

BANK NOTE PAPER MILL PRIVATE LIMITED

BNPM/TEN/HARMONI
CS STUDY/425/2017-
18

SHEET 1 OF 1

CORRIGENDUM NO. 1

CORRIGENDUM No. 1, DATED 19-03-2018

FOR

E TENDER NO. BNPM/HARMONICS STUDY/ 425/2017-18, Dated: 27.2.18

E Tender for conducting Harmonics Study at Bank Note Paper Mill India Pvt Ltd, Mysore establishments/buildings/installations / premises.

**CLIENT : BANK NOTE PAPER MILL INDIA PRIVATE LIMITED ,
MYSURU , KARNATAKA**



**BANK NOTE PAPER MILL INDIA PRIVATE LIMITED
NOTE MUDRAN NAGAR
MYSORE 530005**

**ISSUE
R0**

1.0 SCOPE OF THIS CORRIGENDUM

THIS CORRIGENDUM IS CONSISTING OF TOTAL 20 NO OF PAGES NUMBERED SERIALY..

SR NO	CLAUSE NO OF THE TENDER	PREVIOUS SCOPE	PRESENT SCOPE /CLARIFICATION
1	SECTION VII – TECHNICAL SPECIFICATIONS : SCOPE OF WORK – SHEET 1-2 , (PAGE 20-21 OF 48)	i.)BULLET POINT NO. 3 - To check the validity of a solution (following modifications in the distribution network to check the reduction of harmonic disturbances)	i) SHALL BE READ AS <i>To check the validity of a solution, if any modification is required based on the report then the same will be carried out in future & thereby not in the scope of this tender.</i>
		ii.)ELECTRICITY DETAILS, FACILITY DETAILS, NON LINEAR LOADS, NATURE OF PROBLEMS FACED WERE NOT INCLUDED.	ii)ELECTRICITY DETAILS, FACILITY DETAILS, NON LINEAR LOADS, NATURE OF PROBLEMS FACED ARE FURNISHED IN ANNEXURE – A. (PAGE NO :3-4 OF THIS CORRIGENDUM1)
		iii.)SLD OF ALL DISTRIBUTION TRANSFORMER LEVELS WERE NOT INCLUDED.	iii)SLD OF ALL DISTRIBUTION TRANSFORMER LEVELS ALONG WITH MAIN SLD OF SWITCH YARD ARE ATACHED HEREWITH IN ANNEXURE – B. (NO OF SLDS ARE 14 & 1 MAIN SLD OF SWITCH YARD IS ALSO THERE , PAGE NOS: 6-20 OF THIS CORRIGENDUM)
4	SECTION –I , NIT , SHEET 1 OF 5 (PAGE NO 3 OF 48)	Closing Date and time for receipt of tenders : 21.03.2018, 15:00 Hrs, Bid Opening Date & Time (Techno commercial along with Prequalification criteria) : 21.03.2018, 15:30 Hrs,	Extended Closing Date and time for receipt of tenders : 04.04.2018, 15:00 Hrs, Extended Bid Opening Date & Time (Techno commercial along with Prequalification criteria) : 04.04.2018, 15:30 Hrs,
5	REFER MASTER INDEX (PAGE 2 OF 48)	ALL OTHER TERMS & CONDITIONS	ALL OTHER TERMS & CONDITIONS OF THE E TENDER NO. BNPM/HARMONICS STUDY/ 425/2017-18, Dated: 27.2.18 SHALL REMAIN UNCHANGED.

ANNEXURE -A

1. Electricity Details

<i>Source of Power supply EB/TG/DG</i>	<i>Contract Demand, kVA/kW</i>	<i>Billed Demand, kVA/kW</i>	<i>Minimum PF Reqd. by SEB</i>	<i>Average Power Factor</i>
EB	19000 (applied for reduction to 16000 k VA)	14250 kVA	0.9	0.975

2. Facility Details

<i>Description</i>	<i>Nos.</i>	<i>Rating</i>
Transformer (kVA)	2	20/25 MVA
	3	3.15 MVA
	9	2.5 MVA
	1	2.0 MVA
	1	1.0 MVA
DG / TG (kVA)	1	1500 kVA
Capacitors (kVAr – HT/LT)	2	850 kVAR
	1	650 kVAR
	1	220 kVAR
PCCs	15	-
MCCs	14	-

3. Non-linear loads

- 4.1 Thyristors / VFD : **NOT APPLICABLE** _____kW
- 4.2 Furnace : **NOT APPLICABLE** _____kW
- 4.3 UPS : **APPLICABLE** __537_kVA

UPS TYPE & QUANTITY :

80 kVA . 1

60 kVA . 1

40 kVA . 2

30 kVA - 4

20 kVA . 5

15 kVA - 5

10 kVA . 1

7 kVA - 1

5 kVA . 1

- 4.4 Others_____ : **NOT APPLICABLE**____kW/kVA

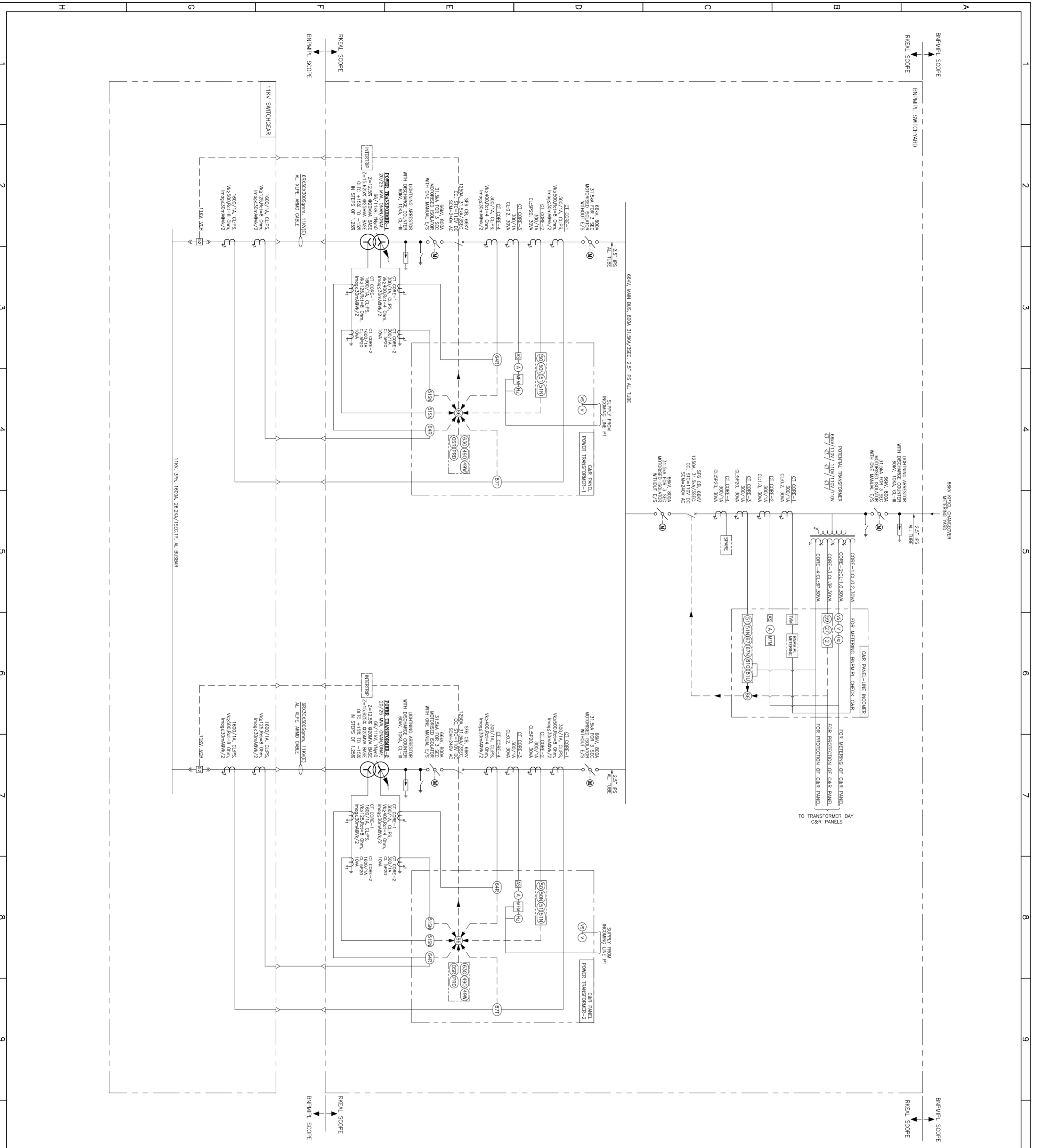
4. Nature of the Problem Faced

- 5.1 Capacitor Failure : **(Yes / ~~No~~)**
- 5.2 Drives Failure : **(Yes / ~~No~~)**
- 5.3 Nuisance Tripping : **(Yes / ~~No~~)**
- 5.4 Others, If any : **(Yes / No)**

5. Reason of conducting Harmonic Study - Being recently commissioned plant , certain failures have been faced as mentioned above in serial number (4), thereby to understand the present situation with respect to harmonics.

ANNEXURE -B

SLD OF ALL DISTRIBUTION TRANSFORMER LEVELS



RELAYING FUNCTIONS:

RELAY NO.	DESCRIPTION	MAKE	MODEL NO.
51/51N	NON DIRECTIONAL O/C & E/F(UND) PROTECTION RELAY	ALSTOM	R42
6N	DIRECTIONAL OVER CURRENT RELAY	ALSTOM	VM950
81U	DIRECTIONAL EARTH FAULT RELAY	ALSTOM	Q2514
81O	OVER FREQUENCY RELAY	ALSTOM	Q2511
29	OVER VOLTAGE RELAY	ALSTOM	VM4M2
53AB	UNDER VOLTAGE PROTECTION	ALSTOM	VM21
53	UNDER VOLTAGE RELAY	ALSTOM	VM21
50	OVER VOLTAGE RELAY	ALSTOM	VM4M2
86	LOCKOUT RELAY	ALSTOM	VM4M2

TRANSFORMER BAY 1 & 2:

RELAY NO.	DESCRIPTION	MAKE	MODEL NO.
50AB	TRANSFORMER DIFFERENTIAL PROTECTION RELAY	ALSTOM	R42
50/50N	TRANSFORMER FAILURE PROTECTION (UNST) PROTECTION RELAY	ALSTOM	VM950
51/51N	NON DIRECTIONAL O/C & E/F(UND) PROTECTION RELAY	ALSTOM	Q2514
51S	RESTRICTED EARTH FAULT RELAY	ALSTOM	Q2511
63G	STANDBY EARTH FAULT RELAY	ALSTOM	VM4M2
480	WINDING TEMPERATURE INDICATING RELAY ALARM & TRIP	ALSTOM	VM4M2
48D	OIL TEMPERATURE INDICATING RELAY ALARM & TRIP	ALSTOM	VM4M2
480	OIL SURGE RELAY	ALSTOM	VM4M2
48D	PRESSURE RELIEF DEVICE	ALSTOM	VM4M2

METERING FUNCTIONS:

RELAY NO.	DESCRIPTION	MAKE	MODEL NO.
A	AMMETER	KE	ANALOG-TYPE BANG
M	POLYMER METER	KE	ANALOG-TYPE BANG
M	MULTI FUNCTION METER	KE	DIGITAL
TM	TRANSFORMER METER WITH RS-485 MODBUS COM. PORT	SEPCO	EMW21

SYMBOLS:

EQUIPMENT	DESCRIPTION	MAKE	MODEL NO.
	CENTRE POLE ROTATING DOUBLE BREAK ISOLATOR OPERATED EARTH SWITCH	RL	-
	SF6 CIRCUIT BREAKER	4BB	EP SR-1-1
	VACUUM CIRCUIT BREAKER	-	-
	POWER TRANSFORMER WITH O/C T	BEL	-
	LIGHTNING ARRESTOR	LAMD	LSM
	CURRENT TRANSFORMER (INDICATES NO. OF CT)	LAMD	LC-46
	CURRENT TRANSFORMER (INDICATES NO. OF CT)	LAMD	LC-46
	POTENTIAL TRANSFORMER	LAMD	LV-46

NOTES:

- THIS SINGLE LINE DIAGRAM INDICATES THE PROPOSED 66KV DISTRIBUTION FOR BAY 1, 2000 TPA BANK.
- NOTE PAPER WILL AT ANYONE.
- FOLLOWING PARAMETERS ARE CONSIDERED AS PER IS 2165 TABLE-2.
- VOLTAGE LABEL: 66KV, 11KV, 120KV, 75.5KV, 375KV, 1400V/11kV, 28KV/11kV, 11KV.
3. SWITCH ON IS 10118-PARTIAL, TABLE-1 THE FOLLOWING MINIMUM CLEARANCES SHALL BE PROVIDED IN THE SWITCHYARD.
- FOR 66KV EQUIPMENTS, HIGHEST SYSTEM VOLTAGE OF 72.5KV.
- PHASE TO EARTH CLEARANCE: 7.50M.
- PHASE TO PHASE CLEARANCE: 6.30M.
- GROUNDING CLEARANCE: 4.00M.
- CREP/SAFE DISTANCE: 31M/AV R/S LINE VOLTAGES PER IS 3718 TABLE 2).
- FOR HEAVILY POLLUTED ATMOSPHERE.
- THE ARRANGEMENT SO AS TO ISOLATE THE TRANSFORMER FROM BOTH SIDES IN CASE OF FAULT.
- AN EMERGENCY TRIP PUSH BUTTON ENCLOSED IN WEATHERPROOF ENCLOSURE SHALL BE PROVIDED NEAR EACH TRANSFORMER FOR TRIPPING THE TRANSFORMER.
- THE MAIN PROTECTION RELAYS SHALL BE NUMERICAL/UNDERPROCESSED (TYPE FOR THE 66KV & 11KV SYSTEM AND ALL AUXILIARY RELAYS SHALL BE ELECTROMAGNETIC TYPE).
- ALL THE MULTIFUNCTION METERS SHALL BE COMMUNICABLE TYPE ON MODBUS PROTOCOL.
- ALL THE CONTROL VOLTAGE FOR 66KV & 11KV SHALL BE 110V DC FOR TRIPPING, CLOSING & INDICATION.
- 230V AC FOR SPACE HEATER, SPRING CHARGING MOTOR AND ILLUMINATION.
- ALL NUMERICAL RELAYS WILL HAVE COMMUNICATION ON UPLIST (IEC 61850) PROTOCOL.
- ENGINEERING REFERENCE DRAWINGS:
 - 1. STD FOR 66KV DISTRIBUTION SYSTEM - TCE DWG. NO.: TCE.5785A-78-AJ-3001, 80

REVISIONS:

REV	REVISION	DATE
1	REVISED AS PER TCE COMMENTS	14.03.15
2	REVISIONAL PARTICULARS	APPROVED DATE

PROJECT: 12000 TPA BANK NOTE PAPER MILL PLANT AT MYSORE, KARNATAKA

PACKAGE: Design, Engineering, Supply, Erection and Commissioning, Performance Acceptance Testing & On-Site Training of 66/11kV Switchyard of the Paper Mill

CLIENT: BANK NOTE PAPER MILL INDIA PRIVATE LIMITED (A JV of SPMIL - A Govt. of India enterprise and BSNPL - Subsidiary of RBI)

CONSULTANT: TATA CONSULTING ENGINEERS LIMITED, MUMBAI.

CONTRACTOR: R.K. Electric Automation Limited
An ISO 9001 : 2008 Company

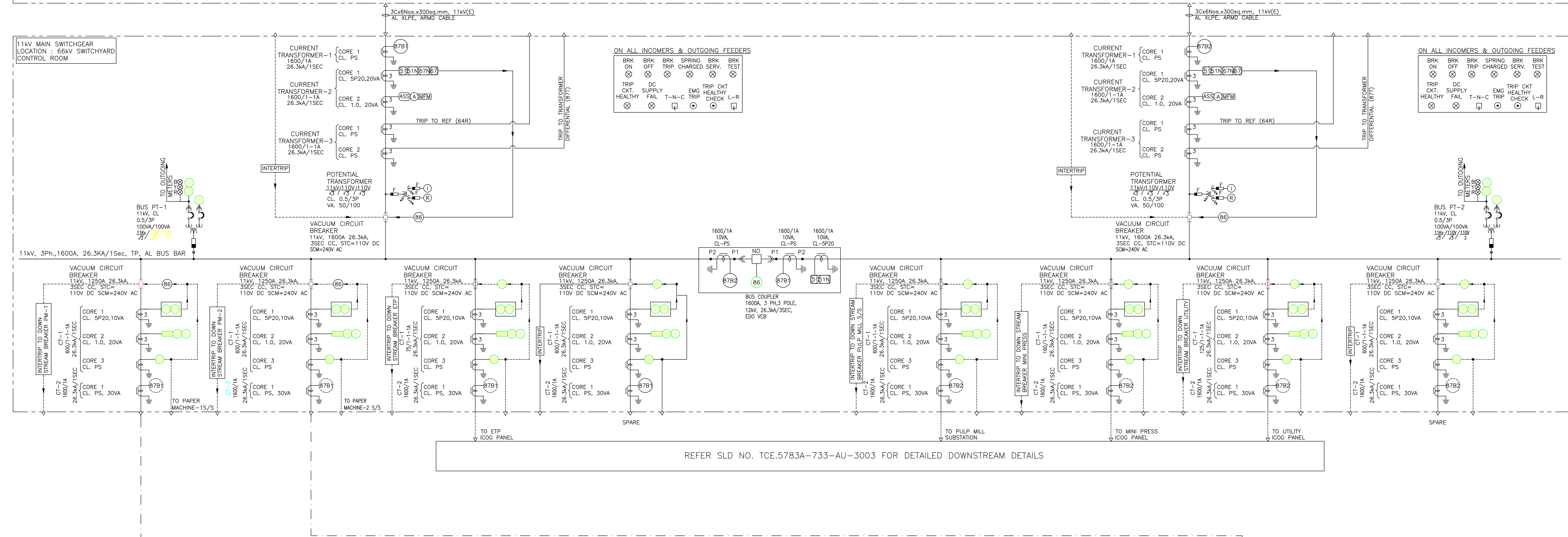
DRAWING NO.: 4037-RK-BNP-101

SINGLE LINE DIAGRAM OF 66KV SWITCH YARD.

