD. BANGALORE</b>	OWNER'S CONSULTANT
<b>भारत हेवी इलेक्ट्रिकल्स लिमिटेड ट्रांसमिशन परियोजना विभाग</b> BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION	
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JOB NO. _____ STATUS _____ DISTRIBUTION _____	
REVISED AS PER TCE/TSGENCO COMMENTS DATED 21.08.2020	
REVISED AS PER TCE/TSGENCO COMMENTS DATED 03.06.2020	
PANEL PLACEMENT & TRENCH LAYOUT IN 400KV SWITCHYARD CONTROL ROOM BLDG.	
DEPT.	उत्तुपात / SCALE
SIGN.	ड्राईंग. क./DRAWING NO.
पृष्ठ 02/02	





1. ALL TRENCHES ARE IN DIRT.
2. ALL TRENCHES AND CABLES MARKED IN THIS DRAWING MAY BE SLIGHTLY MODIFIED TO SUIT SITE CONDITIONS.
3. ALL OPENINGS FOR EXITS OR FOR PIPE TO EQUIPMENTS SHALL BE PROVIDED IN CABLE TRENCHES. SPACING OF SIZE SUITABLE TO DIA. 10/100 PIPE SHALL BE PROVIDED ABOVE TOP CABLE SUPPORT.
4. W - INDICATES MISCELLANEOUS WORK.
5. W SHALL BE PLACED IN THE LOCATION SHOWN. EXACT COORDINATES TO BE SURVEYED ACCORDING TO SITE.
6. ALL TRENCHES SHALL BE PAVED IN DIRT OR GRAVEL OR CONCRETE OR ASPHALT OR ANY SUPPORTIVE DRAIN (S) (S) OR BOTTOM TRENCH.
7. CABLE SUPPORT SHALL BE PROVIDED AT EVERY 1500mm interval.
8. ROADS NOT BE EXCEEDED AT EVERY 1500mm interval. FOR THING CABLE SUPPORT.
9. ALL TRENCHES SHALL BE MARKED IN DIRT OR GRAVEL OR CONCRETE OR ASPHALT OR ANY SUPPORTIVE DRAIN (S) (S) OR BOTTOM TRENCH.
10. THERE OBTAIN DETENTION AT CROSS AND CONTROL ROOM SHALL BE LAID IN 50mm DIA OF PIPE AND CABLE SHALL BE LAID IN 100mm DIA OF PIPE.
11. CABLES FOR LIGHTING PURPOSE SHALL BE LAID IN CIVIL PIPE / TRENCH. SEPARATE DRAWING SHALL BE SUBMITTED FOR LIGHTING SYSTEM.
12. LOCATION OF CABLE TRENCHES NEAR CONTROL ROOM SHALL BE SHOWN IN SEPARATE DRAWING.
13. ALL TRENCHES SHALL BE MARKED IN DIRT OR GRAVEL OR CONCRETE OR ASPHALT OR ANY SUPPORTIVE DRAIN (S) (S) OR BOTTOM TRENCH.
14. CABLES CROSSING ROAD SHALL BE LAID IN CIVIL CULVERT. PIPE CULVERT SHALL BE SHOWN IN SITE CABLE DRAWING.
