

Amendment No. 5 (Technical)

Date: 19.01.2018

Tender Package Name: "Design, Manufacturing, Supply, Erection, Testing & Commissioning of 160 MVA, 220/33-33 kV Gas Insulated Substation (GIS) at Lassipora on Turnkey Basis associated with Strengthening of Transmission System of JKPDD under PMDP Scheme-15

Tender Specification No- RECTPCL/PIA/JKPDD/SS- 02 Dated: 18-11-2017

S. No.	Clause No.	Existing Clause	To be Read as
A. SECTION-I, Project , VOL-II			
1	Clause No.- 4.1.1 (b)	245kV, 40kA for 1 second, SF6 gas-insulated metal enclosed ICT bay module each set comprising of the following:- (i) One (1) number 3-phase, 1600A, SF6 insulated circuit breaker without PIR complete with operating mechanism.	245kV, 40kA for 1 second, SF6 gas-insulated metal enclosed ICT bay module each set comprising of the following:- (i) One (1) number 3-phase/ Three (3) number single phase encapsulated , 1600A, SF6 insulated circuit breaker without PIR complete with operating mechanism.
2	Clause No.- 4.1.1 (d)	245kV, 40kA for 1 second, SF6 gas-insulated metal enclosed Line bay module each set comprising of the following:- (i) One (1) number 3-phase, 1600A, SF ₆ insulated circuit breaker without PIR complete with operating mechanism	245kV, 40kA for 1 second, SF6 gas-insulated metal enclosed Line bay module each set comprising of the following:- (i) One (1) number 3-phase/ Three (3) number single phase encapsulated , 1600A, SF ₆ insulated circuit breaker without PIR complete with operating mechanism.
3	Clause No.- 4.1.1 (e)	245kV, 40kA for 1 second, SF6 gas-insulated metal enclosed Bus Coupler bay module each set comprising of the following:- (i) One (1) number 3-phase, 2500A, SF ₆ insulated circuit breaker without PIR complete with operating mechanism.	245kV, 40kA for 1 second, SF6 gas-insulated metal enclosed Bus Coupler bay module each set comprising of the following:- (i) One (1) number 3-phase/ Three (3) number single phase encapsulated , 2500A, SF ₆ insulated circuit breaker without PIR complete with operating mechanism.

S. No.	Clause No.	Existing Clause	To be Read as
4.	Clause No.- 4.1.3 (d)	<p>Complete sub-station automation system (SAS) based on IEC 61850 including hardware and software for remote control station along with associated equipments for following bays (bay as defined in Technical Specification, Section - Substation Automation):</p> <ul style="list-style-type: none"> • 220kV: 6 Bays • 33kV: 11 Bays <p>For 33kV system, One BCU for two bays having facility of connecting all required digital I/O & analogue signal for both bays shall also be acceptable.</p> <p>The Contractor shall also supply separate BCU for monitoring and control of auxiliary system including LT Transformer. SAS panels shall be placed in 220/33kV Control room.</p>	<p>Complete sub-station automation system (SAS) based on IEC 61850 including hardware and software for remote control station along with associated equipments for following bays (bay as defined in Technical Specification, Section - Substation Automation):</p> <ul style="list-style-type: none"> • 220kV: 6 Bays • 33kV: 11 Bays <p>For 33kV system, One BCU for two bays having facility of connecting all required digital I/O & analogue signal for the bay shall be acceptable.</p> <p>The Contractor shall also supply separate BCU for monitoring and control of auxiliary system including LT Transformer. SAS panels shall be placed in 220/33kV Control room.</p> <p>OR</p> <p>One BCPU for each of 33kV Feeder bay having facility of connecting all required digital I/O & analogue signal for the bay shall be acceptable subject to meeting functional requirement for protection and substation automation.</p> <p>The Contractor shall also supply separate BCPU for monitoring and control of auxiliary system including LT Transformer.</p>
5	Clause no-6.2	<p>Meteorological data :</p> <p>The meteorological data of the substations shall be furnished to successful bidder. However for design purposes and other details as below:</p>	<p>Meteorological data :</p> <p>The meteorological data of the substations shall be furnished to successful bidder. However for design purposes and other details as below:</p> <p>.....</p>

S. No.	Clause No.	Existing Clause	To be Read as
		<p>.....</p> <p>.....</p> <p>All Outdoor Equipment shall be designed for altitude of 1700m above MSL as well as for above Conditions.</p>	<p>.....</p> <p>All Outdoor Equipment shall be designed for altitude of 1700m above MSL as well as for above Conditions.</p> <p>Note:- As confirmed from the Meteorological Department the maximum snowfall recorded in the area during the recent past is 91.7 cm on 19th February 2003.</p> <p>In regard to Sag tension calculations of Transmission lines, snow thickness of 15 mm (radial) may be considered.</p>
6	Annexure-II, List of Tender Drawings		Revised Annexure-II (List of Tender Drawings) is enclosed as Annexure-1 to Amendment-5
5	Proposed Vendor List, Annexure-IX to Sec-I, Vol-II (Additional)	No such clauses	Bidders may refer Annexure-2 to Amendment-5 in this regard.
6	Additional Annexure-X	No such annexure	Additional Annexure-X: CO-ORDINATES OF PROPOSED LAND OF LASSIPOPRA GIS is enclosed as Annexure-3 to Amendment-5
B. SECTION-II, General Technical Requirement, VOL-II			
1	Clause No-9.2	The reports for all type tests as per technical specification shall be furnished by the Contractor	The reports for all type tests as per technical specification shall be furnished by the Contractor

S. No.	Clause No.	Existing Clause	To be Read as
		<p>.....</p> <p>However, in case of instrument transformers, the following type tests should have been conducted within 5 (five) years prior to the originally Scheduled date of bid opening.</p> <p>i) Lightning Impulse Test</p> <p>ii) Switching Impulse Test</p> <p>iii) Multiple Chopped Impulse Test (For CT)</p> <p>iv) Chopped Impulse Test (For CVT)</p> <p>.....</p> <p>.....</p>	<p>.....</p> <p>However, in case of instrument transformers, the following type tests should have been conducted within 10(Ten) years prior to the originally Scheduled date of bid opening.</p> <p>i) Multiple Chopped Impulse Test (For CT)</p> <p>ii) Chopped Impulse Test (For CVT)</p> <p>.....</p> <p>.....</p> <p>..</p>
C. SECTION – III, 220kV Gas Insulated Switch gear, Volume - II			
1	Page No. 62-63	Requirement of 220kV Current Transformer Table – 3A	Revised Table 3A-1 & 3A-2 is attached as Annexure-4 to Amendment-5 for Parameters of GIS CT – Requirement of 220kV Current Transformer For Line/Transformer and Bus Coupler Bay
SECTION – IV, 33kV & 11kV Indoor Switchgear, Volume - II			
1	Page No. 20 & 21, Requirements of 33kV Current Transformer	Table: Incomer / Bus Coupler Feeder Line Feeder LT Transformer Feeder	Revised Table: Incomer / Bus Coupler Feeder Line Feeder LT Transformer Feeder Are enclosed as Annexure-5 to Amendment-5