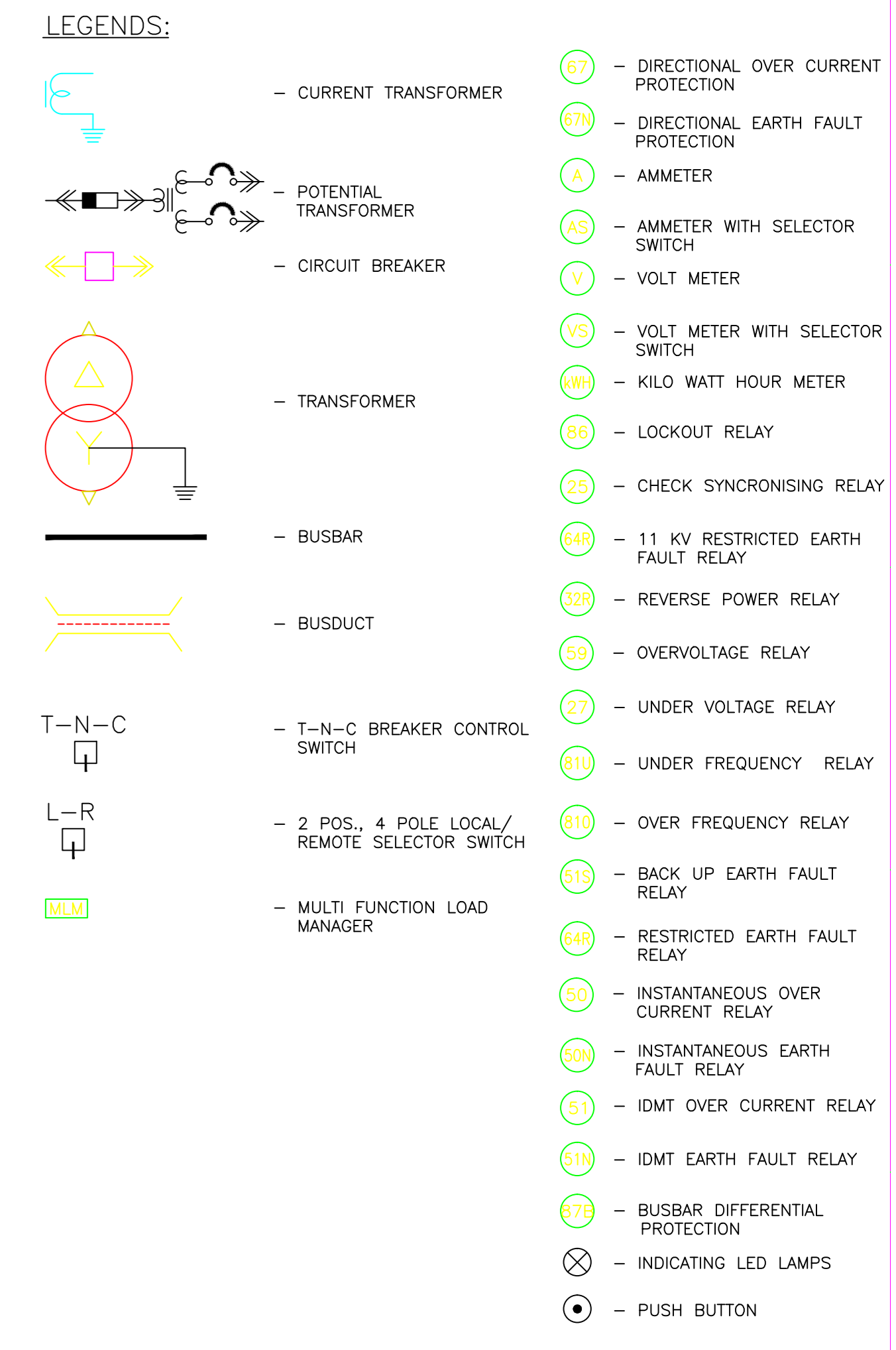
NAME	SIGN.	DATE	SCALE
DRN. MMG		20.05.13	N.T.S
APPD. K.A. BAO		20.05.13	REV. 1

SHT. No. 01 NO. OF SHT. 03 SHT. SIZE A2

REFER SLD NO. TCE.5783A-736-AU-3001 FOR DETAILED UPSTREAM DETAILS

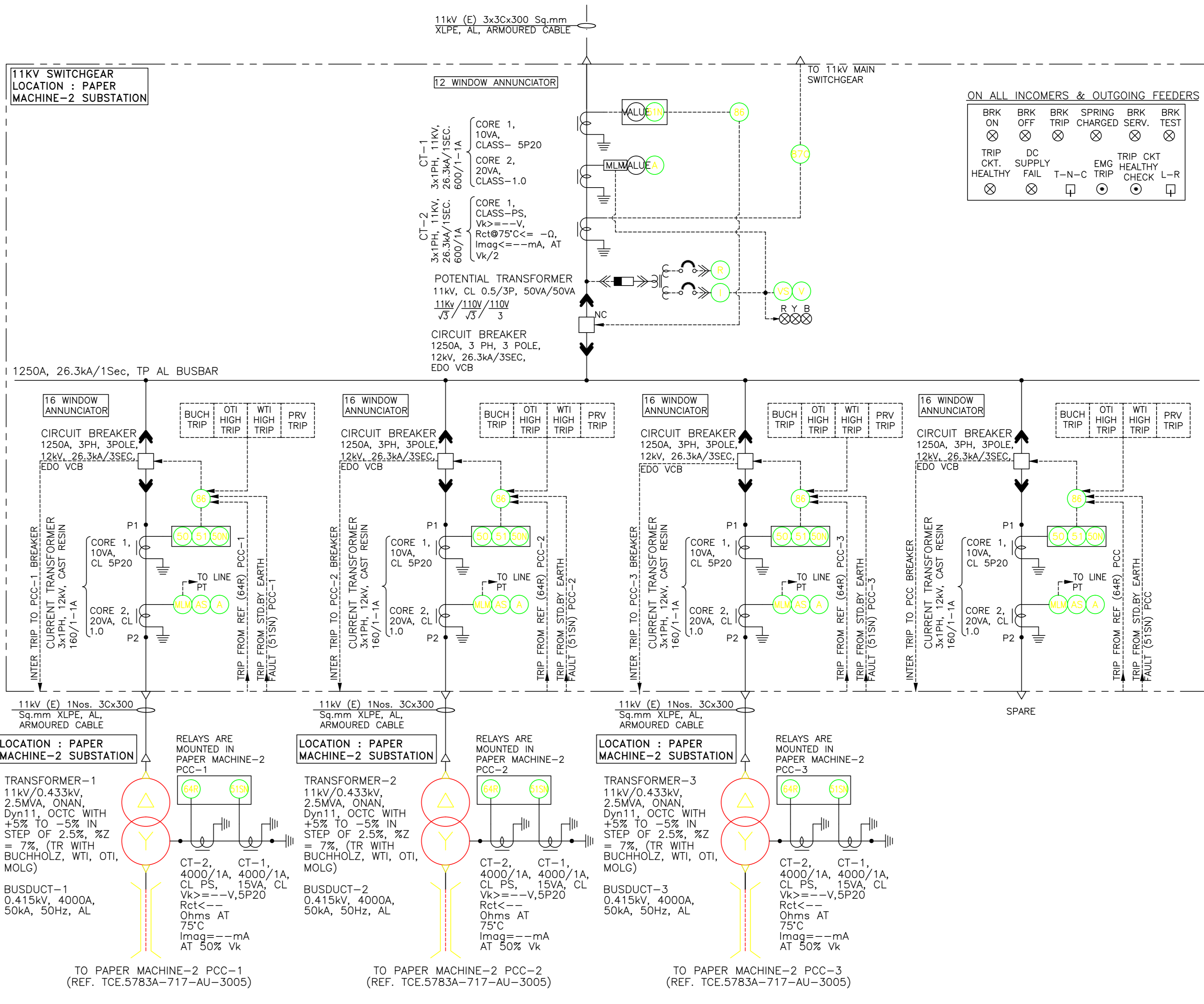
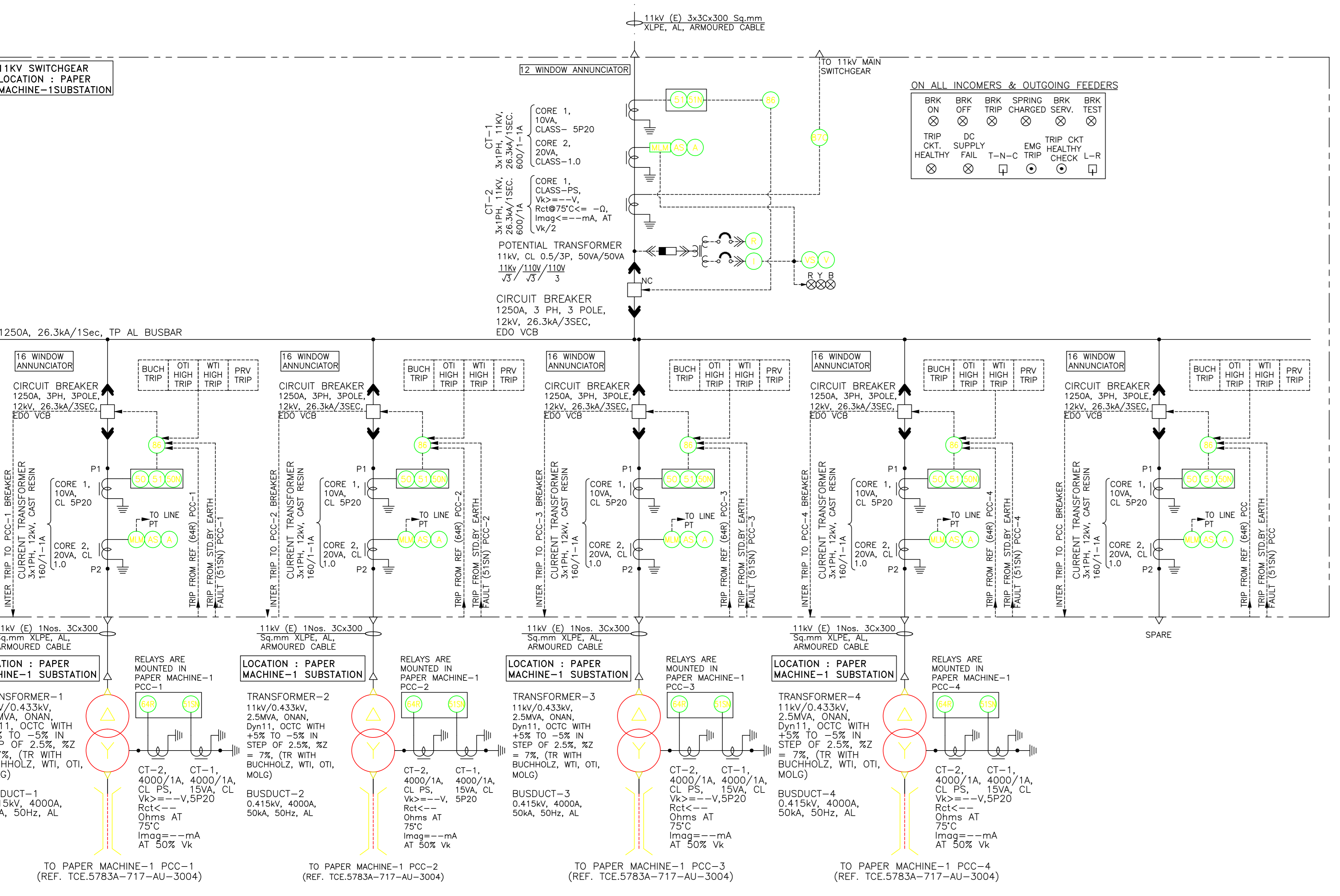


REFER SLD NO. TCE.5783A-733-AU-3003 FOR DETAILED DOWNSTREAM DETAILS



- NOTES:**
- THIS SINGLE LINE DIAGRAM INDICATES PROPOSED POWER DISTRIBUTION FOR 11KV SYSTEM.
 - THE MAIN PROTECTION RELAYS SHALL BE NUMERICAL (MICROPROCESSOR BASED) TYPE. FOR THE 11KV SYSTEM AND ALL AUXILIARY RELAY SHALL BE ELECTROMAGNETIC TYPE.
 - ALL DIGITAL METERS AND NUMERICAL RELAYS SHALL BE OF COMMUNICABLE TYPE OVER MODBUS RTU/COM.
 - FOLLOWING SYSTEM PARAMETERS ARE CONSIDERED, AS PER IS 2165, TABLE-2
- | VOLTAGE LEVEL | HSV | BSL | PFN |
|---------------|-------|-------|-------------|
| 11 kv | 12 kv | 75 kv | 28 kv/1MIN. |
- SYSTEM GROUNDING
 - 11kv - SOLIDLY EARTHED.
 - 415v - SOLIDLY EARTHED.
 - VA, VK, IMAG AND RCT OF CT AND PT SHALL BE CALCULATED BASED ON THE PROTECTION RELAY/ MEASURING INSTRUMENT CONNECTED AND SAME SHALL BE DECIDED DURING DETAILED ENGINEERING.
 - AN EMERGENCY TRIP PUSH BUTTON ENCLOSED IN WEATHERPROOF ENCLOSURE SHALL BE PROVIDED NEAR EACH TRANSFORMER FOR TRIPPING THE TRANSFORMER.
 - ALL METERS SHALL BE COMMUNICABLE TYPE (RS-485).
 - THE CONTROL VOLTAGE FOR 11KV SHALL BE 110 V DC FOR TRIPPING, CLOSING AND INDICATION. 230 V AC FOR SPACE HEATER, SPRING CHARGING MOTOR AND ILLUMINATION.
 - 110V DC SUPPLY SHALL BE DERIVED FROM BATTERY CHARGER AND 230V AC SUPPLY SHALL BE DERIVED FROM PDB THIS SHALL BE MADE AVAILABLE THROUGH A SWITCH AND MCB COMBINATION.
 - FOR CABLE PROTECTION HIGH SPEED PILOT WIRE PROTECTION RELAY HORM-4 ALONG WITH SUPERVISION UNIT RELAY SHALL BE USED.

- ENGINEERING REFERENCE DRAWING:**
- PLOT PLAN ----- TCE.5783A-100-GA-6001_R1.0
 - SINGLE LINE DIAGRAM FOR 66KV DISTRIBUTION SYSTEM ----- TCE.5783A-736-AU-3001_R0
 - SINGLE LINE DIAGRAM FOR 11KV DISTRIBUTION SYSTEM (SH 2 OF 2) ----- TCE.5783A-733-AU-3003_R2



DO NOT SCALE [RELEASED FOR CONSTRUCTION]

BANK NOTE PAPER MILL INDIA PRIVATE LIMITED
12000 TPA BANK NOTE PAPER MILL (MYSORE)

SINGLE LINE DIAGRAM FOR 11KV DISTRIBUTION SYSTEM (SH 1 OF 2)

TATA CONSULTING ENGINEERS LIMITED
MUMBAI

SCALE: NTS	APPROVED	DATE (R0 ISSUE)
OFFICE-DISC DV-EL	GROUP HEAD	06.11.2012
DRN:ADP		DATE (CONSTRUCTION)
CHK:PTN	DWG NO: TCE.5783A-733-AU-3002	15.03.2013
	ISSUE	R2

FOR R0 ISSUE ONLY		ISSUE		REVISIONS		CLEARED		APPD		DATE		ISSUE	
DEPT	SIGNATURE	DATE	R1	REVISED AS PER BNPMPIL COMMENTS	DRN	CHEM	CIVIL	ELEC	I&C	MECH	APPD	DATE	ISSUE
CHEM			R1	REVISED AS PER BNPMPIL COMMENTS	ADP						RSK	06.11.12	
CHEM			R2	REVISED AS PER CHANGE IN LOAD FROM VOITH	ADP						RSK	15.03.13	

FOR R0 ISSUE ONLY		ISSUE		REVISIONS		CLEARED		APPD		DATE		ISSUE	
DEPT	SIGNATURE	DATE	R1	REVISED AS PER BNPMPIL COMMENTS	DRN	CHEM	CIVIL	ELEC	I&C	MECH	APPD	DATE	ISSUE
CHEM			R1	REVISED AS PER BNPMPIL COMMENTS	ADP						RSK	06.11.12	
CHEM			R2	REVISED AS PER CHANGE IN LOAD FROM VOITH	ADP						RSK	15.03.13	

FOR R0 ISSUE ONLY		ISSUE		REVISIONS		CLEARED		APPD		DATE		ISSUE	
DEPT	SIGNATURE	DATE	R1	REVISED AS PER BNPMPIL COMMENTS	DRN	CHEM	CIVIL	ELEC	I&C	MECH	APPD	DATE	ISSUE
CHEM			R1	REVISED AS PER BNPMPIL COMMENTS	ADP						RSK	06.11.12	
CHEM			R2	REVISED AS PER CHANGE IN LOAD FROM VOITH	ADP						RSK	15.03.13	

FILE NAME : 5783AEL3002R2

CONSTRUCTION / FABRICATION WORK IS LIMITED ON 'S' (RELEASED) RESULTS ONLY. ANY CHANGES TO BE MADE TO THIS DRAWING SHALL BE THROUGH THE PROPER CHANNELS. THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION / FABRICATION WORK RELATED TO 'OLD' PROJECTS.