15. ALL TRENCHES SHALL BE MARKED IN DIRT OR GRAVEL OR CONCRETE OR ASPHALT OR ANY SUPPORTIVE DRAIN (S) (S) OR BOTTOM TRENCH.
16. ALL OTHER DETAILS PERTAINING TO CIVIL WORKS SHALL BE REFLECTED IN THE RESPECTIVE CIVIL DRAWINGS.
17. ALL PIPES SHALL BE SECURELY FIXED AT BOTH ENDS.
18. ALL TRENCHES SHALL BE FULLY SEALED TO PREVENT INGRESS OF WATER UNDER THE PIPE.
19. CABLES CARRYING CABLES & POWER CABLES SHALL BE LAID IN SEPARATE OF PIPES.
20. CABLE TRENCH SHALL BE PROVIDED AT EVERY 1500mm interval.
21. THE PURPOSE OF TRENCH LAYOUT DRAWING IS FOR USE AS FOLLOWS :- TO BE USED AS CIVIL INPUT FOR CABLE TRENCHES. - F
22. ALL TRENCHES SHALL BE MARKED IN DIRT OR GRAVEL OR CONCRETE OR ASPHALT OR ANY SUPPORTIVE DRAIN (S) (S) OR BOTTOM TRENCH.
23. CONTROL CABLE SHALL BE LAID IN TWO LAYERS IN EACH TRENCH.
24. LOCATION OF CIVIL JOINT BETWEEN SECONDARY TRENCH BOX AND ANCHOR BOX SHALL BE LAID IN 100/500mm CIVIL PIPE.
25. LOCATION OF CULVERT IN CABLE TRENCH SHALL BE SHOWN IN SEPARATE DRAWING.
26. CABLE CABLE ASSEMBLY SHALL BE WELDED TO ENDED INERT GAS AS MENTIONED BELOW. 6mm WELDED 50mm LONG OVER JOINT.
27. ALL TRENCHES SHALL BE MARKED IN DIRT OR GRAVEL OR CONCRETE OR ASPHALT OR ANY SUPPORTIVE DRAIN (S) (S) OR BOTTOM TRENCH.
28. ALL TRENCHES SHALL BE MARKED IN DIRT OR GRAVEL OR CONCRETE OR ASPHALT OR ANY SUPPORTIVE DRAIN (S) (S) OR BOTTOM TRENCH.
29. ALL TRENCHES SHALL BE MARKED IN DIRT OR GRAVEL OR CONCRETE OR ASPHALT OR ANY SUPPORTIVE DRAIN (S) (S) OR BOTTOM TRENCH.
30. ALL TRENCHES SHALL BE MARKED IN DIRT OR GRAVEL OR CONCRETE OR ASPHALT OR ANY SUPPORTIVE DRAIN (S) (S) OR BOTTOM TRENCH.
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32. ALL TRENCHES SHALL BE MARKED IN DIRT OR GRAVEL OR CONCRETE OR ASPHALT OR ANY SUPPORTIVE DRAIN (S) (S) OR BOTTOM TRENCH.
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LEGEND  
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2. - - - - -  
3. B IN  
4. T IN