S. No.	Clause No.	Existing Clause	To be Read as
D. SECTION-XIII, AIR CONDITIONING SYSTEM, VOL-II			
1	Clause No. 1.5	Keeping in view of temperature variation of -15 degC to 40 Deg C in Lassipora, J&K, provision of heating as well as cooling arrangement is to be made in the air conditioning system.	Keeping in view of temperature variation of -15 degC to 40 Deg C in Lassipora, J&K, provision of heating as well as cooling arrangement is to be made in the air conditioning Units/system. In case contractor is not able to supply Air conditioning Units/System with provision of cooling as well as heating in line with specification requirement, Bidder can also consider to supply Air Conditioning Units and Oil type heat convectors separately against item of Air Conditioning system In Bid Price schedule
E. SECTION-XVII, CIVIL WORKS, VOL-II			
1	Clause No- 13.15,	DETAILED FINISH SCHEDULE: The detailed finish schedule for Control Room Building Cum Administrative building is given below: Table- 1: DETAILED FINISH SCHEDULE *Providing and fixing 15mm thick approximately 600 X 600mm Mineral fiber board panel false ceiling and making cut-outs for electrical fixtures, AC diffusers, open	DETAILED FINISH SCHEDULE: The detailed finish schedule for Control Room Building Cum Administrative building is given below: Table- 1: DETAILED FINISH SCHEDULE *For Control room & Conference room false ceiling shall be aluminium linear ceiling system C84. For rest of the places false ceiling required shall be 15mm thick approximately 600 X 600mm Mineral fiber board panel false ceiling and making cut-outs for

S. No.	Clause No.	Existing Clause	To be Read as
		<p>able access etc. complete with silhouette profile system with 15mm wide flange incorporating 6mm central recess white / black main runners at 1200mm centre-centre and not greater than 600mm from the adjacent wall. The cross tees shall be provided to make a module of approximately 600mm X 600mm by fitting 600 mm long cross tees centrally placed between 1200 mm long cross tees. Cross tees also have 15mm wide flange incorporating 6mm central recess white/black. The module formed above shall be anchored to the slab with channels or angles, suspenders as per manufacturer's specifications.</p>	<p>electrical fixtures, AC diffusers, open able access etc. complete with silhouette profile system with 15mm wide flange incorporating 6mm central recess white / black main runners at 1200mm centre-centre and not greater than 600mm from the adjacent wall. The cross tees shall be provided to make a module of approximately 600mm X 600mm by fitting 600 mm long cross tees centrally placed between 1200 mm long cross tees. Cross tees also have 15mm wide flange incorporating 6mm central recess white/black. The module formed above shall be anchored to the slab with channels or angles, suspenders as per manufacturer's specifications.</p>
2	Clause No.- 13.17,	<p>FALSE CEILING Providing and fixing seamless ceiling with Gypsum board of 12mm thick fixed to the underside of GI frame work. The GI is fixed to the roof Slab with metal expansion fastener. The joint shall be finished with joint paper tape by using jointing Compound recommended by manufacturer with the approval of Employer. The rate includes for all necessary cutting of ceiling for the fixing of complete fixtures.</p>	<p>FALSE CEILING For Control room & Conference room false ceiling shall be aluminium linear ceiling system C84. For rest of the places false ceiling required shall be 15mm thick approximately 600 X 600mm Mineral fiber board panel false ceiling and making cut-outs for electrical fixtures, AC diffusers, open able access etc. complete with silhouette profile system with 15mm wide flange incorporating 6mm central recess white / black main runners at 1200mm centre-centre and not greater than 600mm from the adjacent wall. The cross tees shall be provided to make a module of</p>

S. No.	Clause No.	Existing Clause	To be Read as
			approximately 600mm X 600mm by fitting 600 mm long cross tees centrally placed between 1200 mm long cross tees. Cross tees also have 15mm wide flange incorporating 6mm central recess white/black. The module formed above shall be anchored to the slab with channels or angles, suspenders as per manufacturer's specifications.
3	Clause No. 21.12	<p>FALSE CEILING</p> <p>Fifteen millimeter thick densified regular edged ecofriendly light weight calcium silicate false ceiling as per relevant standards shall be provided in the areas specified in Finish Schedule.</p>	<p>FALSE CEILING</p> <p>For Control room & Conference room false ceiling shall be aluminium linear ceiling system C84. For rest of the places false ceiling required shall be 15mm thick approximately 600 X 600mm Mineral fiber board panel false ceiling and making cut-outs for electrical fixtures, AC diffusers, open able access etc. complete with silhouette profile system with 15mm wide flange incorporating 6mm central recess white / black main runners at 1200mm centre-centre and not greater than 600mm from the adjacent wall. The cross tees shall be provided to make a module of approximately 600mm X 600mm by fitting 600 mm long cross tees centrally placed between 1200 mm long cross tees. Cross tees also have 15mm wide flange incorporating 6mm central recess white/black. The module formed above shall be anchored to the slab with channels or angles, suspenders as per manufacturer's specifications.</p>
4	Clause No-21.1	<p>Control Room and GIS Hall:</p> <p>The GIS building shall be of pre-engineered steel structure. Control room building, if</p>	<p>Control Room and GIS Hall:</p> <p>The 220kV GIS Hall shall be pre-engineered steel structure type and Control room cum administrative</p>

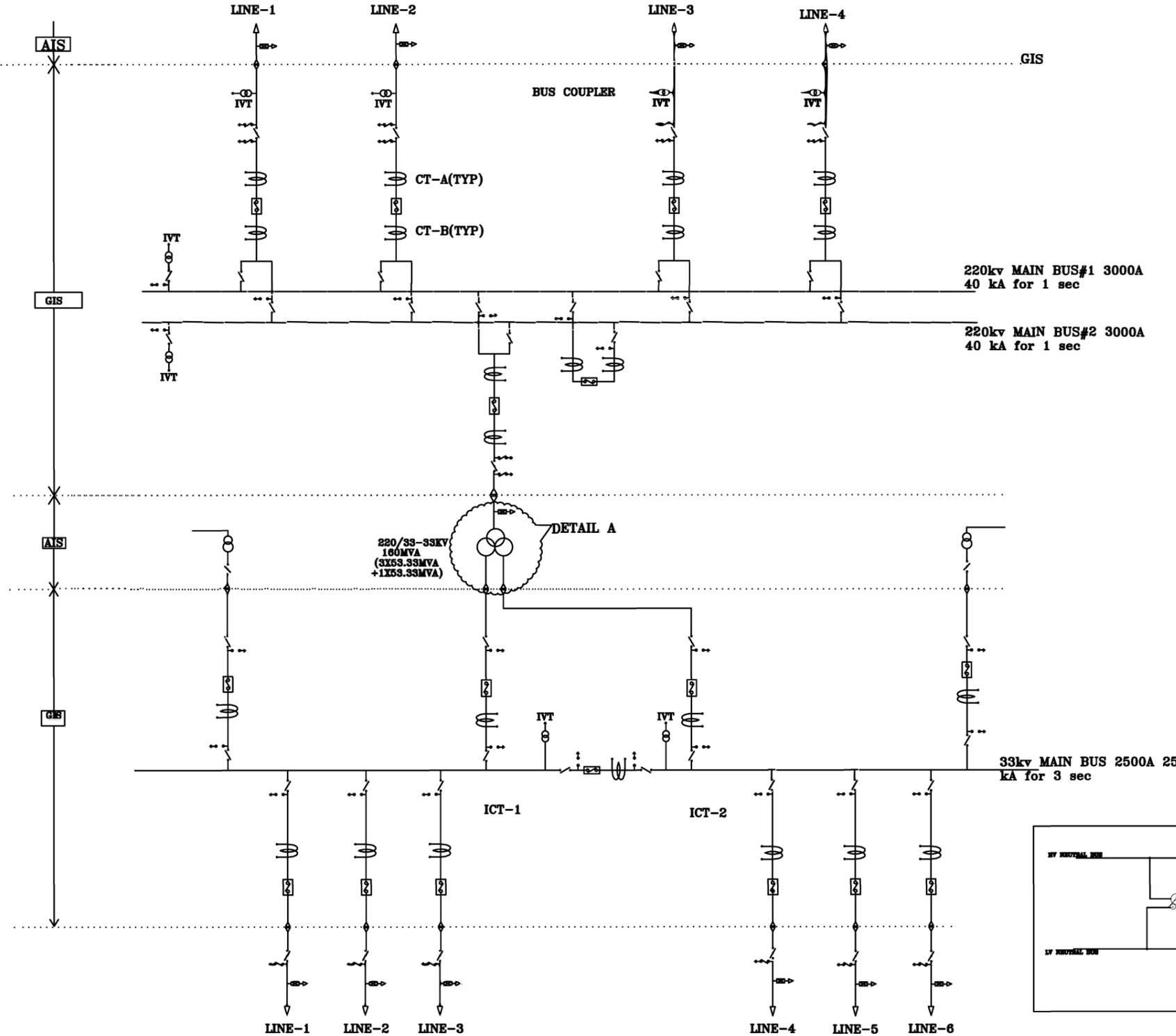
S. No.	Clause No.	Existing Clause	To be Read as
		<p>attached to GIS hall, shall be of pre-engineered steel structure similar to GIS hall and shall be RCC framed structure, if it is not connected with GIS hall. In case of steel control room building all walls shall be of brick masonry and roof of ground floor shall be of RCC. Internal access to the GIS hall from control room building shall be provided.</p> <p>.....</p> <p>.....</p>	<p>building shall be RCC Framed Structure type. Internal access to the GIS hall from control room building shall be provided.</p> <p>Further, 33kV GIS Hall/room shall also be RCC Framed Structure type</p> <p>.....</p>
F. SECTION-XVIII, Control Relay and Protection Panels , VOL-II			
1	Clause No-26.1 (Under Protection) Busbar	Single bus bar protection scheme shall be provided for each main bus and transfer bus (as applicable) for 220KV and 132 KV voltage levels	Single bus bar protection scheme (low impedance decentralized type) shall be provided for each main bus and transfer bus (as applicable) for 220KV and 132 KV voltage levels
2	Clause No-33	The following is the general criteria for the selection of the equipments to be provided in each type of panel. However, contractor can optimise the requirement of panels by suitably clubbing the feeder protection and CB relay panels. It may be noted that Main-I and Main-II protections for line cannot be provided in single panel. Similarly, Group-I & Group-II protections for transformer cannot be provided in single panel.	The following is the general criteria for the selection of the equipments to be provided in each type of panel. However, contractor can optimise the requirement of panels by suitably clubbing the feeder protection and CB relay panels. It may be noted that Main-I and Main-II protections for line cannot be provided in single panel. Similarly, Group-I & Group-II protections for transformer cannot be provided in single panel.