REFER SLD NO. TCE.5783A-733-AU-3002 FOR DETAILED UPSTREAM DETAILS

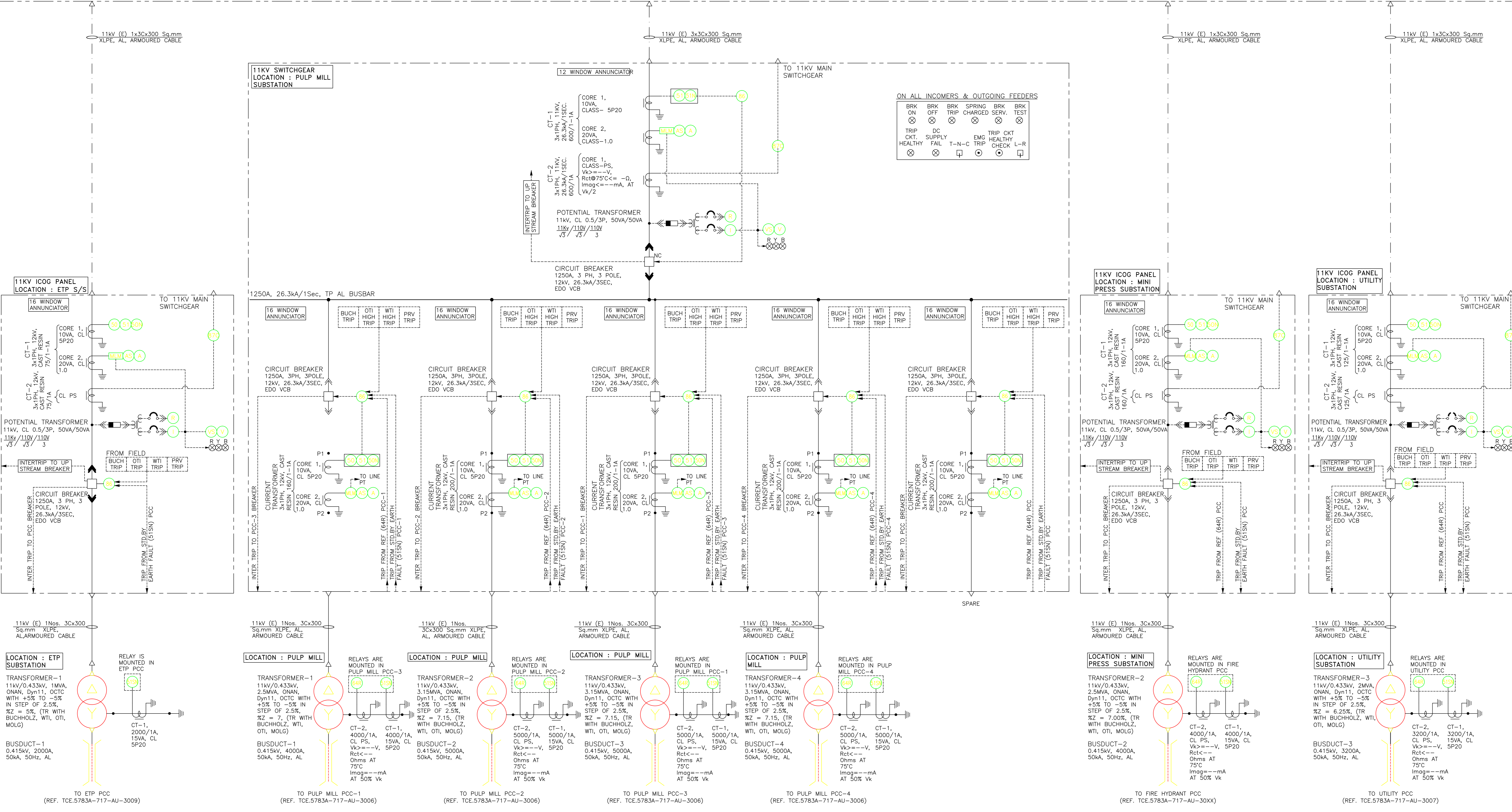
- LEGENDS:**
- CURRENT TRANSFORMER
 - POTENTIAL TRANSFORMER
 - CIRCUIT BREAKER
 - TRANSFORMER
 - BUSBAR
 - BUSDUCT
 - T-N-C
 - L-R
 - MULTI FUNCTION LOAD MANAGER
 - DIRECTIONAL OVER CURRENT PROTECTION
 - DIRECTIONAL EARTH FAULT PROTECTION
 - AMMETER
 - AMMETER WITH SELECTOR SWITCH
 - VOLT METER
 - VOLT METER WITH SELECTOR SWITCH
 - KILO WATT HOUR METER
 - LOCKOUT RELAY
 - CHECK SYNCHRONISING RELAY
 - 11 KV RESTRICTED EARTH FAULT RELAY
 - REVERSE POWER RELAY
 - OVERVOLTAGE RELAY
 - UNDER VOLTAGE RELAY
 - UNDER FREQUENCY RELAY
 - OVER FREQUENCY RELAY
 - BACK UP EARTH FAULT RELAY
 - RESTRICTED EARTH FAULT RELAY
 - INSTANTANEOUS OVER CURRENT RELAY
 - INSTANTANEOUS EARTH FAULT RELAY
 - IDMT OVER CURRENT RELAY
 - IDMT EARTH FAULT RELAY
 - BUSBAR DIFFERENTIAL PROTECTION
 - INDICATING LED LAMPS
 - PUSH BUTTON

NOTES:

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 - ALL DIGITAL METERS AND NUMERICAL RELAYS SHALL BE OF COMMUNICABLE TYPE OVER MODBUS PROTOCOL.
 - FOLLOWING SYSTEM PARAMETERS ARE CONSIDERED, AS PER IS 2165, TABLE-2
- | VOLTAGE LEVEL | HSV | BIL | PFN |
|---------------|-------|-------|-------------|
| 11 kv | 12 kv | 75 kv | 28 kv/1MIN. |
- SYSTEM GROUNDING
 - VA, VK, IMAG AND RCT OF CT AND PT SHALL BE CALCULATED BASED ON THE PROTECTION RELAY/ MEASURING INSTRUMENT CONNECTED AND SAME SHALL BE DECIDED DURING DETAILED ENGINEERING.
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 - FOR CABLE PROTECTION HIGH SPEED PILOT WIRE PROTECTION RELAY HORM-4 ALONG WITH SUPERVISION UNIT RELAY SHALL BE USED.

ENGINEERING REFERENCE DRAWING:

- PLOT PLAN ----- TCE.5783A-100-GA-6001_R10
- SINGLE LINE DIAGRAM FOR 66KV DISTRIBUTION SYSTEM ----- TCE.5783A-736-AU-3001_R0
- SINGLE LINE DIAGRAM FOR 11KV DISTRIBUTION SYSTEM (SH 1 OF 2) ----- TCE.5783A-733-AU-3002_R2



FOR RO ISSUE ONLY				REVISIONS				CLEARED				REVISIONS				CLEARED				REVISIONS										
DEPT	SIGNATURE	DATE	ISSUE	DRN	CHEM	CIVIL	ELEC	I&C	MECH	APPD	DATE	ISSUE	DRN	CHEM	CIVIL	ELEC	I&C	MECH	APPD	DATE	ISSUE	DRN	CHEM	CIVIL	ELEC	I&C	MECH	APPD	DATE	ISSUE
ELEC			R1	REVISED AS PER BNP/MP COMMENTS	ADP					RSK	08.11.12																			
CIVIL			R2	REVISED AS PER CHANGE IN LOAD FROM VOITH	ADP					RSK	15.03.13																			
ELEC			R3	REVISED TO INCORPORATE THE LOCATION OF THE TRANSFORMER	ADP					RSK	01.03.14																			

DO NOT SCALE RELEASED FOR CONSTRUCTION

BANK NOTE PAPER MILL INDIA PRIVATE LIMITED
12000 TPA BANK NOTE PAPER MILL (W/SORE)

SINGLE LINE DIAGRAM FOR 11KV DISTRIBUTION SYSTEM (SH 2 OF 2)

TATA CONSULTING ENGINEERS LIMITED
MUMBAI

SCALE: HTS	APPROVED	DATE (RO ISSUE): 06.11.2012
OFFICE-DISC: DV-EL	GROUP HEAD	DATE (GROUP SIGN): 01.03.2014
DRN: ADP		
CHK: PTN	DWG NO: TCE.5783A-733-AU-3003	ISSUE: R3

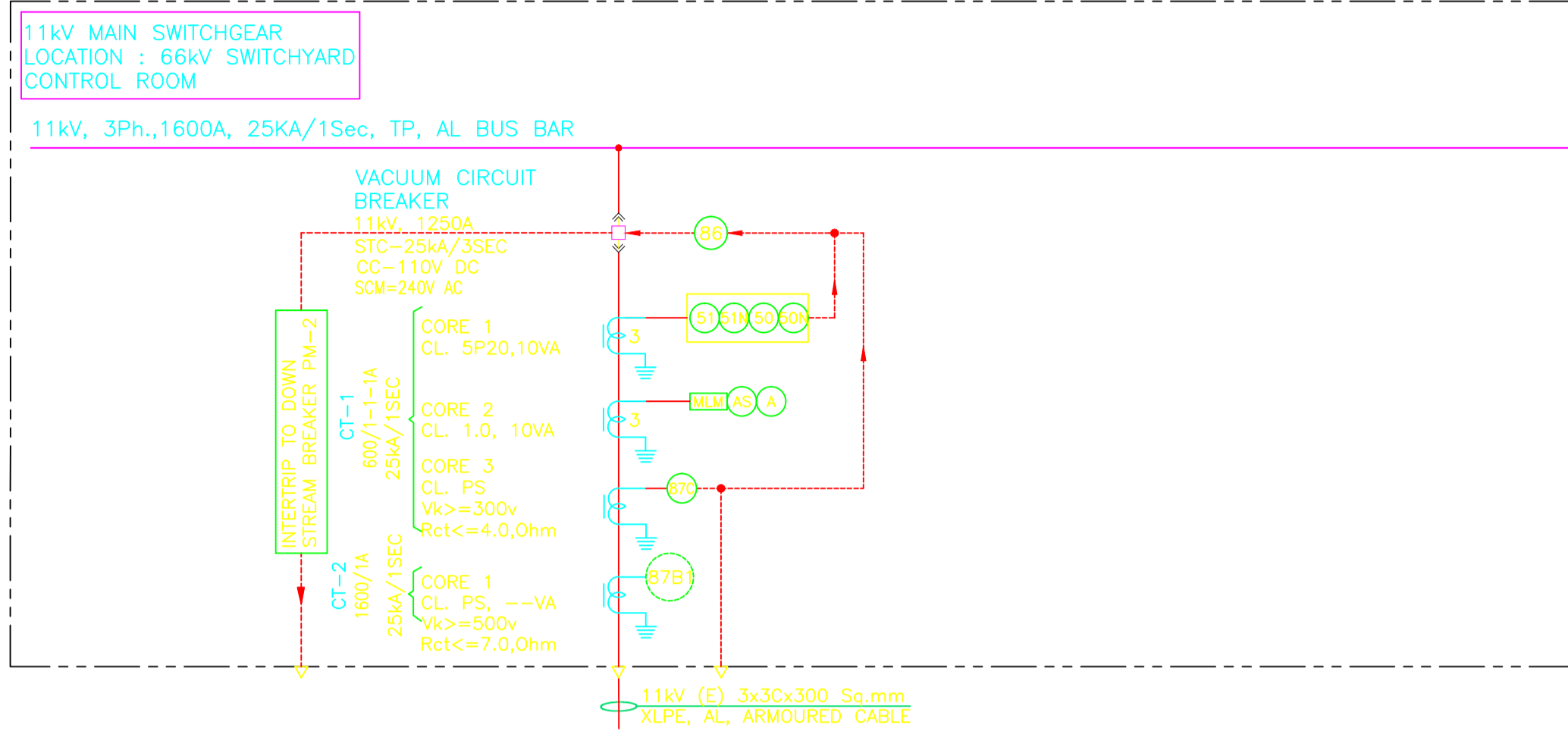
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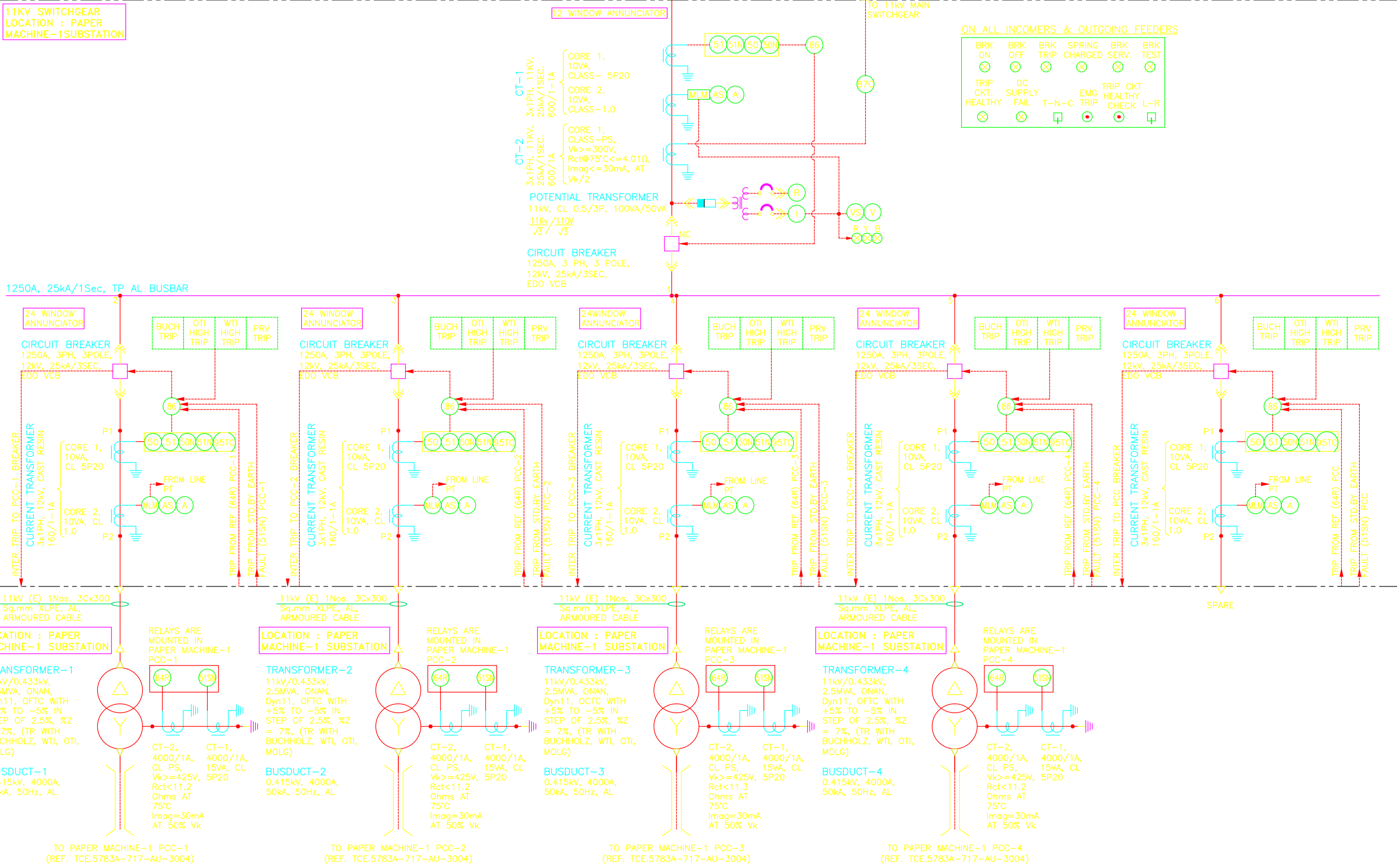
DATE: 06.11.2012

DATE (GROUP SIGN): 01.03.2014

CONSTRUCTION / FABRICATION WORK IS NOT TO BE STARTED UNTIL THE WORK IS RELEASED FOR CONSTRUCTION. BEFORE OFFICE TO CLEAR, THE WORK SHALL BE RELEASED FOR CONSTRUCTION. THE WORK SHALL BE RELEASED FOR CONSTRUCTION ONLY AFTER THE WORK IS RELEASED FOR CONSTRUCTION.



11kV SWITCHGEAR LOCATION : PAPER MACHINE-1 SUBSTATION



- LEGENDS:**
- CURRENT TRANSFORMER
 - POTENTIAL TRANSFORMER
 - CIRCUIT BREAKER
 - TRANSFORMER
 - BUSBAR
 - BUSDUCT
 - T-N-C
 - L-R
 - MULTI
 - DIRECTIONAL OVER CURRENT PROTECTION
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 - IDMT EARTH FAULT RELAY
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 - PUSH BUTTON

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 - ALL DIGITAL METERS AND NUMERICAL RELAYS SHALL BE OF COMMUNICABLE TYPE OVER MODBUS PROTOCOL.
 - FOLLOWING SYSTEM PARAMETERS ARE CONSIDERED, AS PER IS 2165, TABLE-2
 - SYSTEM GROUNDING
 - VIA VK, IMAG AND RCT OF CT AND PT SHALL BE CALCULATED BASED ON THE PROTECTION RELAY / MEASURING INSTRUMENT CONNECTED AND SAME SHALL BE DECIDED DURING DETAILED ENGINEERING.
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 - FOR CABLE PROTECTION HIGH SPEED PILOT WIRE PROTECTION RELAY HORM-4 ALONG WITH SUPERVISION UNIT RELAY SHALL BE USED.