MK FIXING DETAIL ON TRENCH  
A & B DIMENSIONS ARE AS PER MK DRAWING.  
X-TRENCH WALL THICKNESS,

JOB NO.			
DISTRIBUTION			
REV.	DATE	ALTERED	PK
01	27.02.20	CHECKED	NK
		APPROVED	SKS/AG
ZONE	REVISED AS PER TCE COMMENT REF NO. TCE.11005A-EL-VDT- DATED 26.12.18 & AS PER LAT		

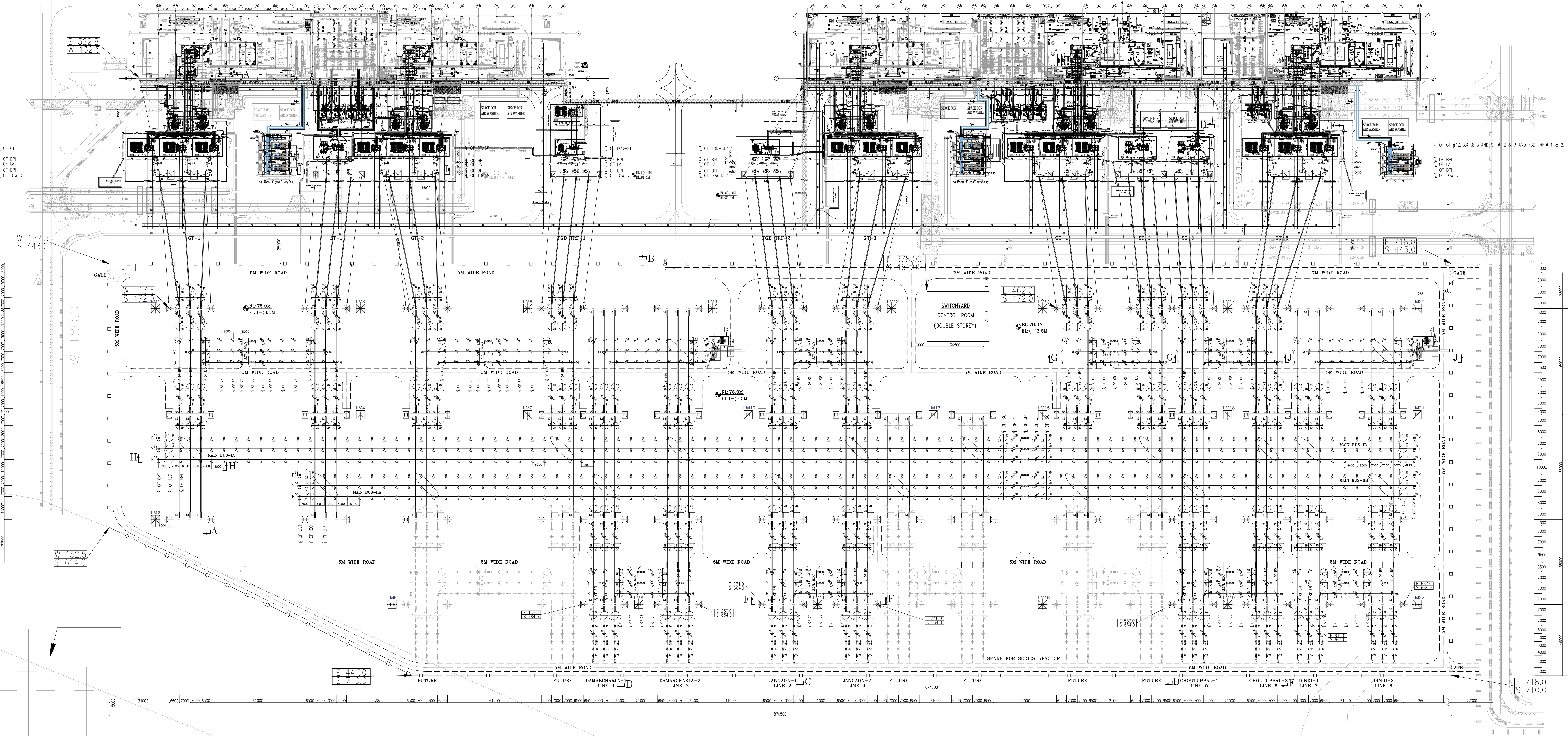
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DRAWING No. TB-0-387-316-013

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It must not be used directly or indirectly in any way detrimental to the interest of the company.



TUNGAPAHAD VAGU

SYSTEM PARAMETERS

DESCRIPTION	400kV
HIGHEST SYSTEM VOLTAGE (kV)	420
RATED FREQUENCY	50Hz, +3% to -5%
LIGHTNING IMPULSE WITHSTAND VOLTAGE (kVp)	1425
SWITCHING IMPULSE WITHSTAND VOLTAGE (kVp)	1050
P.T. WITHSTAND VOLTAGE (kV rms)	630
SYSTEM FAULT LEVEL (kA for 1sec)	63
CREEPAGE DISTANCE (25mm/kV) (mm)	10500
MAIN BUS CURRENT RATING	3150A
LINE DIA CURRENT RATING	3150A
GT/ST DIA CURRENT RATING	1600A
SYSTEM NEUTRAL EARTHING	EFFECTIVELY EARTHED
MECHANICAL STRENGTH OF DISC INSULATORS	160KN
CREEPAGE DISTANCE OF DISC INSULATORS	430MM
SC FORCE FOR DESIGN OF SWITCHYARD TOWERS EXCEPT DEAD END, LAST ROW OF SWITCHYARD TOWERS & TOWERS IN TRF YARD	9200 KG & 11500 KG
SC FORCE FOR DESIGN OF LAST ROW OF SWITCHYARD TOWERS & TOWERS IN TRF YARD	11500 KG
SC FORCE FOR DESIGN OF DEAD END TOWERS	SC FORCE N.A. NRM. FORCE 8000KG
CORONA EXTINCTION VOLTAGE (MIN.)	320kV (rms)
MAX. RADIO INTERFERENCE VOLTAGE FOR FREQUENCY BETWEEN 0.5MHz & 2MHz AT 266Kv/mrms	1000 microV