S. No.	Clause No.	Existing Clause	To be Read as		
		Note: All 220kV and 33kV feeders shall be provided with ABT type meters except Bus coupler, Transfer BC and Bus sectionalizer.		
G. SECTION-XX, Transformer, VOL-II					
1	Annexure-G, Table No-3, Technical parameters of Current Transformers (160 MVA), 220/33-33 kV	Description	Current Transformer parameters (Transformer)		
			HV Side LV Side Neutral Side		
		(a) Ratio			
		CORE 1	1000/1	1000/1	1000/1
		CORE 2	600/1	1000/1	-
H. Second Envelope (Price Schedule), VOL-III					
1.	Price Schedule	160MVA (3x53.33+1x53.33 spare) , 220/33kV, Single Phase Transformer	160MVA (3x53.33MVA+1x53.33MVA spare), 220/33-33kV , Single Phase Transformer Note: For all purposes bidder may read the transformer rating as above.		
2.	Schedule -1, Sl. No. C.2.ii				
3.	Schedule -2, Sl. No. C.2.ii	<u>Item Description</u> <u>UNIT</u> <u>QTY</u> 30 kV Surge Arrestors (1-Phase) - Nos 21	<u>Item Description</u> <u>UNIT</u> <u>QTY</u> 33 kV Surge Arrestors (1-Phase) - Nos 18		
4.	Schedule -3, Sl. No. C.2.ii				

S. No.	Clause No.	Existing Clause	To be Read as														
5	Schedule -3, Sl. No. Q	<table border="0"> <thead> <tr> <th data-bbox="667 280 1045 310"><u>Item Description</u></th> <th data-bbox="1052 280 1136 310"><u>UNIT</u></th> <th data-bbox="1142 280 1209 310"><u>QTY</u></th> </tr> </thead> <tbody> <tr> <td data-bbox="667 315 1045 396">Training of employers personnel as per clause 11 of section project-</td> <td data-bbox="1052 375 1136 396">LS</td> <td data-bbox="1142 375 1209 396">1</td> </tr> </tbody> </table>	<u>Item Description</u>	<u>UNIT</u>	<u>QTY</u>	Training of employers personnel as per clause 11 of section project-	LS	1	<table border="0"> <thead> <tr> <th data-bbox="1266 280 1644 310"><u>Item Description</u></th> <th data-bbox="1703 280 1787 310"><u>UNIT</u></th> <th data-bbox="1793 280 1860 310"><u>QTY</u></th> </tr> </thead> <tbody> <tr> <td data-bbox="1266 315 1644 375">Training of employers personnel as per clause 11 of section project-</td> <td data-bbox="1703 347 1787 368">LS</td> <td data-bbox="1793 347 1860 368">0</td> </tr> </tbody> </table>			<u>Item Description</u>	<u>UNIT</u>	<u>QTY</u>	Training of employers personnel as per clause 11 of section project-	LS	0
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Training of employers personnel as per clause 11 of section project-	LS	1															
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Training of employers personnel as per clause 11 of section project-	LS	0															

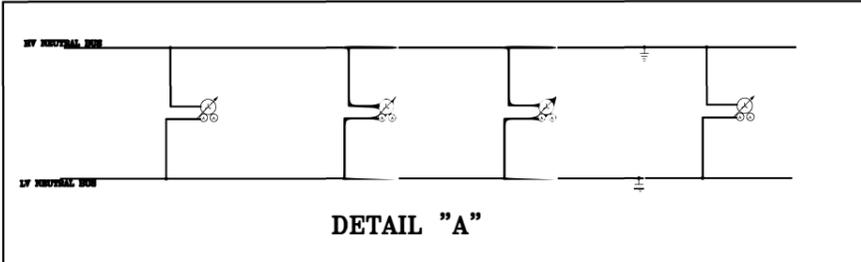
Annexure-1 to Amendment-5

Revised ANNEXURE-II of Section-I, Vol-II		
220/33kV GIS LASSIPORA SS		
S. No.	TITLE OF DWG	Drawing no.
01	Single Line Diagram	RECTPCL/J&K/DRG/1
02	General Arrangement	RECTPCL/J&K/DRG/2
03	Boundary wall drawing	RECTPCL/J&K/DRG/3
04	Standard drawing for Cable Trench	
04 (i)	RCC Detail for Cable Trench Sections	RECTPCL/J&K/DRG/4
04 (ii)	Detail for cable trench section-1	RECTPCL/J&K/DRG/5
04 (iii)	Detail for cable trench section-2	RECTPCL/J&K/DRG/6
05	Details of concrete road (RIGID PAVEMENT) In switchyard area	RECTPCL/J&K/DRG/7
06	Conceptual Layout plan of Control Room Drawing	RECTPCL/J&K/DRG/8
07	Details of Drain	RECTPCL/J&K/DRG/9
08	SLD for Emergency Lighting Distribution Board	RECTPCL/J&K/DRG/10
09	SLD for 415V MSB	RECTPCL/J&K/DRG/11
10	Standard drawing for Fencing	RECTPCL/J&K/DRG/12
11	SLD for 415V MLDB	RECTPCL/J&K/DRG/13
12	SLD for 415V ACDB	RECTPCL/J&K/DRG/14
13	Pipe Earthing Arrangement	RECTPCL/J&K/DRG/15
14	SLD For 48V DCDB	RECTPCL/J&K/DRG/16
15	SLD For 110V DCDB	RECTPCL/J&K/DRG/17
16	Fire Fighting Pump House drawing	RECTPCL/J&K/DRG/18
17	Gate and security room drawing	RECTPCL/J&K/DRG/19
18	GA & RCC details of Sump PIT	RECTPCL/J&K/DRG/20
19	Details of Switchyard Gate	RECTPCL/J&K/DRG/21
20	Standard drawing for Rain Water Harvesting	RECTPCL/J&K/DRG/22