- ENGINEERING REFERENCE DRAWING:**
- PLOT PLAN ----- TCE.5783A-100-GA-6001_R10
 - SINGLE LINE DIAGRAM FOR 66kV DISTRIBUTION SYSTEM ----- TCE.5783A-756-AU-3001_R0
 - SINGLE LINE DIAGRAM FOR 11kV DISTRIBUTION SYSTEM (SH 2 OF 2) ----- TCE.5783A-733-AU-3003_R2

DO NOT SCALE | RELEASED FOR CONSTRUCTION

BANK NOTE PAPER MILL INDIA PRIVATE LIMITED
12000 TPA BANK NOTE PAPER MILL (MYSORE)

SINGLE LINE DIAGRAM FOR PAPER MACHINE-1 SUBSTATION

TATA CONSULTING ENGINEERS LIMITED
MUMBAI

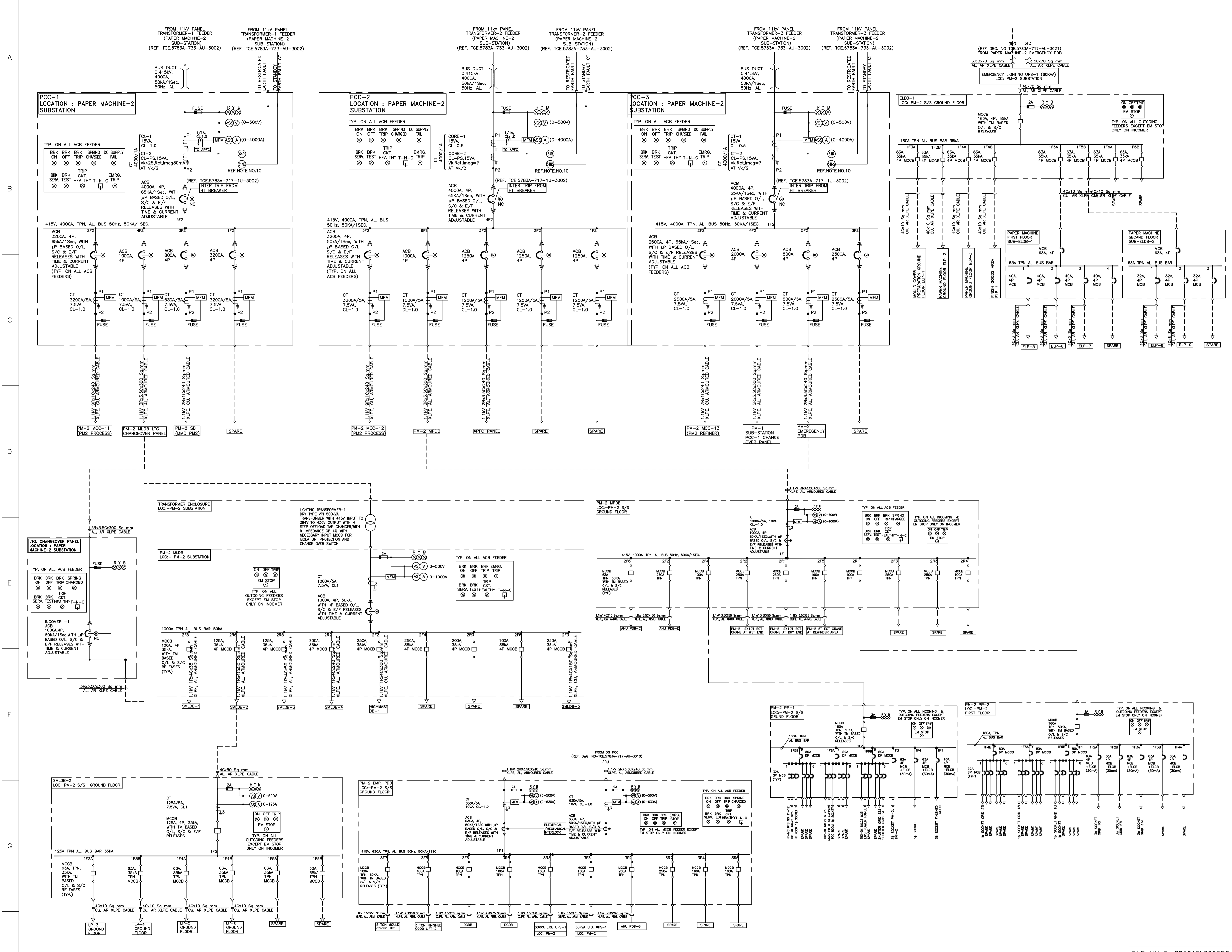
SCALE: NTS APPROVED: DATE (NO ISSUED): 15.11.2017
OFFICE-DWG: DV-EL GROUP HEAD DATE (ISSUED): 15.03.2013
DRN: ADP
CHD: PTN DWG NO: TCE.5783A-733-AU-3002 ISSUE NO: 02

FOR RQ ISSUE ONLY		ISSUE	REVISIONS	DRN	CLEARED	APPD	DATE	ISSUE	REVISIONS	DRN	CLEARED	APPD	DATE	ISSUE	REVISIONS	DRN	CLEARED	APPD	DATE	ISSUE	
DEPT	SIGNATURE	DATE			CHEM	CIVIL	ELEC	I&C	MECH		CHEM	CIVIL	ELEC	I&C	MECH		CHEM	CIVIL	ELEC	I&C	MECH
CHM			R1 REVISED AS PER BNPMP COMMENTS	ADP						RSK			08.11.10								
CIVIL			R2 REVISED AS PER CHANGE IN LOAD FROM VOITH	ADP						RSK			15.03.13								

FILE NAME: 5783AEL3002R2

IF PREPARED/ISSUED AND NOT FOR USE FOR CONSTRUCTION PURPOSES WITHOUT THE PERMISSION OF THE PROJECT ENGINEER IN CHARGE, THE USER SHALL BE RESPONSIBLE FOR ANY DAMAGE TO THE PROJECT OR TO THE COMPANY.

INFORMATION CONTAINED WITHIN THIS DOCUMENT IS UNCLASSIFIED EXCEPT WHERE SHOWN OTHERWISE. IT IS THE POLICY OF TATA CONSULTING ENGINEERS LIMITED TO MAKE ALL INFORMATION AVAILABLE TO THE PUBLIC.



- ### LEGEND:
- CURRENT TRANSFORMER
 - NORMALLY OPEN
 - NORMALLY CLOSED
 - AMMETER
 - AMMETER SELECTOR SWITCH
 - VOLTMETER
 - VOLTMETER SELECTOR SWITCH
 - BUS DUCT
 - FUSE
 - INDICATING LAMP
 - T-N-C BREAKER CONTROL SWITCH
 - MULTI FUNCTION METER
 - EMERGENCY TRIP PUSH BUTTON (STAY PUT)

- ### NOTES:
- THIS SINGLE LINE DIAGRAM INDICATES THE POWER DISTRIBUTION FOR PCC-1, PCC-2 & PCC-3 OF PAPER MACHINE-2 SUBSTATION.
 - THE PCCs SHALL BE FREE STANDING SINGLE FRONT COMPARTMENTALIZED, IP54/IP42 (FOR VENTILATION BOARDS) WITH TOP BUSDUCT ENTRY & BOTTOM CABLE O/G.
 - ALL ACB'S SHALL BE 4 POLE, 50KA/1SEC, ELECTRICALLY OPERATED DRAWOUT TYPE WITH MICROPROCESSOR BASED O/L, S/C & E/F RELEASES WITH TIME AND CURRENT ADJUSTABLE & SHALL BE COMMUNICABLE ON MODBUS (RS485).
 - BUSBARS SHALL BE OF ELECTROLYTIC GRADE ALUMINIUM SUITABLE FOR WITHSTANDING 50KA/1SEC. THE NEUTRAL BUSBAR SHALL HAVE CROSS SECTIONAL AREA HALF OF THE PHASE BUSBAR.
 - PANEL WIRING FOR CT/AUXILIARY CIRCUIT SHALL BE WITH 1100 VOLTS GRADE FRLS, PVC INSULATED, 2.5 Sq. mm. STANDARD COPPER WIRE AND 1.5 Sq. mm. STANDARD COPPER WIRE FOR CONTROL PT AND OTHER CIRCUITS..
 - THE CONTROL VOLTAGE FOR BREAKERS SHALL BE 110V DC FOR TRIPPING, CLOSING & INDICATION. 240V AC SUPPLY SHALL BE CONSIDERED FOR SPACE HEATER, SPRING CHARGING MOTOR & PANEL ILLUMINATION LAMP. POTENTIAL INDICATING LAMPS SHALL BE SUITABLE FOR 110V AC SUPPLY.
 - 110V DC SUPPLY SHALL BE DERIVED FROM BATTERY CHARGER AND 240V AC SUPPLY SHALL BE DERIVED FROM RESPECTIVE BUS. VENDOR SHALL PROVIDE SEPARATE 110V DC & 240V AUXILIARY SUPPLY.
 - THE BUSDUCT SHALL BE SANDWICHED TYPE. BIDDER TO CONSIDER THE NECESSARY ADAPTER BOX AS REQUIRED FOR BUSDUCT CONNECTION FOR THE INCOMER.
 - PCC SHALL BE EXTENSIBLE ON EITHER SIDE.
 - STANDBY AND RESTRICTED EARTH FAULT RELAY IS LOCATED IN PCC INCOMER.
 - CABLE DETAILS WILL BE FURNISHED TO SUCCESSFUL BIDDER DURING DETAILED ENGINEERING. PANEL SHALL BE DESIGNED IN A SUCH WAY THAT IT SHALL HAVE SUFFICIENT SPACE FOR TERMINATION AND MAINTAINING PURCHASER CABLE.
 - CT PARAMETERS SHOWN ARE INDICATIVE ONLY. CT/PT BURDEN, CLASS PS DETAILS WILL BE FINALIZED DURING DETAILED ENGINEERING BASED ON DESIGN REQUIREMENT.

- ### ENGINEERING REFERENCE DRAWING:
- SINGLE LINE DIAGRAM FOR 11KV DISTRIBUTION SYSTEM (SHEET 1 OF 2) ----- TCE.5783A-733-AU-3002_R2
 - SINGLE LINE DIAGRAM FOR PCC- 1, PCC-2, PCC-3 & PCC-4 OF PAPER MACHINE-1 S/S ----- TCE.5783A-717-AU-3004_R0

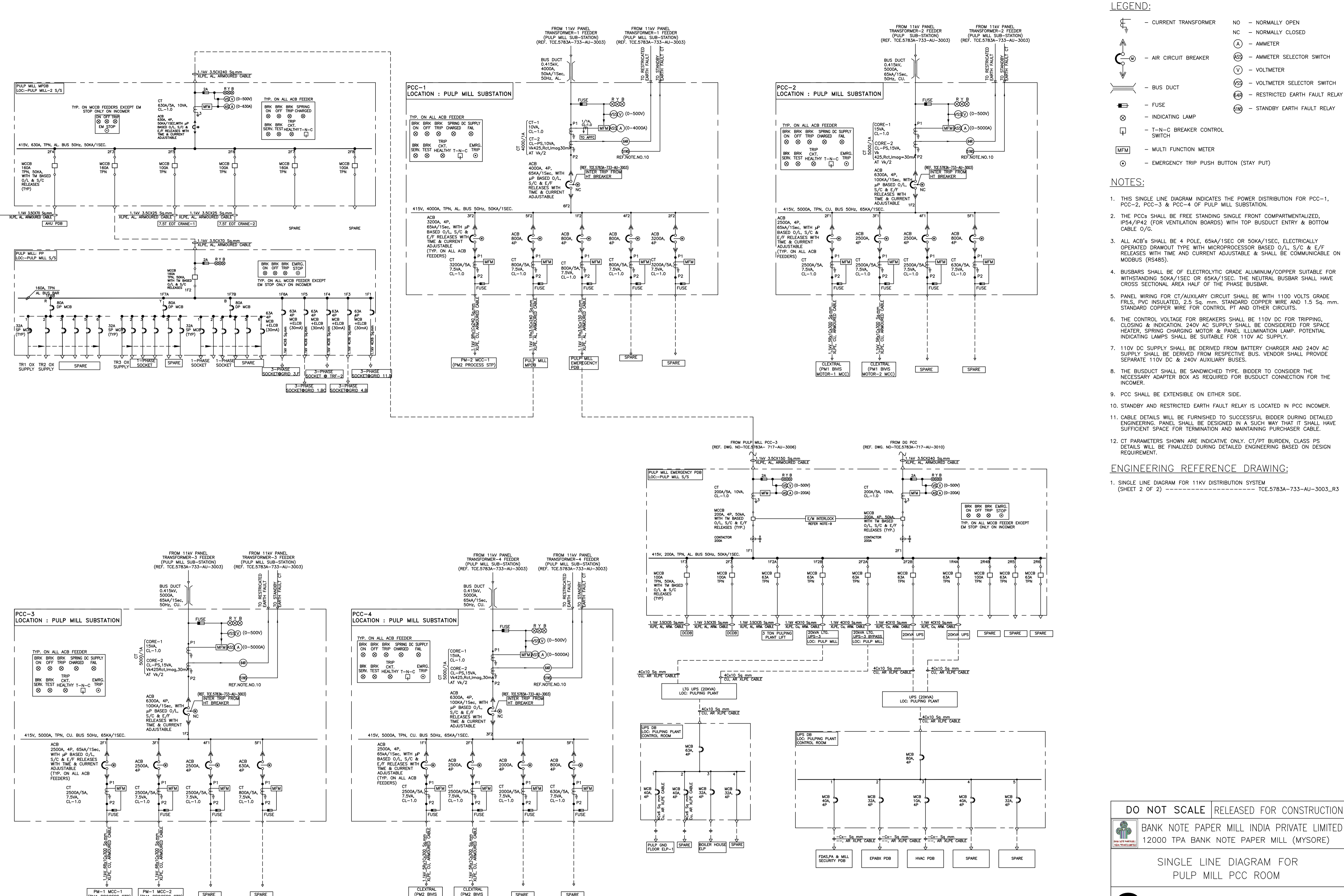
DO NOT SCALE RELEASED FOR CONSTRUCTION

BANK NOTE PAPER MILL INDIA PRIVATE LIMITED
12000 TPA BANK NOTE PAPER MILL (MYSORE)

SINGLE LINE DIAGRAM FOR
PM2 PCC ROOM

FILE NAME : 6059AEL3005R0		TATA CONSULTING ENGINEERS LIMITED MUMBAI	
SCALE: NTS	APPROVED	DATE (RO ISSUE)	18-04-2014
OFFICE-DISC:MUM-EL		DATE (CURRENT ISSUE)	18-04-2014
DRN: PSB		CONSTRUCTION / FABRICATION WORK IS PERMITTED ON 'R' (RELEASED) ISSUES ONLY.	
CHD:	DWG TCE.5783A- 717-AU-3005	ISSUE	RO

FOR RO ISSUE ONLY		ISSUE		REVISIONS		REVISIONS		DRN		CLEARED		APPD		DATE		DATE	
DEPT	SIGNATURE	DATE	ISSUE	NO	DESCRIPTION	CHEM	CIVIL	ELEC	I&C	MECH	CHEM	CIVIL	ELEC	I&C	MECH	DATE	DATE



LEGEND:

- CURRENT TRANSFORMER
- AIR CIRCUIT BREAKER
- BUS DUCT
- FUSE
- INDICATING LAMP
- T-N-C BREAKER CONTROL SWITCH
- MULTI FUNCTION METER
- EMERGENCY TRIP PUSH BUTTON (STAY PUT)
- NO — NORMALLY OPEN
- NC — NORMALLY CLOSED
- ⊙ — AMMETER
- ⊙ — AMMETER SELECTOR SWITCH
- ⊙ — VOLTMETER
- ⊙ — VOLTMETER SELECTOR SWITCH
- ⊙ — RESTRICTED EARTH FAULT RELAY
- ⊙ — STANDBY EARTH FAULT RELAY

NOTES:

- THIS SINGLE LINE DIAGRAM INDICATES THE POWER DISTRIBUTION FOR PCC-1, PCC-2, PCC-3 & PCC-4 OF PULP MILL SUBSTATION.
- THE PCCs SHALL BE FREE STANDING SINGLE COMPARTMENTALIZED, IP54/IP42 (FOR VENTILATION BOARDS) WITH TOP BUSDUCT ENTRY & BOTTOM CABLE O/G.
- ALL ACB'S SHALL BE 4 POLE, 65KA/1SEC OR 50KA/1SEC, ELECTRICALLY OPERATED DRAWOUT TYPE WITH MICROPROCESSOR BASED O/L, S/C & E/F RELEASES WITH TIME AND CURRENT ADJUSTABLE & SHALL BE COMMUNICABLE ON MODBUS (RS485).
- BUSBARS SHALL BE OF ELECTROLYTIC GRADE ALUMINUM/COPPER SUITABLE FOR WITHSTANDING 50KA/1SEC OR 65KA/1SEC. THE NEUTRAL BUSBAR SHALL HAVE CROSS SECTIONAL AREA HALF OF THE PHASE BUSBAR.
- PANEL WIRING FOR CT/AUXILIARY CIRCUIT SHALL BE WITH 1100 VOLTS GRADE FRLS, PVC INSULATED, 2.5 Sq. mm. STANDARD COPPER WIRE AND 1.5 Sq. mm. STANDARD COPPER WIRE FOR CONTROL PT AND OTHER CIRCUITS.
- THE CONTROL VOLTAGE FOR BREAKERS SHALL BE 110V DC FOR TRIPPING, CLOSING & INDICATION. 240V AC SUPPLY SHALL BE CONSIDERED FOR SPACE HEATER, SPRING CHARGING MOTOR & PANEL ILLUMINATION LAMP. POTENTIAL INDICATING LAMPS SHALL BE SUITABLE FOR 110V AC SUPPLY.
- 110V DC SUPPLY SHALL BE DERIVED FROM BATTERY CHARGER AND 240V AC SUPPLY SHALL BE DERIVED FROM RESPECTIVE BUS. VENDOR SHALL PROVIDE SEPARATE 110V DC & 240V AUXILIARY BUSES.
- THE BUSDUCT SHALL BE SANDWICHED TYPE, BIDDER TO CONSIDER THE NECESSARY ADAPTER BOX AS REQUIRED FOR BUSDUCT CONNECTION FOR THE INCOMER.
- PCC SHALL BE EXTENSIBLE ON EITHER SIDE.
- STANDBY AND RESTRICTED EARTH FAULT RELAY IS LOCATED IN PCC INCOMER.
- CABLE DETAILS WILL BE FURNISHED TO SUCCESSFUL BIDDER DURING DETAILED ENGINEERING. PANEL SHALL BE DESIGNED IN A SUCH WAY THAT IT SHALL HAVE SUFFICIENT SPACE FOR TERMINATION AND MAINTAINING PURCHASER CABLE.
- CT PARAMETERS SHOWN ARE INDICATIVE ONLY. CT/P/BURDEN, CLASS PS DETAILS WILL BE FINALIZED DURING DETAILED ENGINEERING BASED ON DESIGN REQUIREMENT.