SCHEDULE OF EQUIPMENT

S.NO.	DESCRIPTION	SYMBOL	QTY.
1A	400KV, 3150A, 63KA FOR 3 SEC, 3PH, SF6 CIRCUIT BREAKER WITHOUT PIR WITHOUT CSD		19
1B	400KV, 3150A, 63KA FOR 3 SEC, 3PH, SF6 CIRCUIT BREAKER WITHOUT PIR WITH CSD		14
2	400KV, 3150A, 63KA FOR 1 SEC, 3PH HDB ISOLATOR WITH ONE EARTH SWITCH		96
3	400KV, 3150A, 63KA FOR 1 SEC, 3PH HDB ISOLATOR WITH TWO EARTH SWITCH		04
4	400kV, 3000A, 5-CORE, 63KA FOR 1 SEC, 1PH. CURRENT TRANSFORMER		132
5	400kV, 3000A, 2-CORE, 63KA FOR 1 SEC, 1PH. CURRENT TRANSFORMER (METERING)		54
6	400kV, 4400pF, 1PH, CAPACITIVE VOLTAGE TRANSFORMER (3 SECONDARY)		36
7	400kV, 4400pF, 1PH, METERING CAPACITIVE VOLTAGE TRANSFORMER (2 SECONDARY)		54
8	390kV, 20KA, 1-PH, METAL OXIDE GAPLESS TYPE CLASS- IV POLYMER SURGE ARRESTER (PRESSURE RELIEF CLASS 63KA @ 0.2 SEC.)		60
9	400kV, 125 MVAR BUS REACTOR		2
10	400KV, 8KN BUS POST INSULATOR (SOLID CORE PORCELAIN TYPE)		786

LEGEND TABLE

	PRESENT BHEL SCOPE
	CUSTOMER SCOPE
	TENSION STRING INSULATOR (PORCELAIN) (2X25 DISCS)
	SUSPENSION STRING INSULATOR (PORCELAIN) (1X25 DISCS)
	COLUMN WITHOUT PEAK
	COLUMN WITH PEAK
	CORONA END BELL
	INDICATES CONNECTION TO MAIN BUS
	LIGHTNING MAST

CONDUCTOR DETAIL

S.NO.	DESCRIPTION	CONDUCTOR	INS. STRING
1.	MAIN BUS	4.5"PS (EH) AL TUBE OD=120mm, ID=96mm	---
2.	EQUIPMENT INTERCONNECTION	4.5"PS AL TUBE/TWIN BERSMIS ACSR	---
3.	JUMPER /DROPPERS LINE SIDE & DIA.	QUAD MOOSE ACSR	DOUBLE TENSION
3.	JUMPER /DROPPERS GT/ST SIDE & DIA.	TWIN BERSMIS ACSR	DOUBLE TENSION
4.	SUB CONDUCTOR SPACING	450 mm	---
4.	SHIELD WIRE	(7/8 SWG) GS WIRE	---

CLEARANCE TABLE

PHASE TO PHASE (PP)	4200
PHASE TO EARTH (PE)	3500
SECTION CLEARANCE (SC)	6500
VERTICAL GROUND CLEARANCE TO NEAREST PART NOT AT EARTH POTENTIAL OF AN INSULATOR SUPPORTING LIVE CONDUCTOR/EQUIPMENT	2440
GROUND CLEARANCE (PLINTH TO CENTER OF TUBE)	8000