TYPICAL 220kV CT DETAILS:
 CT-A : CORE 1-FEEDER PROTECTION
 CORE 2-FEEDER PROTECTION
 CORE 3-METERING
 CT-B : CORE 1- BUS BAR PROTECTION
 CORE 2-BUSBAR PROTECTION

LEGEND:
 ——— UNDER PRESENT SCOPE
 - - - - - FUTURE/EXISTING

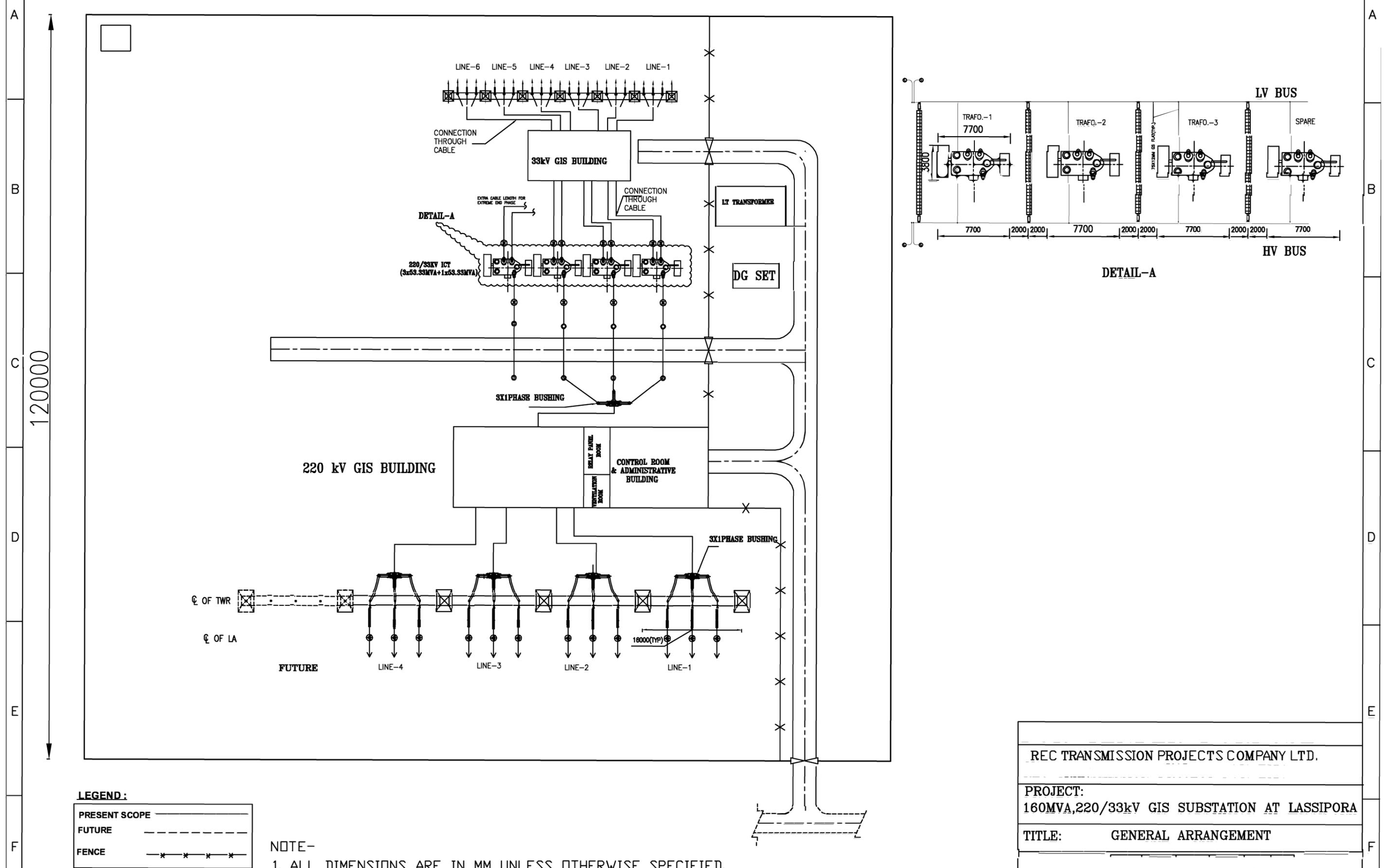


NOTE: For Spare Transformer Switching Scheme, Please refer clause no. 4.1.1 (b7) & 4.1.1 (c) of Section - Project.

FOR TENDER PURPOSE ONLY.	
REC TRANSMISSION PROJECT COMPANY LTD.	
PROJECT:	160MVA, 220/33kV GIS SUBSTATION AT LASSIPORA
TITLE:	SINGLE LINE DIAGRAM

130000

Drg. No. - RECTPCL/J&K/DRG/02

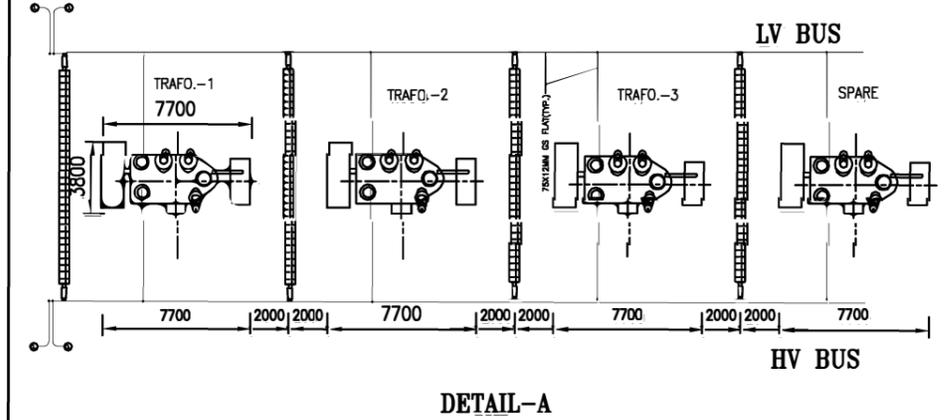


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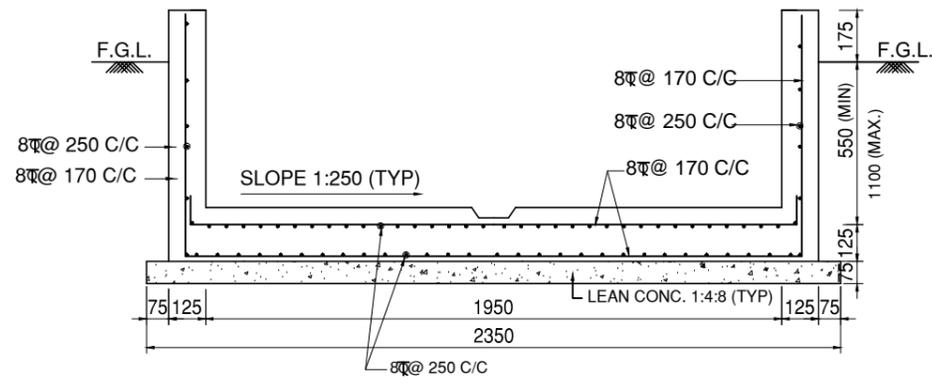
LEGEND:

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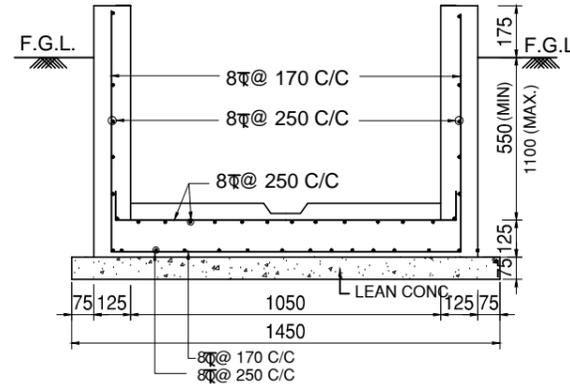
NOTE-
 1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.