ENGINEERING REFERENCE DRAWING:

- SINGLE LINE DIAGRAM FOR 11KV DISTRIBUTION SYSTEM (SHEET 2 OF 2) --- TCE.5783A-733-AU-3003_R3

FOR RO ISSUE ONLY		ISSUE		REVISIONS		CLEARED		APPD		DATE		ISSUE		REVISIONS		CLEARED		APPD		DATE		ISSUE	
DEPT	SIGNATURE	DATE		DRN	CHEM	CIVIL	ELEC	I&C	MECH					DRN	CHEM	CIVIL	ELEC	I&C	MECH				

DO NOT SCALE RELEASED FOR CONSTRUCTION

BANK NOTE PAPER MILL INDIA PRIVATE LIMITED
12000 TPA BANK NOTE PAPER MILL (MYSORE)

SINGLE LINE DIAGRAM FOR PULP MILL PCC ROOM

TATA CONSULTING ENGINEERS LIMITED
MUMBAI

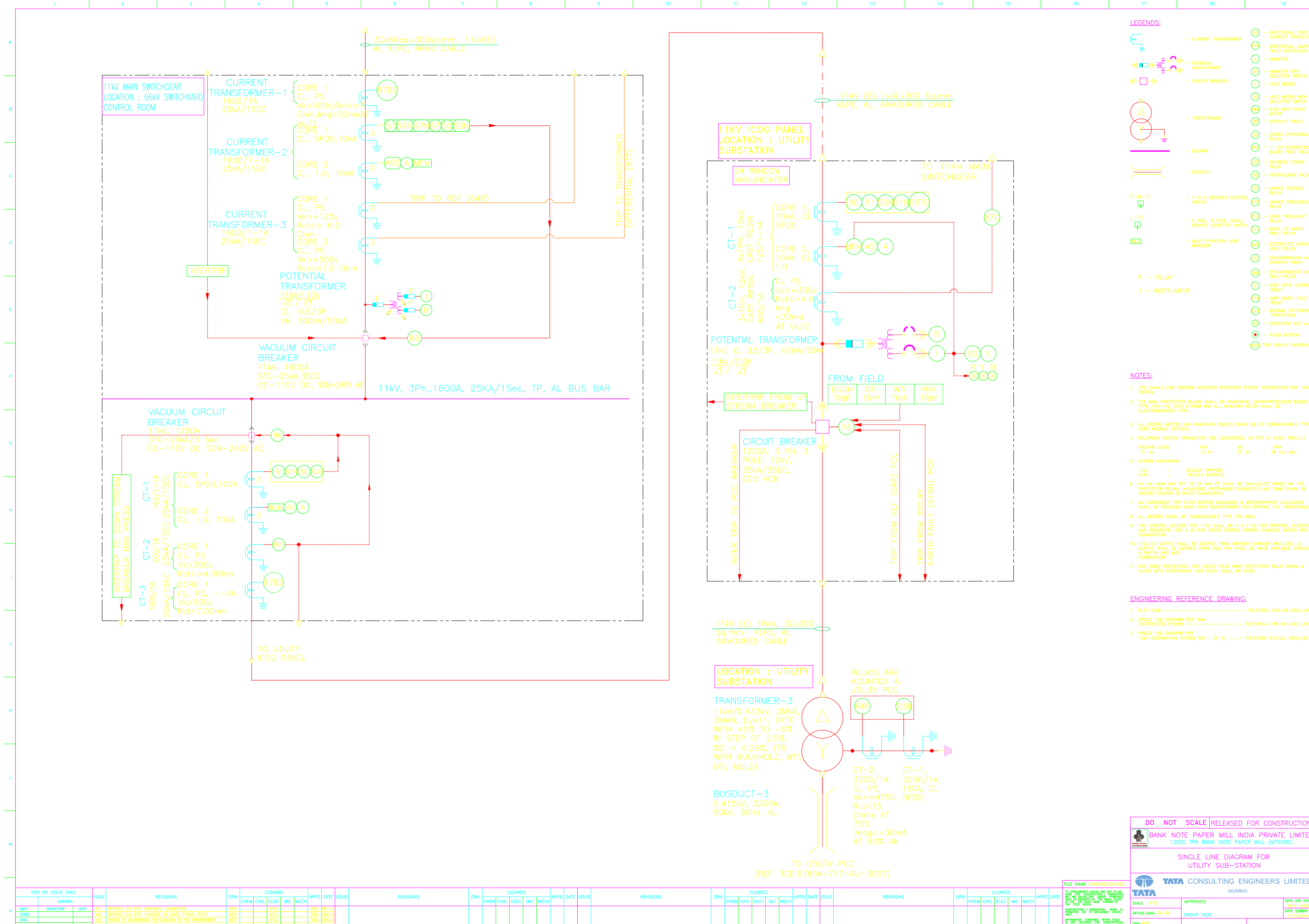
FILE NAME : 5783AEL3006R0

SCALE: NTS APPROVED DATE (RO ISSUE) 18-04-2014
OFFICE-DISC:MUM-EL DATE (REVISN ISSUE) 18-04-2014

DRN: PSB
CHD: DWG NO TCE.5783A-717-AU-3006 ISSUE RO

CONSTRUCTION / FABRICATION WORK IS PERMITTED ON 'R' (RELEASED) ISSUES ONLY.
INFORMATION CONTAINED WITHIN 'HOLD' IS NOT RELEASED FOR CONSTRUCTION / FABRICATION. FIELD MUST GET DESIGNER'S OFFICE TO CLEAR 'HOLD' IN TIME BEFORE PROCEEDING WITH ANY CONSTRUCTION / FABRICATION WORK RELATED TO 'HOLD'.

TCE FORM NO. 041 RS



- LEGENDS:**
- CURRENT TRANSFORMER
 - POTENTIAL TRANSFORMER
 - CIRCUIT BREAKER
 - TRANSFORMER
 - BUSBAR
 - BUSDUCT
 - T-N-C — T-N-C BREAKER CONTROL SWITCH
 - L-R — 2 POS., 4 POLE LOCAL/REMOTE SELECTOR SWITCH
 - M-LM — MULTI FUNCTION LOAD MANAGER
 - R — RELAY
 - I — INSTRUMENT
- 87 — DIRECTIONAL OVER CURRENT PROTECTION
 - 87N — DIRECTIONAL EARTH FAULT PROTECTION
 - A — AMMETER
 - AS — AMMETER WITH SELECTOR SWITCH
 - V — VOLT METER
 - VS — VOLT METER WITH SELECTOR SWITCH
 - KWH — KWH METER
 - 86 — LOCKOUT RELAY
 - 87S — CHECK SYNCRONISING RELAY
 - 88 — 11 KV RESTRICTED EARTH FAULT RELAY
 - 89 — OVERVOLTAGE RELAY
 - 27 — UNDER VOLTAGE RELAY
 - 27U — UNDER FREQUENCY RELAY
 - 810 — OVER FREQUENCY RELAY
 - 815 — BACK UP EARTH FAULT RELAY
 - 820 — RESTRICTED EARTH FAULT RELAY
 - 830 — INSTANTANEOUS OVER CURRENT RELAY
 - 840 — INSTANTANEOUS EARTH FAULT RELAY
 - 851 — IDMT OVER CURRENT RELAY
 - 851A — IDMT EARTH FAULT RELAY
 - 87R — BUSBAR DIFFERENTIAL PROTECTION
 - 87T — INDICATING LED LAMPS
 - 87H — PUSH BUTTON
 - 87H-1 — TRIP CIRCUIT SUPERVISION

- NOTES:**
- THIS SINGLE LINE DIAGRAM INDICATES PROPOSED POWER DISTRIBUTION FOR 11KV SYSTEM.
 - THE MAIN PROTECTION RELAYS SHALL BE NUMERICAL (MICROPROCESSOR BASED) TYPE. FOR THE 11KV SYSTEM AND ALL AUXILIARY RELAY SHALL BE ELECTROMAGNETIC TYPE.
 - ALL DIGITAL METERS AND NUMERICAL RELAYS SHALL BE OF COMMUNICABLE TYPE OVER MODBUS PROTOCOL.
 - FOLLOWING SYSTEM PARAMETERS ARE CONSIDERED, AS PER IS 2165, TABLE-2
- | VOLTAGE LEVEL | HSV | BIL | PFN |
|---------------|-------|-------|-------------|
| 11 kv | 12 kv | 75 kv | 28 kv/1MIN. |
- SYSTEM GROUNDING
11kv — SOLIDLY EARTHED.
415v — SOLIDLY EARTHED.
 - VA, VK, I_{mag} AND R_{ct} OF CT AND PT SHALL BE CALCULATED BASED ON THE PROTECTION RELAY/ MEASURING INSTRUMENT CONNECTED AND SAME SHALL BE DECIDED DURING DETAILED ENGINEERING.
 - AN EMERGENCY TRIP PUSH BUTTON ENCLOSED IN WEATHERPROOF ENCLOSURE SHALL BE PROVIDED NEAR EACH TRANSFORMER FOR TRIPPING THE TRANSFORMER.
 - ALL METERS SHALL BE COMMUNICABLE TYPE (RS-485).
 - THE CONTROL VOLTAGE FOR 11KV SHALL BE 110 V DC FOR TRIPPING, CLOSING AND INDICATION; 230 V AC FOR SPACE HEATER, SPRING CHARGING MOTOR AND ILLUMINATION.
 - 110V DC SUPPLY SHALL BE DERIVED FROM BATTERY CHARGER AND 230V AC SUPPLY SHALL BE DERIVED FROM PDB THIS SHALL BE MADE AVAILABLE THROUGH A SWITCH AND MCB.
 - FOR CABLE PROTECTION HIGH SPEED PILOT WIRE PROTECTION RELAY HORM-4 ALONG WITH SUPERVISION UNIT RELAY SHALL BE USED.

- ENGINEERING REFERENCE DRAWING:**
- PLOT PLAN ----- TCE.5783A-100-GA-6001_R10
 - SINGLE LINE DIAGRAM FOR 66KV DISTRIBUTION SYSTEM ----- TCE.5783A-736-AU-3001_R0
 - SINGLE LINE DIAGRAM FOR 11KV DISTRIBUTION SYSTEM (SH 1 OF 2) ----- TCE.5783A-733-AU-3002_R2

FOR R0 ISSUE ONLY		ISSUE	REVISIONS	DRN	CLEARED	APPD	DATE	ISSUE	REVISIONS	DRN	CLEARED	APPD	DATE	ISSUE	REVISIONS	DRN	CLEARED	APPD	DATE	ISSUE	REVISIONS	DRN	CLEARED	APPD	DATE	ISSUE	
DEPT	SIGNATURE	DATE	R1	ADP																							
CHEN			R2	ADP																							
CIVIL			R3	ADP																							
ELEC																											
MCH																											

DO NOT SCALE | RELEASED FOR CONSTRUCTION

BANK NOTE PAPER MILL INDIA PRIVATE LIMITED
12000 TPA BANK NOTE PAPER MILL (MYSORE)

SINGLE LINE DIAGRAM FOR
UTILITY SUB-STATION

TATA CONSULTING ENGINEERS LIMITED
MUMBAI

SCALE: NTS APPROVED DATE (R0 ISSUE) 28.11.2012
OFFICE-DISC DV-EL GROUP HEAD DATE (RURR0 ES00) 01.03.2014
DRN:ADP
CHD:PTN DWG: TCE.5783A-733-AU-3003 ISSUE: R3

LEGEND:

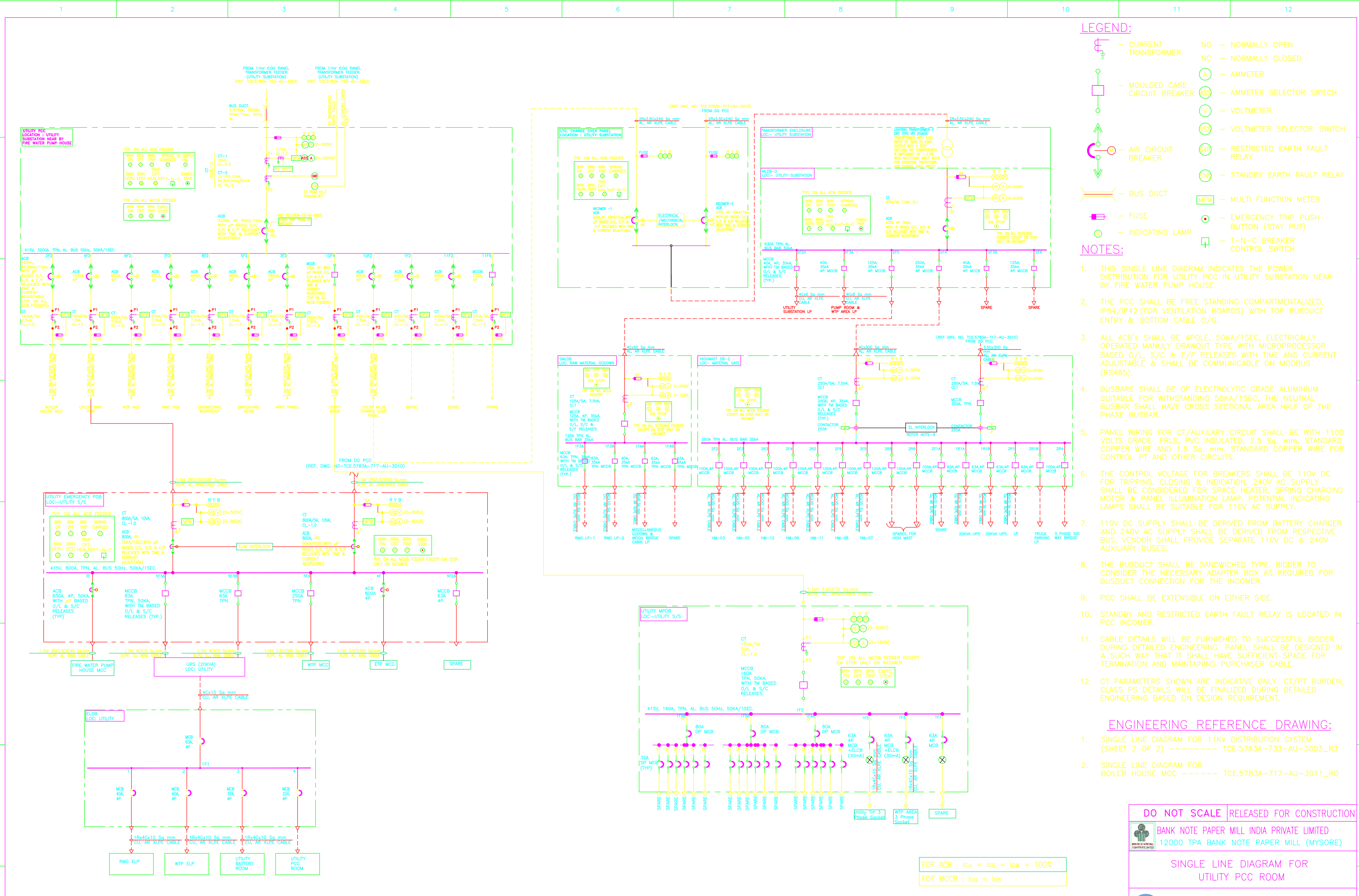
- CURRENT TRANSFORMER
- MOULDED CASE CIRCUIT BREAKER
- AIR CIRCUIT BREAKER
- BUS DUCT
- FUSE
- INDICATING LAMP
- NO - NORMALLY OPEN
- NC - NORMALLY CLOSED
- A - AMMETER
- AS - AMMETER SELECTOR SWITCH
- V - VOLTMETER
- VS - VOLTMETER SELECTOR SWITCH
- 64R - RESTRICTED EARTH FAULT RELAY
- 5IN - STANDBY EARTH FAULT RELAY
- MFM - MULTI FUNCTION METER
- EMERGENCY TRIP PUSH BUTTON (STAY PUT)
- T-N-C BREAKER CONTROL SWITCH

NOTES:

- THIS SINGLE LINE DIAGRAM INDICATES THE POWER DISTRIBUTION FOR UTILITY PCC IN UTILITY SUBSTATION NEAR BY FIRE WATER PUMP HOUSE.
- THE PCC SHALL BE FREE STANDING COMPARTMENTALIZED, IP54/IP42 (FOR VENTILATION BOARDS) WITH TOP BUSDUCT ENTRY & BOTTOM CABLE O/G.
- ALL ACB'S SHALL BE 4POLE, 50KA/1SEC, ELECTRICALLY OPERATED MANUALLY DRAWOUT TYPE WITH MICROPROCESSOR BASED O/L, S/C & E/F RELEASES WITH TIME AND CURRENT ADJUSTABLE & SHALL BE COMMUNICABLE ON MODBUS (RS485).
- BUSBARS SHALL BE OF ELECTROLYTIC GRADE ALUMINIUM SUITABLE FOR WITHSTANDING 50KA/1SEC. THE NEUTRAL BUSBAR SHALL HAVE CROSS SECTIONAL AREA HALF OF THE PHASE BUSBAR.
- PANEL WIRING FOR CT/AUXILIARY CIRCUIT SHALL BE WITH 1100 VOLTS GRADE FRLS, PVC INSULATED, 2.5 Sq. mm. STANDARD COPPER WIRE AND 1.5 Sq. mm. STANDARD COPPER WIRE FOR CONTROL PT AND OTHER CIRCUITS.
- THE CONTROL VOLTAGE FOR BREAKERS SHALL BE 110V DC FOR TRIPPING, CLOSING & INDICATION. 240V AC SUPPLY SHALL BE CONSIDERED FOR SPACE HEATER, SPRING CHARGING MOTOR & PANEL ILLUMINATION LAMP. POTENTIAL INDICATING LAMPS SHALL BE SUITABLE FOR 110V AC SUPPLY.
- 110V DC SUPPLY SHALL BE DERIVED FROM BATTERY CHARGER AND 240V AC SUPPLY SHALL BE DERIVED FROM RESPECTIVE BUS. VENDOR SHALL PROVIDE SEPARATE 110V DC & 240V AUXILIARY BUSES.
- THE BUSDUCT SHALL BE SANDWICHED TYPE. BIDDER TO CONSIDER THE NECESSARY ADAPTER BOX AS REQUIRED FOR BUSDUCT CONNECTION FOR THE INCOMER.
- PCC SHALL BE EXTENSIBLE ON EITHER SIDE.
- STANDBY AND RESTRICTED EARTH FAULT RELAY IS LOCATED IN PCC INCOMER.
- CABLE DETAILS WILL BE FURNISHED TO SUCCESSFUL BIDDER DURING DETAILED ENGINEERING. PANEL SHALL BE DESIGNED IN A SUCH WAY THAT IT SHALL HAVE SUFFICIENT SPACE FOR TERMINATION AND MAINTAINING PURCHASER CABLE.
- CT PARAMETERS SHOWN ARE INDICATIVE ONLY. CT/PT BURDEN, CLASS PS DETAILS WILL BE FINALIZED DURING DETAILED ENGINEERING BASED ON DESIGN REQUIREMENT.