NOTES:-

- ALL CONNECTIONS MARKED WITH ACSR CONDUCTOR ARE WITH "MOOSE". CONNECTIONS MARKED WITH AL TUBE ARE WITH 4.5" IPS.
- SWITCHYARD SHALL BE PROVIDED WITH GRAVELS. THE THICKNESS OF GRAVEL SHALL BE 150MM. GRAVEL SPREAD DRG TO BE ISSUED SEPARATELY.
- LA PRESSURE RELIEF VALVE SHALL NOT BE TOWARDS TRANSFORMER SIDE/ANY EQUIPMENT KEPT NEAR LIGHTNING ARRESTERS.
- SPI, ISOLATOR, LA, CT, CB & GT STRUCTURE SHALL BE LATTICE TYPE.
- TERMINATION OF OUTGOING LINE CONDUCTORS ON THE SWITCHYARD GANTRY INCLUDING INSULATOR STRINGS FOR SAME IS NOT IN SCOPE OF CONTRACT AND THEREFORE SHOWN IN DOTTED. CUSTOMER TO PROVIDE CONDUCTOR DETAILS.
- THE TOP OF THE BOLT OF LA / POST INSULATOR (COMING NEAR GENERATOR/STATION TRANSFORMER YARD) FOUNDATION SHALL BE LOWER BY 15MM THAN THE TOP OF RAIL. THIS IS TO FACILITATE THE REMOVAL OF LA STRUCTURE DURING TRANSFORMER TO BE TAKEN OUT FOR REPAIR / REPLACEMENT.
- CONSTRUCTION OF ROAD, DRAIN AND SHOULDERS ARE UNDER THE SCOPE OF BHEL. REFERENCE DRAWING:  
A) SINGLE LINE DIAGRAM OF 400KV SWITCHYARD (TB-2-387-510-001)  
B) TRANSFORMER YARD LAYOUT UNIT # 1,2,3,4,5 (PE-0G-417-100-001)  
C) PLOT PLAN (PE-0G-417-100-M001)

NOTES:-

- REFER ANNEXURE-1 FOR BOQ OF CLAMPS & CONNECTORS.
- REFER ANNEXURE-2 FOR BOQ OF STRING INSULATORS AND HARDWARES.

COMPUTER DRG. DATE NAME :  
SIGN & DATE  
INVENTORY No.

REF. DRG. No.  
SIGN & DATE  
INVENTORY No.

REV. DATE ALTERED CHECKED APPROVED  
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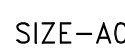
JOB NO.  
STATUS  
DISTRIBUTION  
REV. DATE ALTERED NK  
01 25.03.21 CHECKED SWS  
APPROVED AC

REVISED AS PER APPROVED LAYOUT  
PLAN AND SECTIONAL ELEVATION OF  
400 KV SWITCHYARD.