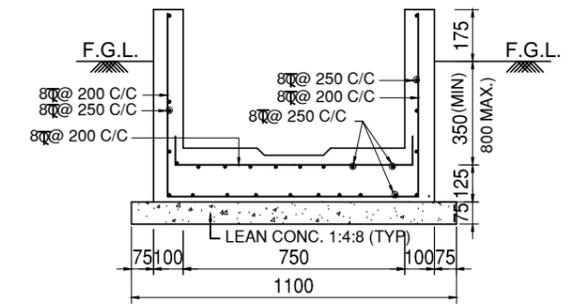
REC TRANSMISSION PROJECTS COMPANY LTD.	
PROJECT: 160MVA, 220/33kV GIS SUBSTATION AT LASSIPORA	
TITLE:	GENERAL ARRANGEMENT



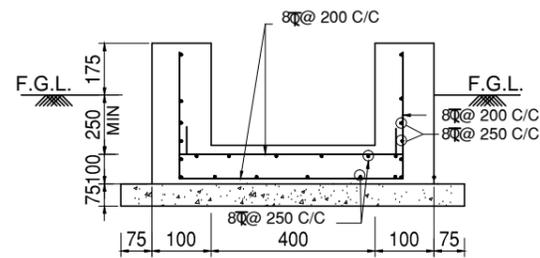
SECTION 1-1



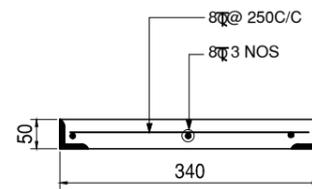
SECTION 2-2



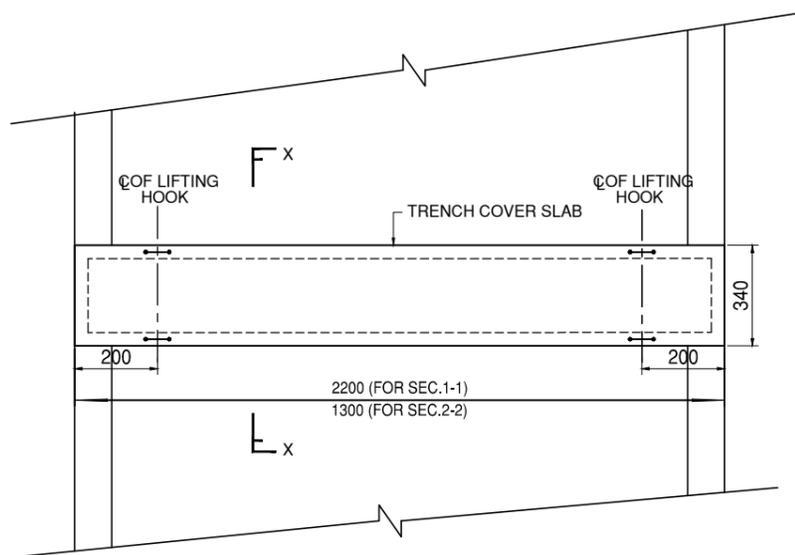
SECTION 3-3



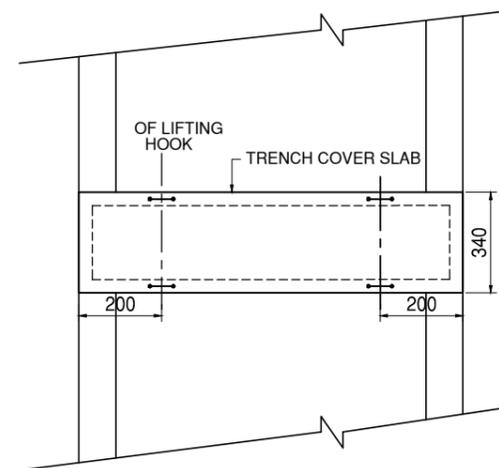
SECTION 4-4



SECTION X-X



PLAN
(DETAIL OF TRENCH COVER FOR SECTION 1-1 & 2-2)



(DETAIL OF TRENCH COVER FOR SECTION 3-3 & 4-4)

NOTE:

1. ALL DIMENSIONS ARE IN mm. UNLESS OTHERWISE SPECIFIED.
2. R.C.C. MIX. SHOULD BE 1:1.5:3 (1 CEMENT: 1.5 COARSE SAND: 3 STONE AGGREGATE 20mm NOMINAL SIZE.)
3. LEAN CONC. SHALL BE IN THE RATIO 1:4:8.

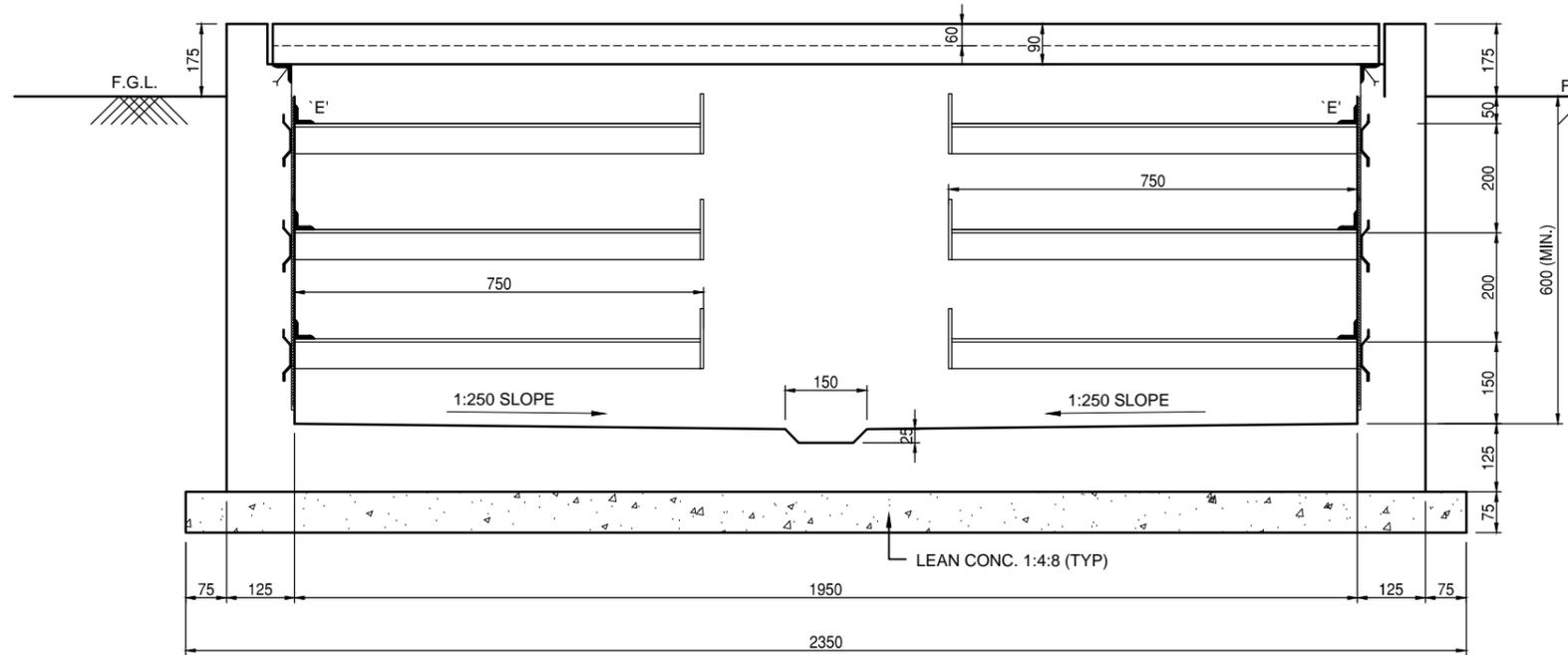
RELEASED FOR TENDER

REC TRANSMISSION PROJECTS COMPANY LTD.