ENGINEERING REFERENCE DRAWING:

- SINGLE LINE DIAGRAM FOR 11KV DISTRIBUTION SYSTEM (SHEET 2 OF 2) ----- TCE.5783A-733-AU-3003_R3
- SINGLE LINE DIAGRAM FOR BOILER HOUSE MCC ----- TCE.5783A-717-AU-3011_RO



FOR ACB : Icu = Ics = Icw = 100%
FOR MCCB : Icu = Ics

FILE NAME : 5783AEL3007R0

FOR RO ISSUE ONLY			ISSUE	REVISIONS					DRN	CLEARED					APPD	DATE	ISSUE	REVISIONS	DRN	CLEARED					APPD	DATE
DEPT	SIGNATURE	DATE		CHEM	CIVIL	ELEC	I&C	MECH		CHEM	CIVIL	ELEC	I&C	MECH						CHEM	CIVIL	ELEC	I&C	MECH		
CHEM																										
CIVIL																										
ELEC																										
I&C																										
MECH																										

DO NOT SCALE RELEASED FOR CONSTRUCTION

BANK NOTE PAPER MILL INDIA PRIVATE LIMITED
12000 TPA BANK NOTE PAPER MILL (MYSORE)

SINGLE LINE DIAGRAM FOR UTILITY PCC ROOM

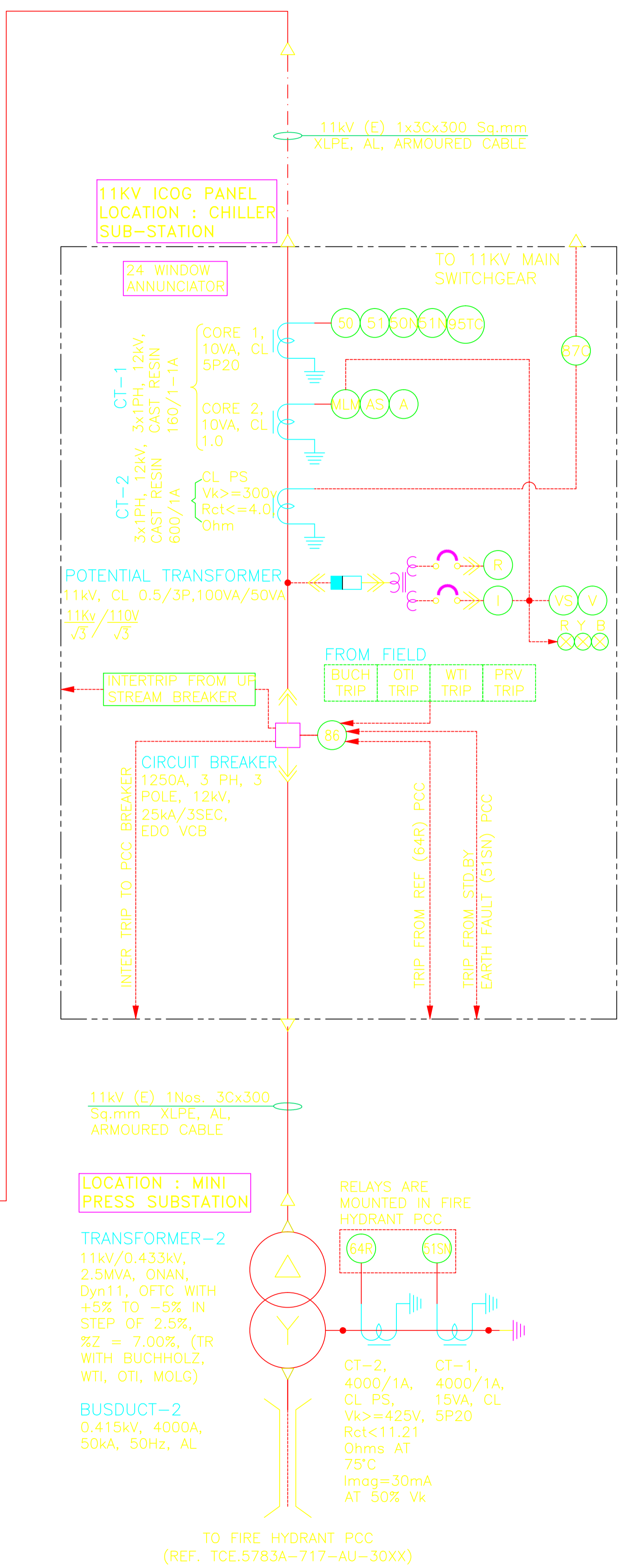
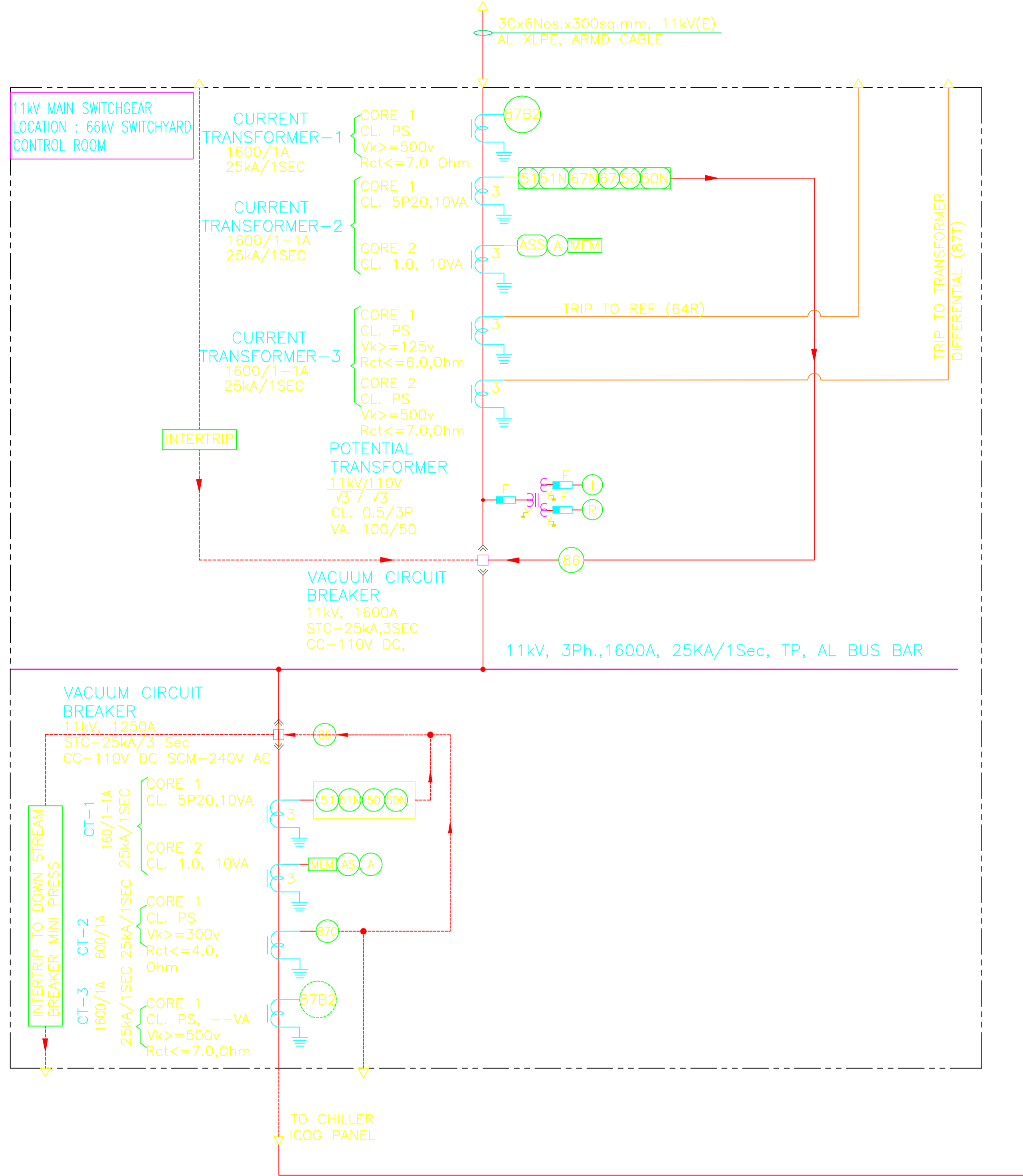
TATA CONSULTING ENGINEERS LIMITED
MUMBAI

SCALE: NTS	APPROVED	DATE (RO ISSUE) 18-04-2014
OFFICE-DISC: MUM-EL		DATE (CURRENT ISSUE) 18-04-2014
DRN: PSB		
CHD:	DWG NO TCE.5783A-717-AU-3007	ISSUE RO

FILE NAME: F041R5.DWG

SCALE: AT

TCE FORM NO. 041 R5



LEGENDS:

	- CURRENT TRANSFORMER		- DIRECTIONAL OVER CURRENT PROTECTION
	- POTENTIAL TRANSFORMER		- DIRECTIONAL EARTH FAULT PROTECTION
	- CIRCUIT BREAKER		- AMMETER
	- TRANSFORMER		- AMMETER WITH SELECTOR SWITCH
	- BUSBAR		- VOLT METER
	- BUSDUCT		- VOLT METER WITH SELECTOR SWITCH
	- T-N-C BREAKER CONTROL SWITCH		- KWH METER
	- 2 POS., 4 POLE LOCAL/REMOTE SELECTOR SWITCH		- LOCKOUT RELAY
	- MULTI-FUNCTION LOAD MANAGER		- CHECK SYNCHRONISING RELAY
	- RELAY		- 11 kV RESTRICTED EARTH FAULT RELAY
	- INSTRUMENT		- REVERSE POWER RELAY
			- UNDER VOLTAGE RELAY
			- UNDER FREQUENCY RELAY
			- OVER FREQUENCY RELAY
			- BACK UP EARTH FAULT RELAY
			- RESTRICTED EARTH FAULT RELAY
			- INSTANTANEOUS OVER CURRENT RELAY
			- INSTANTANEOUS EARTH FAULT RELAY
			- IDMT OVER CURRENT RELAY
			- IDMT EARTH FAULT RELAY
			- BUSBAR DIFFERENTIAL PROTECTION
			- INDICATING LED LAMPS
			- PUSH BUTTON
			- TRIP CIRCUIT SUPERVISION

- NOTES:**
- THIS SINGLE LINE DIAGRAM INDICATES PROPOSED POWER DISTRIBUTION FOR 11KV SYSTEM.
 - THE MAIN PROTECTION RELAYS SHALL BE NUMERICAL (MICROPROCESSOR BASED) TYPE. FOR THE 11KV SYSTEM AND ALL AUXILIARY RELAY SHALL BE ELECTROMAGNETIC TYPE.
 - ALL DIGITAL METERS AND NUMERICAL RELAYS SHALL BE OF COMMUNICABLE TYPE OVER MODBUS PROTOCOL.
 - FOLLOWING SYSTEM PARAMETERS ARE CONSIDERED, AS PER IS 2165, TABLE-2
- | | | | |
|---------------|-------|-------|-------------|
| VOLTAGE LEVEL | HSV | BIL | PFN |
| 11 kV | 12 kV | 75 kV | 28 kV/1MIN. |
- SYSTEM GROUNDING
11kV - SOLIDLY EARTHED.
415V - SOLIDLY EARTHED.
 - VA, V_k, I_{mag} AND RCT OF CT AND PT SHALL BE CALCULATED BASED ON THE PROTECTION RELAY/ MEASURING INSTRUMENT CONNECTED AND SAME SHALL BE DECIDED DURING DETAILED ENGINEERING.
 - AN EMERGENCY TRIP PUSH BUTTON ENCLOSED IN WEATHERPROOF ENCLOSURE SHALL BE PROVIDED NEAR EACH TRANSFORMER FOR TRIPPING THE TRANSFORMER.
 - ALL METERS SHALL BE COMMUNICABLE TYPE (RS-485).
 - THE CONTROL VOLTAGE FOR 11KV SHALL BE 110 V DC FOR TRIPPING, CLOSING AND INDICATION. 230 V AC FOR SPACE HEATER, SPRING CHARGING MOTOR AND ILLUMINATION.
 - 110V DC SUPPLY SHALL BE DERIVED FROM BATTERY CHARGER AND 230V AC SUPPLY SHALL BE DERIVED FROM PDB THIS SHALL BE MADE AVAILABLE THROUGH A SWITCH AND MCB
 - FOR CABLE PROTECTION HIGH SPEED PILOT WIRE PROTECTION RELAY HORM-4 ALONG WITH SUPERVISION UNIT RELAY SHALL BE USED.

- ENGINEERING REFERENCE DRAWING:**
- PLDT PLAN ----- TCE.5783A-100-GA-6001_R10
 - SINGLE LINE DIAGRAM FOR 66KV DISTRIBUTION SYSTEM ----- TCE.5783A-736-AU-3001_R0
 - SINGLE LINE DIAGRAM FOR 11KV DISTRIBUTION SYSTEM (SH 1 OF 2) ----- TCE.5783A-733-AU-3002_R2

FOR R0 ISSUE ONLY			ISSUE	REVISIONS	DRN	CLEARED			APPD	DATE	ISSUE	REVISIONS	DRN	CLEARED			APPD	DATE	ISSUE	REVISIONS	DRN	CLEARED			APPD	DATE	ISSUE
DEPT	SIGNATURE	DATE	R1	REVISED AS PER BNP/IMP COMMENTS	ADP	CHEM	CIVIL	ELEC	I&C	MECH	RSK	R1	CHEM	CIVIL	ELEC	I&C	MECH	RSK	R2	CHEM	CIVIL	ELEC	I&C	MECH	RSK		
CHEM			R2	REVISED AS PER CHANGE IN LOAD FROM VOITH	ADP							R2							R2								
CIVIL			R3	REVISED TO INCORPORATE THE LOCATION OF THE TRANSFORMER	ADP							R3							R3								

FILE NAME: F50404.DWG

FILE NAME: 5783AEL3003R2

DO NOT SCALE | RELEASED FOR CONSTRUCTION

BANK NOTE PAPER MILL INDIA PRIVATE LIMITED
12000 TPA BANK NOTE PAPER MILL (MYSORE)

SINGLE LINE DIAGRAM FOR CHILLER SUB-STATION

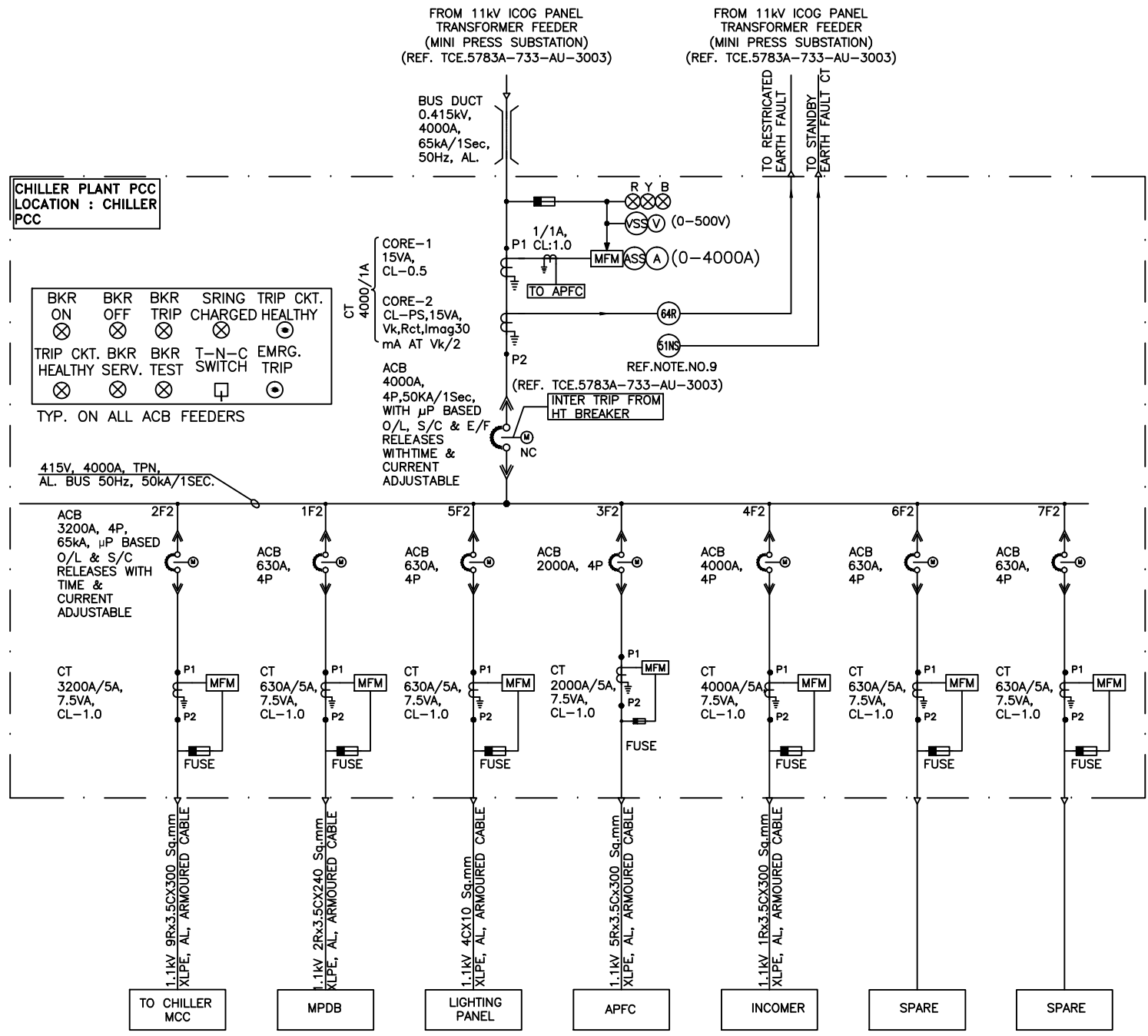
TATA CONSULTING ENGINEERS LIMITED
MUMBAI

SCALE: NTS APPROVED: [Signature] DATE (R0 ISSUE): 08.11.2012

OFFICE-DWG-DY-EL GROUP HEAD DATE (CURRENT ISSUE): 01.03.2014

DRN: ADP

CHD: PTN DWG NO: TCE.5783A-733-AU-3003 ISSUE: R3



BKR ON \otimes BKR OFF \otimes BKR TRIP \otimes SRING CHARGED \otimes TRIP HEALTHY \odot

TRIP CKT. HEALTHY \otimes BKR SERV. \otimes BKR TEST \otimes T-N-C SWITCH \square EMRG. TRIP \odot

TYP. ON ALL ACB FEEDERS

415V, 4000A, TPN, AL. BUS 50Hz, 50KA/1SEC.