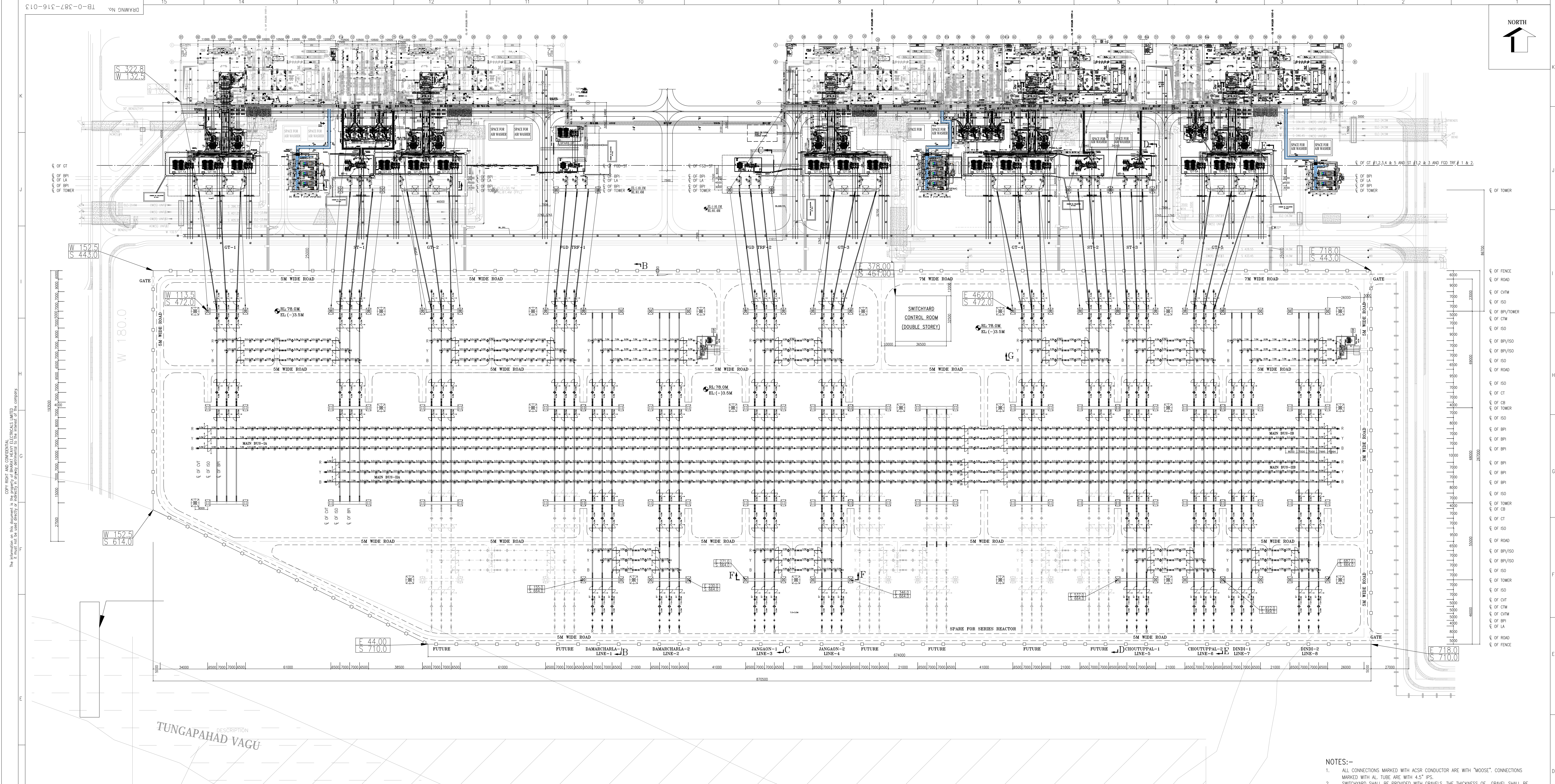


STATE POWER GENERATION CORPORATION LTD. TELANGANA, INDIA 5 x 800 MW YADADRI TPS, NALGONDA	OWNER'S CONSULTANT: TATA CONSULTING ENGINEERS LTD. BANGALORE
BHARAT HEAVY ELECTRICALS LIMITED BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION	
Erection Key Diagram (Plan Layout) of 400kV Switchyard	
DEPT. / SCALE SIGN.	DATE / SCALE SIGN.
01	01









SYSTEM PARAMETERS

DESCRIPTION	400KV
HIGHEST SYSTEM VOLTAGE (KV)	420
RATED FREQUENCY	50Hz, +3% to -5%
LIGHTNING IMPULSE WITHSTAND VOLTAGE (kVp)	1425
SWITCHING IMPULSE WITHSTAND VOLTAGE (kVp)	1050
P.T. WITHSTAND VOLTAGE (kV rms)	630
SYSTEM FAULT LEVEL (kA for 1sec)	63
CREEPAGE DISTANCE (25mm/kV) (mm)	10500
MAIN BUS CURRENT RATING	3150A
LINE DIA CURRENT RATING	3150A
GT/ST DIA CURRENT RATING	1600A
SYSTEM NEUTRAL EARTHING	EFFECTIVELY EARTHED
MECHANICAL STRENGTH OF DISC INSULATORS	160KN
CREEPAGE DISTANCE OF DISC INSULATORS	430MM
SC FORCE FOR DESIGN OF SWITCHYARD TOWERS EXCEPT DEAD END, LAST ROW OF SWITCHYARD TOWERS & TOWERS IN TRF YARD	9200 KG & 11500 KG
SC FORCE FOR DESIGN OF LAST ROW OF SWITCHYARD TOWERS & TOWERS IN TRF YARD	11500 KG
SC FORCE FOR DESIGN OF DEAD END TOWERS	SC FORCE N/A
CORONA EXTINCTION VOLTAGE (MIN.)	320kV (rms)
MAX. RADIO INTERFERENCE VOLTAGE FOR FREQUENCY BETWEEN 0.5MHz & 2MHz AT 266Kv/rms	1000 microV