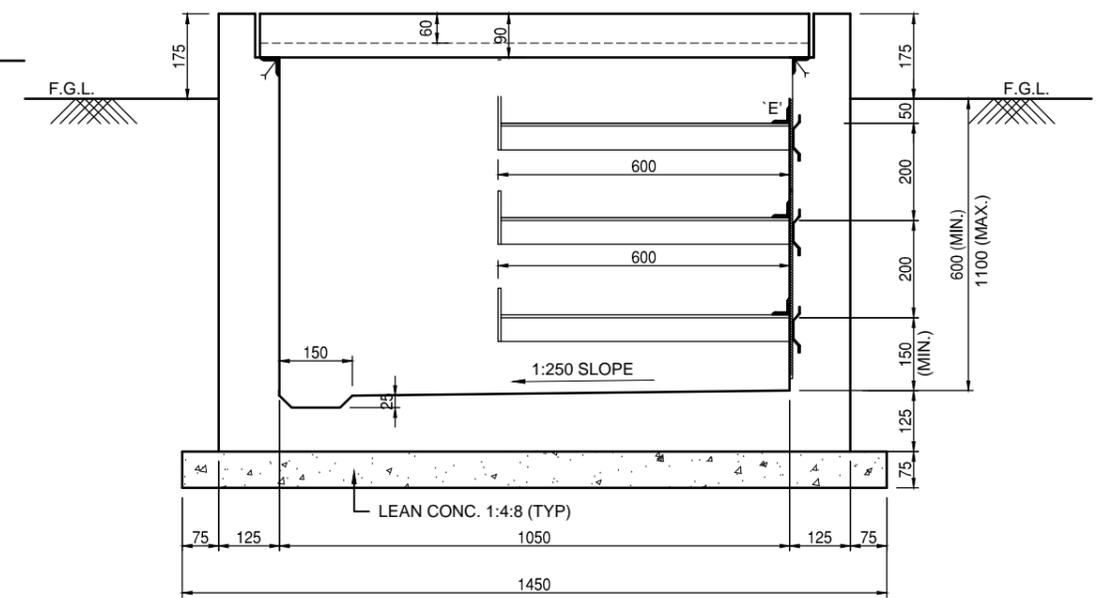
PROJECT : STANDARD DRAWING FOR CABLE TRENCH

TITLE : R.C.C. DETAIL FOR CABLE TRENCH SECTIONS.