- LEGEND:**
- CURRENT TRANSFORMER
 - NO - NORMALLY OPEN
 - NC - NORMALLY CLOSED
 - (A) - AMMETER
 - MOULDED CASE CIRCUIT BREAKER
 - (ASS) - AMMETER SELECTOR SWITCH
 - (V) - VOLTMETER
 - AIR CIRCUIT BREAKER
 - (VSS) - VOLTMETER SELECTOR SWITCH
 - (64R) - RESTRICTED EARTH FAULT RELAY
 - (51NS) - STANDBY EARTH FAULT RELAY
 - BUS DUCT
 - (MFM) - MULTI FUNCTION METER
 - FUSE
 - (E) - EMERGENCY TRIP PUSH BUTTON (STAY PUT)
 - T-N-C BREAKER CONTROL SWITCH
 - (L) - INDICATING LAMP

- NOTES:**
- THIS SINGLE LINE DIAGRAM INDICATES THE POWER DISTRIBUTION FOR CHILLER PCC IN MINI PRESS SUBSTATION.
 - THE PCC SHALL BE FREE DRAW OUT TYPE STANDING SINGLE FORNT COMPARTMENTALIZED, IP54/IP42 (FOR VENTILATION BOARDS) WITH TOP BUSDUCT ENTRY & BOTTOM CABLE O/G.
 - ALL ACB'S SHALL BE 4POLE, 50KA/1SEC, ELECTRICALLY OPERATED DRAWOUT TYPE WITH MICROPROCESSOR BASED O/L, S/C & E/F RELEASES WITH TIME AND CURRENT ADJUSTABLE & SHALL BE COMMUNICABLE ON MODBUS (RS485).
 - BUSBARS SHALL BE OF ELECTROLYTIC GRADE ALUMINIUM SUITABLE FOR WITHSTANDING 50KA/1SEC. THE NEUTRAL BUSBAR SHALL HAVE CROSS SECTIONAL AREA HALF OF THE PHASE BUSBAR.
 - PANEL WIRING FOR CT/AUXILIARY CIRCUIT SHALL BE WITH 1100 VOLTS GRADE FRLS, PVC INSULATED, 2.5 Sq. mm. STANDARD COPPER WIRE AND 1.5 Sq. mm. STANDARD COPPER WIRE FOR CONTROL PT AND OTHER CIRCUITS.
 - PCC SHALL BE EXTENSIBLE ON EITHER SIDE.
 - THE CONTROL VOLTAGE FOR PCC PANEL SHALL BE 240V AC.
 - THE BUSDUCT SHALL BE SANDWICHED TYPE. BIDDER TO CONSIDER THE NECESSARY ADAPTER BOX AS REQUIRED FOR BUSDUCT CONNECTION FOR THE INCOMER.
 - STANDBY AND RESTRICTED EARTH FAULT RELAY IS LOCATED IN PCC INCOMER.
 - CABLE DETAILS WILL BE FURNISHED TO SUCCESSFUL BIDDER DURING DETAILED ENGINEERING. PANEL SHALL BE DESIGNED IN A SUCH WAY THAT IT SHALL HAVE SUFFICIENT SPACE FOR TERMINATION AND MAINTAINING PURCHASER CABLE.

ENGINEERING REFERENCE DRAWING:

- SINGLE LINE DIAGRAM FOR 11KV DISTRIBUTION SYSTEM (SHEET 2 OF 2) ----- TCE.5783A-733-AU-3003_R3

FOR ACB : I_{cu} = I_{cs} = I_{cw}

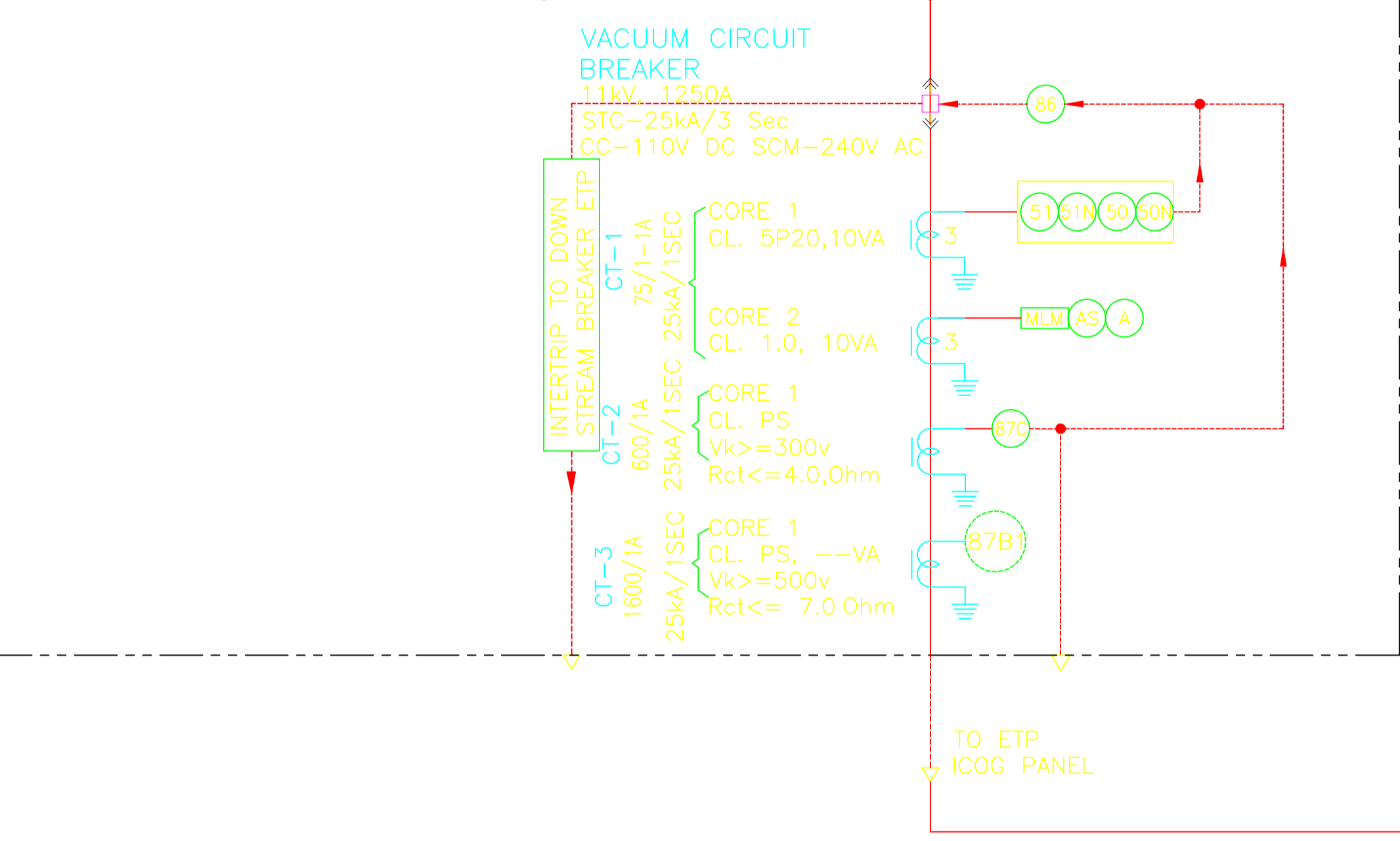
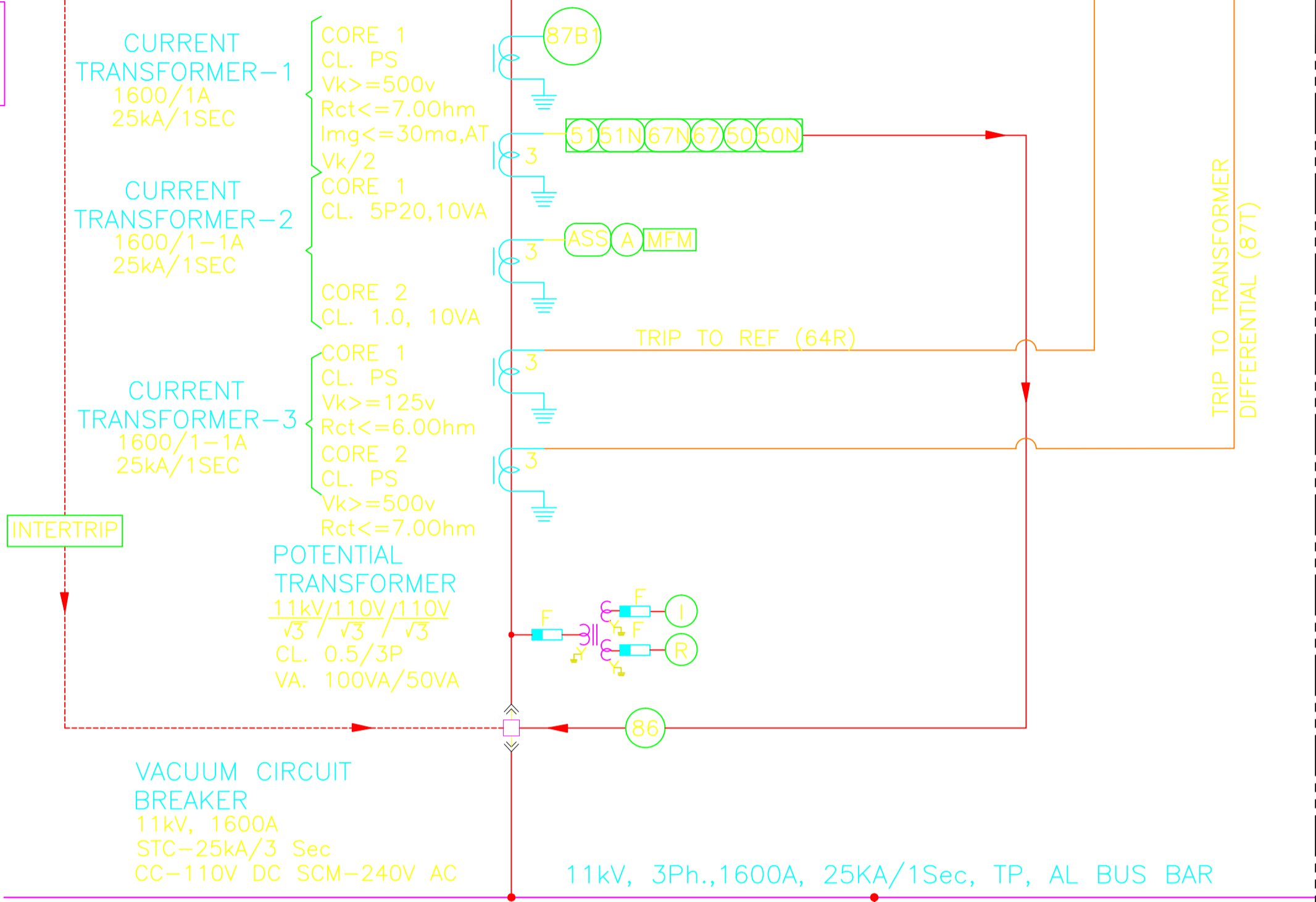
FOR MCCB : I_{cu} = I_{cs}

DO NOT SCALE RELEASED FOR CONSTRUCTION

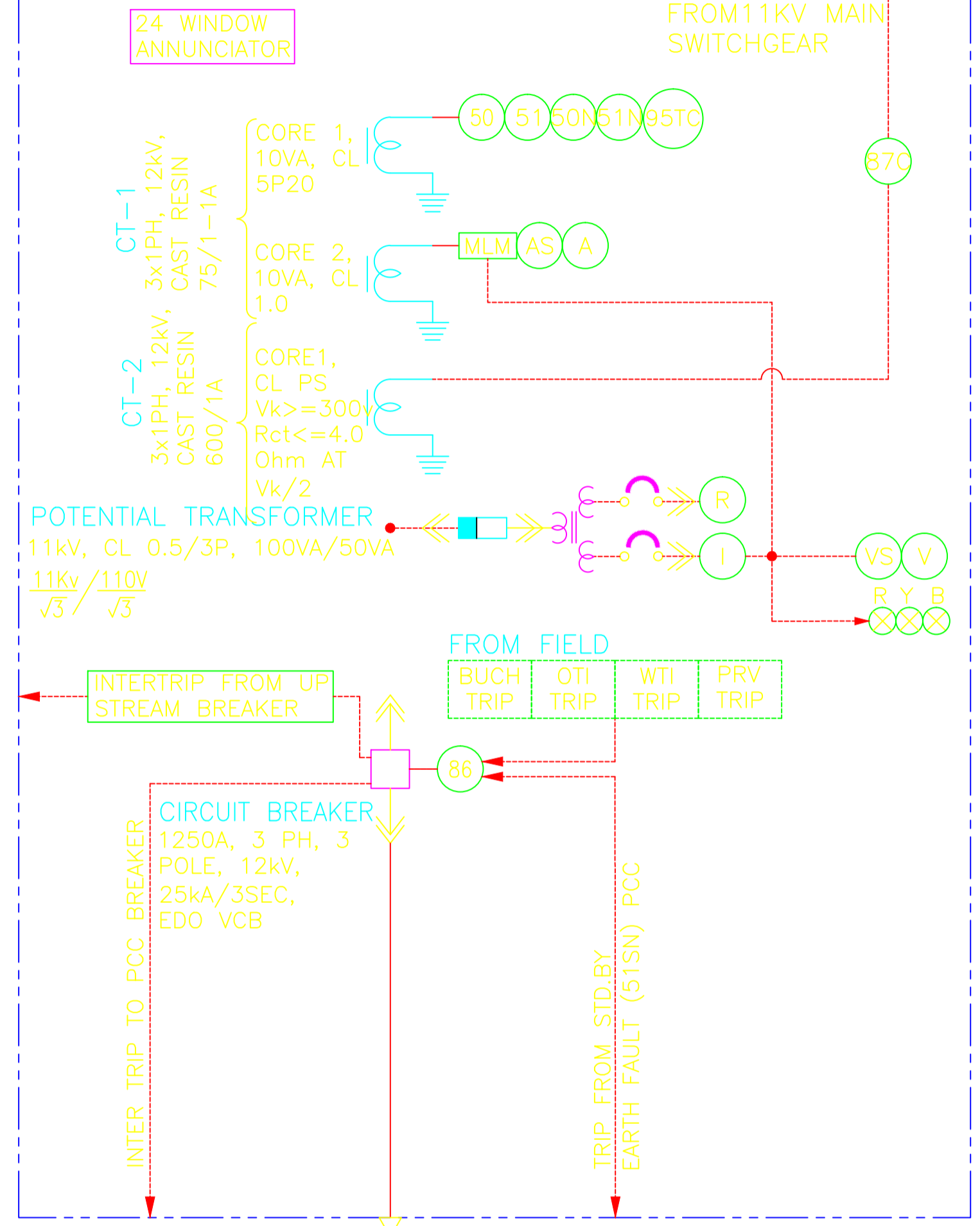
415V SINGLE LINE DIAGRAM FOR CHILLER PCC		
SCALE: NTS	APPROVED	DATE (RO ISSUE) 18-04-2014
CLIENT : BANK NOTE PAPER MILL INDIA PRIVATE LIMITED	OFFICE-DISC:DV-EL	DATE (CURRENT ISSUE) 18-04-2014
DRN: ADP	DWG NO TCE.5783A-717-AU-3008	ISSUE RO
CHD:		