SCHEDULE OF EQUIPMENT

S.NO.	DESCRIPTION	SYMBOL	QTY.
1A	400KV, 3150A, 63KA FOR 3 SEC, 3PH, SF6 CIRCUIT BREAKER WITHOUT PIR WITHOUT CSD		19
1B	400KV, 3150A, 63KA FOR 3 SEC, 3PH, SF6 CIRCUIT BREAKER WITHOUT PIR WITH CSD		14
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3	400KV, 3150A, 63KA FOR 1 SEC, 3PH HDB ISOLATOR WITH TWO EARTH SWITCH		04
4	400KV, 3000A, 5-CORE, 63KA FOR 1 SEC, 1PH. CURRENT TRANSFORMER		132
5	400KV, 3000A, 2-CORE, 63KA FOR 1 SEC, 1PH. CURRENT TRANSFORMER (METERING)		54
6	400KV, 4400pF, 1PH, CAPACITIVE VOLTAGE TRANSFORMER (3 SECONDARY)		36
7	400KV, 4400pF, 1PH, METERING CAPACITIVE VOLTAGE TRANSFORMER (2 SECONDARY)		54
8	390KV, 20KA, 1-PH, METAL OXIDE GAPLESS TYPE CLASS- IV POLYMER SURGE ARRESTER (PRESSURE RELIEF CLASS 63KA @ 0.2 SEC.)		60
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LEGEND TABLE

	PRESENT BHEL SCOPE
	CUSTOMER SCOPE
	TENSION STRING INSULATOR (PORCELAIN) (2X25 DISCS)
	SUSPENSION STRING INSULATOR (PORCELAIN) (1X25 DISCS)
	COLUMN WITHOUT PEAK
	COLUMN WITH PEAK
	CORONA END BELL
	LIGHTNING MAST

CONDUCTOR DETAIL

S.NO.	DESCRIPTION	CONDUCTOR	INS. STRING
1.	MAIN BUS	4.5"IPS (EH) AL TUBE OD=120mm, ID=96mm	---
2.	EQUIPMENT INTERCONNECTION	4.5"IPS AL TUBE/TWIN BERSMIS ACSR	---
3.	JUMPER /DROPPERS LINE SIDE & DIA.	QUAD MOOSE ACSR	DOUBLE TENSION
3.	JUMPER /DROPPERS GT/ST SIDE & DIA.	TWIN BERSMIS ACSR	DOUBLE TENSION
4.	SUB CONDUCTOR SPACING	450 mm	---
4.	SHIELD WIRE	(7/8 SWG) GS WIRE	---

CLEARANCE TABLE

PHASE TO PHASE (PP)	4200
PHASE TO EARTH (PE)	3500
SECTION CLEARANCE (SC)	6500
VERTICAL GROUND CLEARANCE TO NEAREST PART NOT AT EARTH POTENTIAL OF AN INSULATOR SUPPORTING LIVE CONDUCTOR/EQUIPMENT	2440
GROUND CLEARANCE (PLINTH TO CENTER OF TUBE)	8000

4.5" IPS (EH TYPE) AL TUBE CUT LENGTH

CUT LENGTH	REQUIRED QTY.	MANDATORY SPARE
7000MM AL TUBE	81 Nos.	06 Nos.
6500MM AL TUBE	69 Nos.	06 Nos.
6000MM AL TUBE	21 Nos.	06 Nos.
5500MM AL TUBE	90 Nos.	05 Nos.
5000MM AL TUBE	660 Nos.	06 Nos.
4500MM AL TUBE	318 Nos.	03 Nos.
3000MM AL TUBE	666 Nos.	04 Nos.
TOTAL LENGTH	8365.5 MTR	200 MTR
TOTAL LENGTH INCLUDING MANDATORY SPARE	8565.5 MTR	

NOTES:-

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C) PLOT PLAN (PE-DG-417-100-M001)

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	<b>भारत भारी इलेक्ट्रिकल्स लिमिटेड</b>	TELANGANA STATE POWER GENERATION CORPORATION LTD. TELANGANA, INDIA
	<b>टाटा कंसल्टिंग इंजीनियर्स लिमिटेड</b>	5 x 800 MW YADADRI TPS, NALGONDA
	<b>भारत भारी इलेक्ट्रिकल्स लिमिटेड</b>	TATA CONSULTING ENGINEERS LTD. BANGALORE
PROJECT NAME: BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION		
JOB NO. STATUS		
DISTRIBUTION		
REV.	DATE	ALTERED BY
01	25.03.21	APPROVED AC
REVISD AS PER APPROVED LAYOUT PLAN AND SECTIONAL ELEVATION OF 400 KV SWITCHYARD.		
SHEET No. 03		