FOR RO ISSUE ONLY		ISSUE	REVISIONS	DRN	CLEARED					APPD	DATE	FILE NAME : 5783AEL3008R0
DEPT	SIGNATURE				DATE	CHEM	CIVIL	ELEC	I&C			
CHEM												<small>IF (PRELIMINARY) ISSUES ARE NOT TO BE USED FOR CONSTRUCTION / FABRICATION BUT ARE ISSUED FOR LIMITED PURPOSES ONLY AS INDICATED IN THE SMALL BLOCK AT THE TOP RIGHT HAND CORNER OF THE TITLE BLOCK, CONSTRUCTION / FABRICATION WORK IS PERMITTED ON (RELEASED) ISSUES ONLY.</small> <small>INFORMATION CONTAINED WITHIN THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION / FABRICATION. FIELD MUST GET DESIGN OFFICE TO CLEAR ANY AND ALL CONSTRUCTION / FABRICATION WORK RELATED TO THIS.</small>
CIVIL												
ELEC												
I&C												
MECH												

11kV MAIN SWITCHGEAR
LOCATION : 66kV SWITCHYARD
CONTROL ROOM



11kV ICOG PANEL
LOCATION : ETP S/S

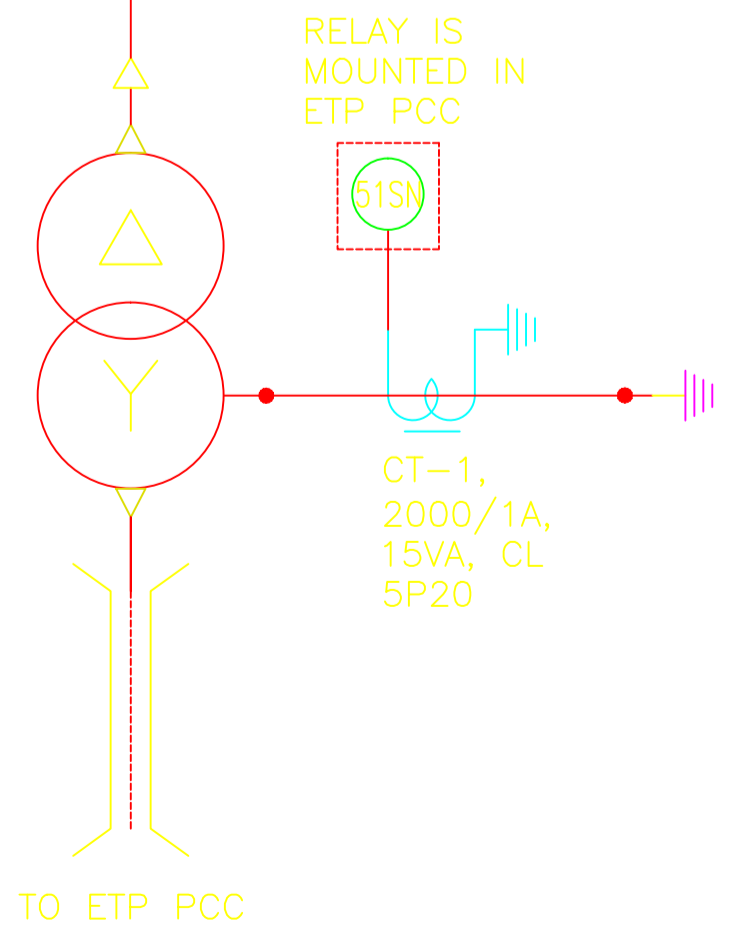


11kV (E) 1Nos. 3Cx300 Sq.mm XLPE, AL, ARMoured CABLE

LOCATION : ETP SUBSTATION

TRANSFORMER-1
11kV/0.433kV, 1MVA, ONAN, Dyn11, OFTC WITH +5% TO -5% IN STEP OF 2.5%, %Z = 5%, (TR WITH BUCHHOLZ, WTI, OTI, MOLG)

BUSDUCT-1
0.415kV, 2000A, 50kA, 50Hz, AL



- LEGENDS:**
- CURRENT TRANSFORMER
 - POTENTIAL TRANSFORMER
 - CIRCUIT BREAKER
 - TRANSFORMER
 - BUSBAR
 - BUSDUCT
 - T-N-C SWITCH
 - L-R SWITCH
 - MULTI-FUNCTION LOAD MANAGER
 - DIRECTIONAL OVER CURRENT PROTECTION
 - DIRECTIONAL EARTH FAULT PROTECTION
 - AMMETER
 - AMMETER WITH SELECTOR SWITCH
 - VOLT METER
 - VOLT METER WITH SELECTOR SWITCH
 - kWh WATT HOUR METER
 - LOCKOUT RELAY
 - CHECK SYNCRONISING RELAY
 - 11 kV RESTRICTED EARTH FAULT RELAY
 - OVERVOLTAGE RELAY
 - UNDER VOLTAGE RELAY
 - UNDER VOLTAGE RELAY
 - UNDER FREQUENCY RELAY
 - OVER FREQUENCY RELAY
 - BACK UP EARTH FAULT RELAY
 - RESTRICTED EARTH FAULT RELAY
 - INSTANTANEOUS OVER CURRENT RELAY
 - INSTANTANEOUS EARTH FAULT RELAY
 - IDMT OVER CURRENT RELAY
 - IDMT EARTH FAULT RELAY
 - BUSBAR DIFFERENTIAL PROTECTION
 - INDICATING LED LAMPS
 - PUSH BUTTON
 - TRIP CIRCUIT SUPERVISION
- R - RELAY
I - INSTRUMENT

- NOTES:**
- THIS SINGLE LINE DIAGRAM INDICATES PROPOSED POWER DISTRIBUTION FOR 11kV SYSTEM.
 - THE MAIN PROTECTION RELAYS SHALL BE NUMERICAL (MICROPROCESSOR BASED) TYPE. FOR THE 11kV SYSTEM AND ALL AUXILIARY RELAY SHALL BE ELECTROMAGNETIC TYPE.
 - ALL DIGITAL METERS AND NUMERICAL RELAYS SHALL BE OF COMMUNICABLE TYPE OVER MODBUS PROTOCOL.
 - FOLLOWING SYSTEM PARAMETERS ARE CONSIDERED, AS PER IS 2165, TABLE-2
- | VOLTAGE LEVEL | HSV | BIL | PFN |
|---------------|-------|-------|-------------|
| 11 kV | 12 kV | 75 kV | 28 kV/1MIN. |
- SYSTEM GROUNDING
11kV - SOLIDLY EARTHED.
415V - SOLIDLY EARTHED.
 - VA, VK, IMAG AND RCT OF CT AND PT SHALL BE CALCULATED BASED ON THE PROTECTION RELAY/ MEASURING INSTRUMENT CONNECTED AND SAME SHALL BE DECIDED DURING DETAILED ENGINEERING.
 - AN EMERGENCY TRIP PUSH BUTTON ENCLOSED IN WEATHERPROOF ENCLOSURE SHALL BE PROVIDED NEAR EACH TRANSFORMER FOR TRIPPING THE TRANSFORMER.
 - ALL METERS SHALL BE COMMUNICABLE TYPE (RS-485).
 - THE CONTROL VOLTAGE FOR 11kV SHALL BE 110 V DC FOR TRIPPING, CLOSING AND INDICATION; 230 V AC FOR SPACE HEATER, SPRING CHARGING MOTOR AND ILLUMINATION.
 - 110V DC SUPPLY SHALL BE DERIVED FROM BATTERY CHARGER AND 230V AC SUPPLY SHALL BE DERIVED FROM PDB THIS SHALL BE MADE AVAILABLE THROUGH A SWITCH AND MCB COMBINATION.
 - FOR CABLE PROTECTION HIGH SPEED PILOT WIRE PROTECTION RELAY HORM-4 ALONG WITH SUPERVISION UNIT RELAY SHALL BE USED.

- ENGINEERING REFERENCE DRAWING:**
- PLOT PLAN ----- TCE.5783A-100-GA-6001_R10
 - SINGLE LINE DIAGRAM FOR 66kV DISTRIBUTION SYSTEM ----- TCE.5783A-736-AU-3001_RD
 - SINGLE LINE DIAGRAM FOR 11kV DISTRIBUTION SYSTEM (SH 1 OF 2) ----- TCE.5783A-733-AU-3002_R2

FOR RO ISSUE ONLY	ISSUE	REVISIONS	DRN	CLEARED					APPD	DATE	ISSUE	REVISIONS	DRN	CLEARED					APPD	DATE	ISSUE	REVISIONS	DRN	CLEARED					APPD	DATE	ISSUE	
				CHEM	CIVIL	ELEC	I&C	MECH						CHEM	CIVIL	ELEC	I&C	MECH						CHEM	CIVIL	ELEC	I&C	MECH				
DEPT	SIGNATURE	DATE	R1	REVISED AS PER BNPMPIL COMMENTS	ADP					RSK	08.11.12																					
CHEM			R2	REVISED AS PER CHANGE IN LOAD FROM VOITH	ADP					RSK	15.03.14																					
CIVIL			R3	REVISED TO INCORPORATE THE LOCATION OF THE TRANSFORMER	ADP					RSK	01.03.14																					

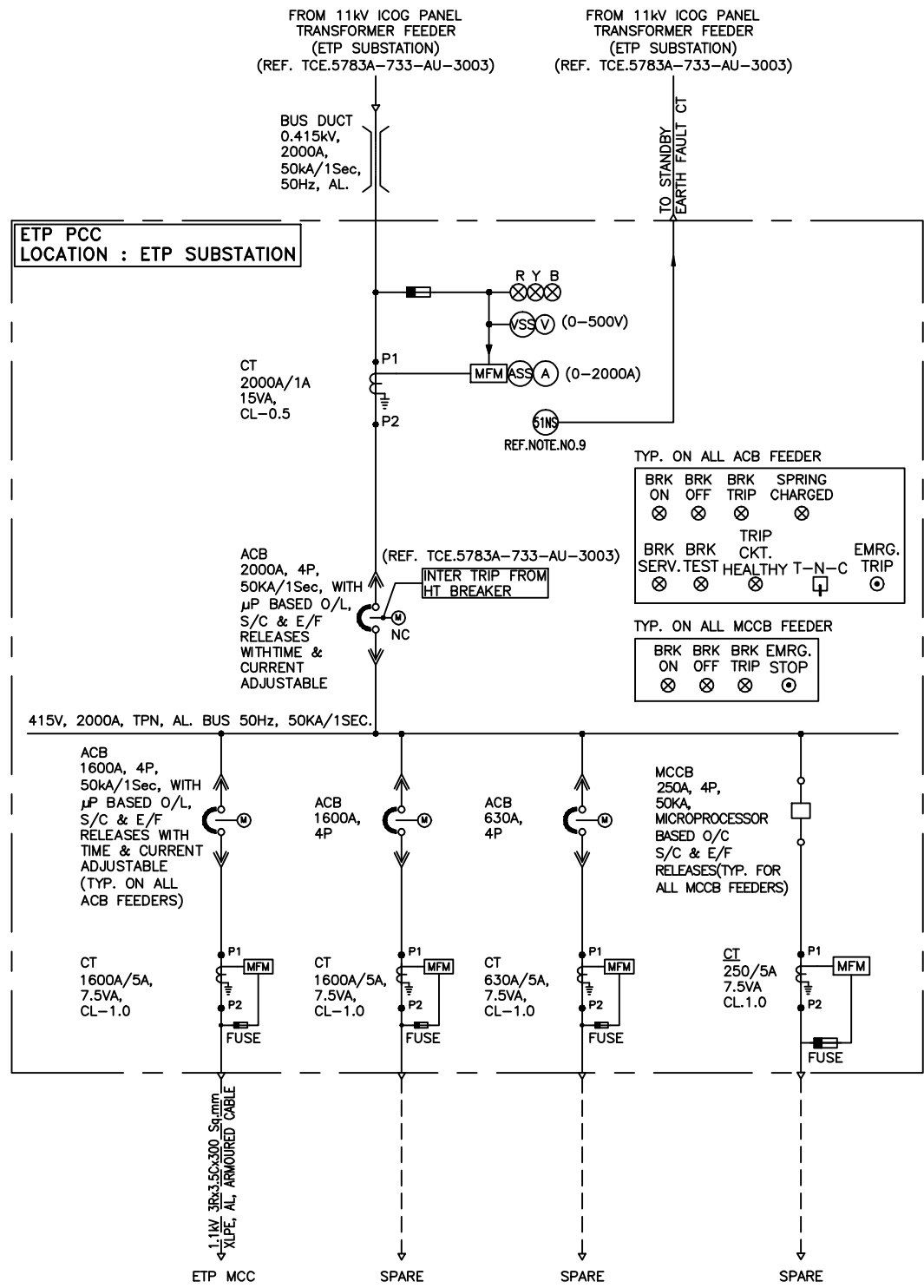
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BANK NOTE PAPER MILL INDIA PRIVATE LIMITED
12000 TPA BANK NOTE PAPER MILL (MYSORE)

SINGLE LINE DIAGRAM FOR ETP SUB-STATION

TATA CONSULTING ENGINEERS LIMITED
MUMBAI

SCALE: NTS APPROVED DATE (RO ISSUE) 08.11.2012
OFFICE-DWG DY-EL GROUP HEAD DATE (CURRENT ISSUE) 01.03.2014
DRN: ADP
CHD: PTN DWG NO: TCE.5783A-733-AU-3003 ISSUE R3
TCE FORM NO. 903 M



- LEGEND:**
- CURRENT TRANSFORMER
 - AIR CIRCUIT BREAKER
 - BUS DUCT
 - FUSE
 - INDICATING LAMP
 - T-N-C BREAKER CONTROL SWITCH
 - NO - NORMALLY OPEN
 - NC - NORMALLY CLOSED
 - (A) - AMMETER
 - (ASS) - AMMETER SELECTOR SWITCH
 - (V) - VOLTMETER
 - (VSS) - VOLTMETER SELECTOR SWITCH
 - (51NS) - STANDBY EARTH FAULT RELAY
 - (MFM) - MULTI FUNCTION METER
 - (E) - EMERGENCY TRIP PUSH BUTTON (STAY PUT)

- NOTES:**
- THIS SINGLE LINE DIAGRAM INDICATES THE POWER DISTRIBUTION FOR ETP PCC IN ETP SUBSTATION.
 - THE PCC SHALL BE FREE STANDING SINGLE FORNT COMPARTMENTALIZED, IP54/IP42 (FOR VENTILATION BOARDS) WITH TOP BUSDUCT ENTRY & BOTTOM CABLE O/G.
 - ALL ACB'S SHALL BE 4POLE, 50KA/1SEC, ELECTRICALLY OPERATED DRAWOUT TYPE WITH MICROPROCESSOR BASED O/L, S/C & E/F RELEASES WITH TIME AND CURRENT ADJUSTABLE & SHALL BE COMMUNICABLE ON MODBUS (RS485).
 - BUSBARS SHALL BE OF ELECTROLYTIC GRADE ALUMINIUM SUITABLE FOR WITHSTANDING 50KA/1SEC. THE NEUTRAL BUSBAR SHALL HAVE CROSS SECTIONAL AREA HALF OF THE PHASE BUSBAR.
 - PANEL WIRING FOR CT/AUXILIARY CIRCUIT SHALL BE WITH 1100 VOLTS GRADE FRLS, PVC INSULATED, 2.5 Sq. mm. STANDARD COPPER WIRE AND 1.5 Sq. mm. STANDARD COPPER WIRE FOR CONTROL PT AND OTHER CIRCUITS.
 - THE CONTROL VOLTAGE FOR BREAKERS SHALL BE 240V AC FOR TRIPPING, CLOSING & INDICATION. 240V AC SUPPLY SHALL BE CONSIDERED FOR SPACE HEATER, SPRING CHARGING MOTOR & PANEL ILLUMINATION LAMP. POTENTIAL INDICATING LAMPS SHALL BE SUITABLE FOR 110V AC SUPPLY.
 - THE BUSDUCT SHALL BE SANDWICHED TYPE. BIDDER TO CONSIDER THE NECESSARY ADAPTER BOX AS REQUIRED FOR BUSDUCT CONNECTION FOR THE INCOMER.
 - PCC SHALL BE EXTENSIBLE ON EITHER SIDE.
 - STANDBY EARTH FAULT RELAY IS LOCATED IN PCC INCOMER.
 - CABLE DETAILS WILL BE FURNISHED TO SUCCESSFUL BIDDER DURING DETAILED ENGINEERING. PANEL SHALL BE DESIGNED IN A SUCH WAY THAT IT SHALL HAVE SUFFICIENT SPACE FOR TERMINATION AND MAINTAINING PURCHASER CABLE.

ENGINEERING REFERENCE DRAWING:
 1. SINGLE LINE DIAGRAM FOR 11KV DISTRIBUTION SYSTEM (SHEET 2 OF 2) ----- TCE.5783A-733-AU-3003_R3

FOR ACB : Icu = Ics = Icw = 100%
FOR MCCB : Icu = Ics

FOR RO ISSUE ONLY			ISSUE	REVISIONS	DRN	CLEARED					APPD	DATE	FILE NAME : 5783AEL3009R0	TATA CONSULTING ENGINEERS LIMITED MUMBAI	DO NOT SCALE RELEASED FOR CONDRUCTION		
CLEARED	SIGNATURE	DATE				CHEM	CIVIL	ELEC	I&C	MECH					SINGLE LINE DIAGRAM FOR ETP PCC		
DEPT															SCALE: NTS APPROVED DATE (RO ISSUE) 18-04-2014		
CHEM															OFFICE-DISC: MUM-EL DATE (CURRENT ISSUE) 18-04-2014		
CIVIL															DRN: ADP DWG NO TCE.5783A-717-AU-3009 ISSUE R0		
ELEC															CLIENT : BANK NOTE PAPER MILL INDIA PRIVATE LIMITED		
I&C															PROJECT : 12000 TPA BANK NOTE PAPER MILL (MYSORE)		
MECH															CHD:		

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