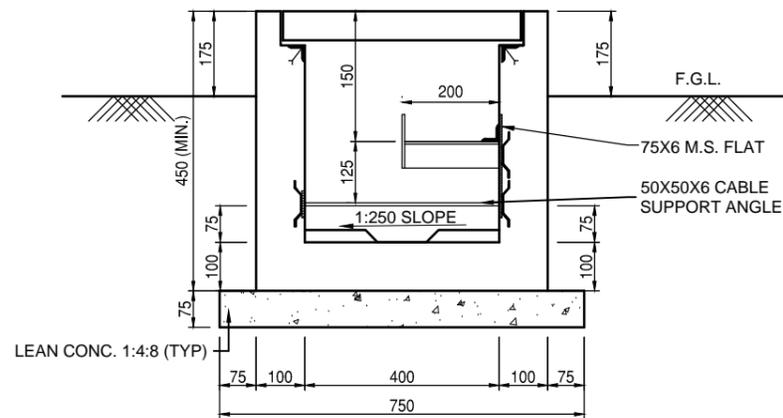
NIS



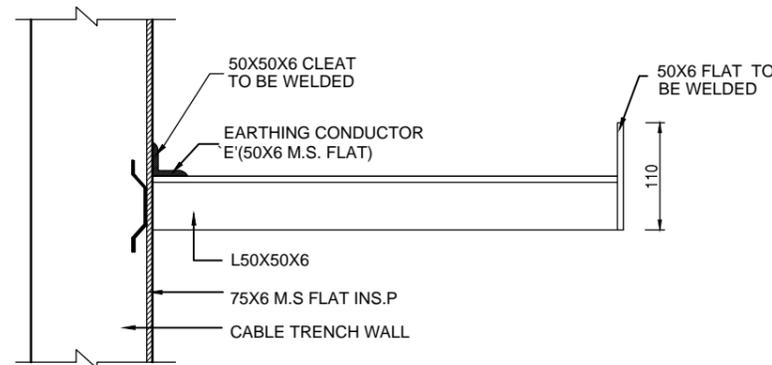
SECTION 1-1



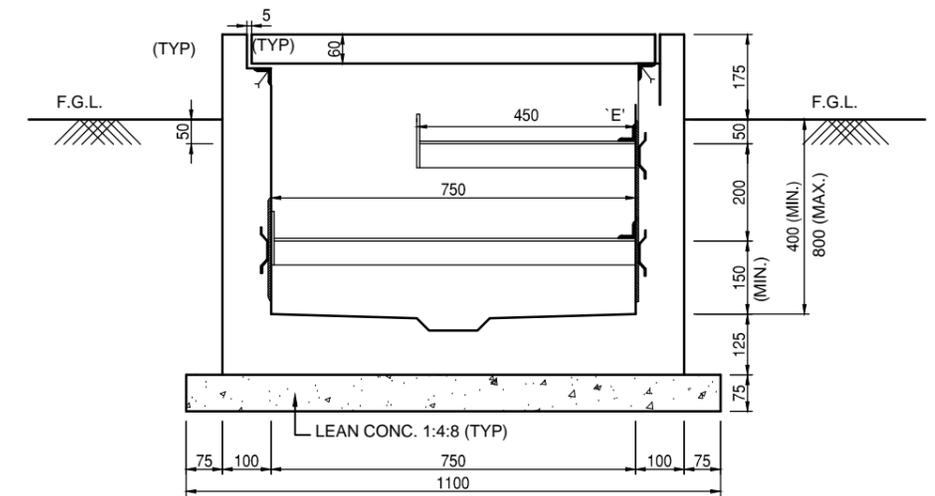
SECTION 2-2



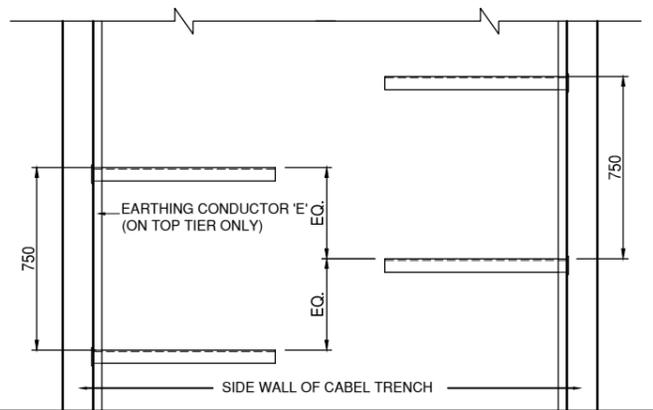
SECTION 4-4



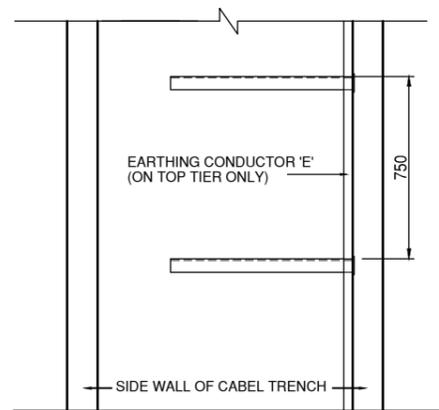
TYPICAL CABLE SUPPORT



SECTION 3-3



PLAN
CABLE TRAY SUPPORT FOR SECTION 1-1



PLAN
CABLE TRAY SUPPORT FOR
SECTION 2-2 & 3-3

RELEASED FOR TENDER

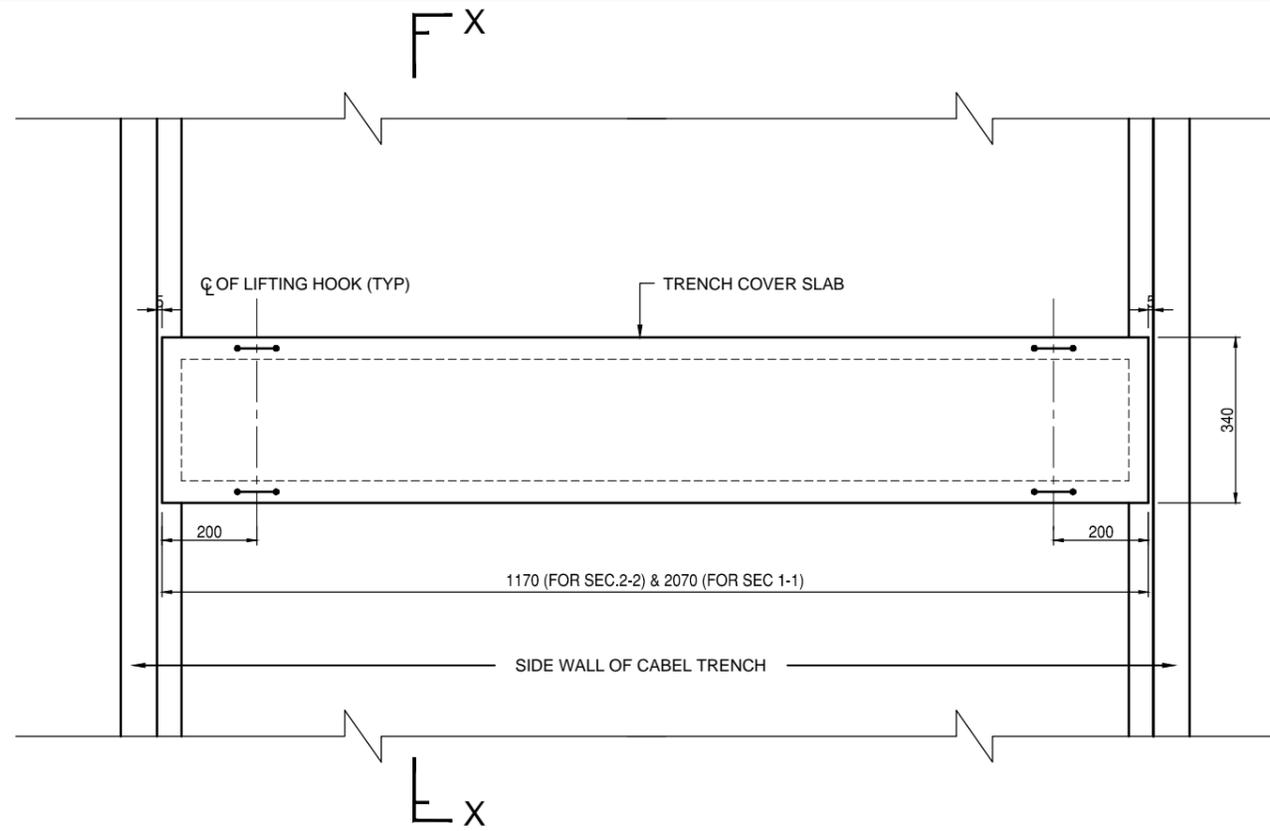
REC TRANSMISSION PROJECTS COMPANY LTD.

PROJECT : **STANDARD DRAWING FOR
CABLE TRENCH**

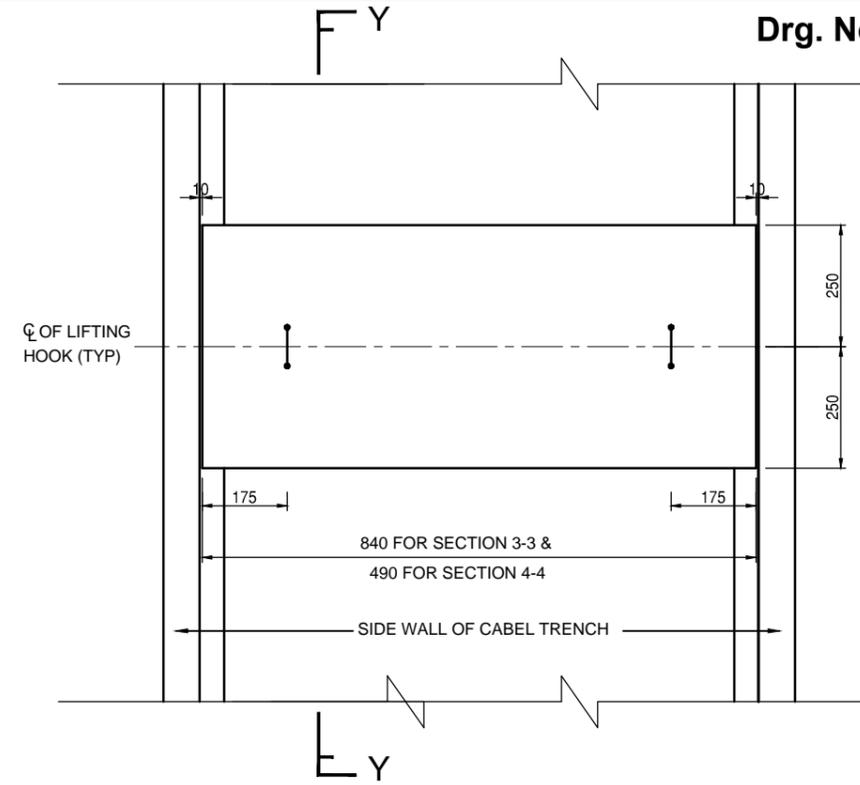
TITLE : **DETAIL FOR CABLE
TRENCH SECTIONS.**

NTS

REV
R-0



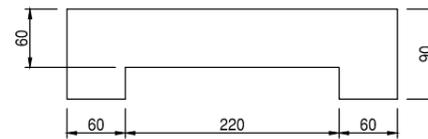
**DETAIL OF TRENCH COVER SLAB
FOR SECTION (1-1) & (2-2)**



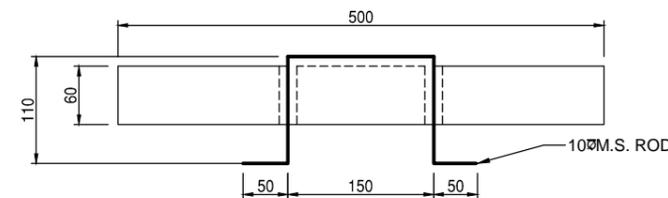
**DETAIL OF TRENCH COVER SLAB
FOR SECTION (3-3) & (4-4)**

NOTE:

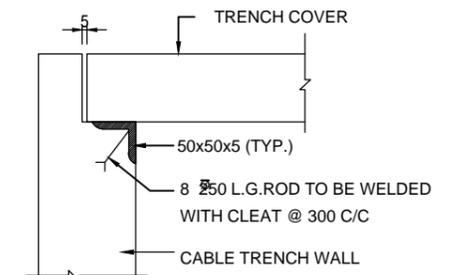
1. ALL DIMENSIONS ARE IN mm. UNLESS OTHERWISE SPECIFIED.
2. DO NOT SCALE THE DRG. FOLLOW WRITTEN DIMENSION ONLY.
3. R.C.C. MIX SHALL BE 1:1.5:3 (1CEMENT:1.5COARSE SAND:3 STONE AGGREGATE) 20MM NOMINAL SIZE.
4. LEAN CONC. SHALL BE 1:4:8.
5. CLEAR COVER FOR BOTTOM SLAB REINF. ON TOP SIDE IS 25mm.
6. LIFTING HOOK ARE TO BE PROVIDED IN EVERY TENTH SLAB.
7. NECESSARY OPENING SHALL BE PROVIDED AT APPROPROATE LOCATION TO TAKE OUT CABLES.
8. FOR ACTUAL DEPTH OF TRENCHES REFER CABLE TRENCH LAYOUT.
9. F.G.L. DENOTES FINISHED GRADED LEVEL (FORMATION LEVEL).
10. F.G.L. TO BE TAKEN FROM LAYOUT DRG.
11. A SLOPE OF 1:250 SHALL BE GIVEN IN THE DIRECTION PERPENDICULAR TO THE RUN OF THE TRENCH FOR ALL SECTIONS.
12. ALL CABEL TRENCHES SHALL BE GIVEN A SLOPE OF 1:1000 IN THE DIRECTION OF MAIN RUN.
13. EARTHING CONDUCTOR 'E' 50X6 M.S.FLAT WOULD BE WELDED ON THE CABLE SUPPORTING STRUCTURES BEFORE INSTALATION OF CABLE.
14. ALL STEEL STRUCTURE PLATES WOULD BE PAINTED WITH NON CORROSIVE PAINT ON A SUITABLE PRIMER BEFORE INSTALLATION OF CABLES. EARTHING CONDUCTOR WOULD HAVE RED PAINT.
15. TRENCH WALL SHALL CLEAR THE EQUIPMENT FOUNDATION BY 100mm.(MINIMUM)
16. NECESSARY CONSTRUCTION JOINT SHALL BE PROVIDED AT EVERY 30M. MIN OR AS PER SITE REQUIREMENT.
17. 40mm CLEAR COVER FOR WALL AND BOTTOM SLAB REINFORCEMENT WHICH IS TOWARDS EARTH SIDE SHALL BE PROVIDED.
18. ALL SUPPORT ANGLE SHALL BE L50X50X6.
19. ANCHORING FLAT (75X6mm)SHALL BE PROVIDED AT EACH SUPPORT ANGLE POINT.
20. EARTHING CONDUCTOR MKD.'E' SHALL BE PROVIDED ON THE TOP TIER OF EACH CABLE TRENCH SECTIONS.
21. TRENCH WALL SHALL CLEAR THE TOWER FOUNDATION BY 1000mm (MIN.)



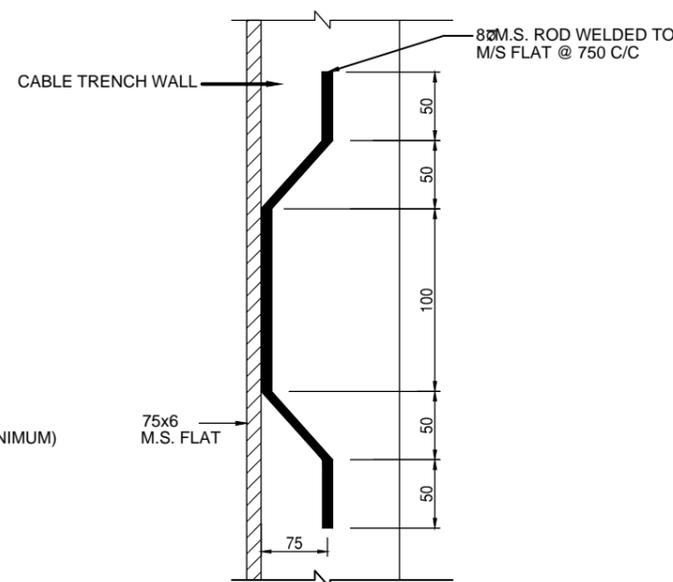
SECTION X-X



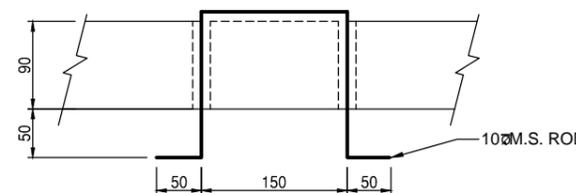
SECTION Y-Y



**TYPICAL DETAIL OF
SLAB SUPPORT**



**TYPICAL DETIAL OF ANCHORING
75X6 M.S.FLAT**



**DETAIL OF LIFTING HOOK
FOR SECTION 1-1 & 2-2**

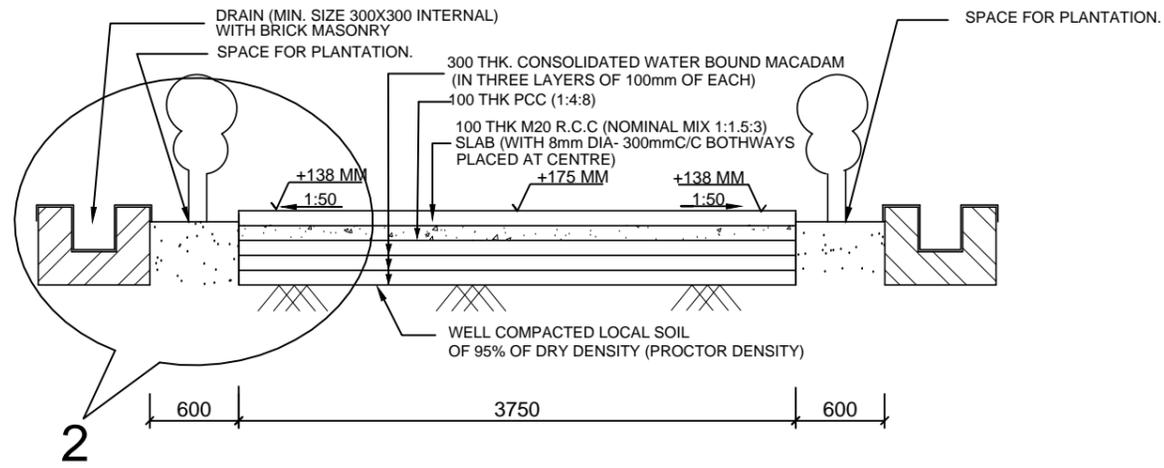
RELEASED FOR TENDER

REC TRANSMISSION PROJECTS COMPANY LTD.

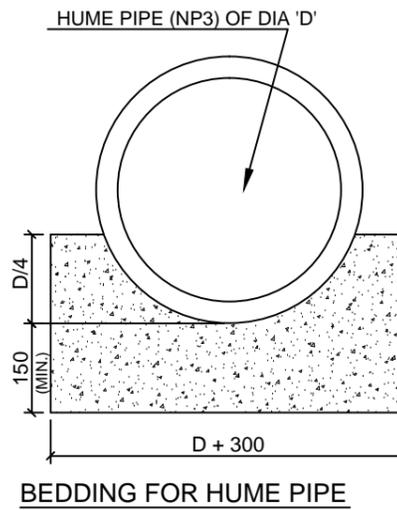
PROJECT : **STANDARD DRAWING FOR
CABLE TRENCH**

TITLE : **DETAIL FOR CABLE
TRENCH SECTIONS.**

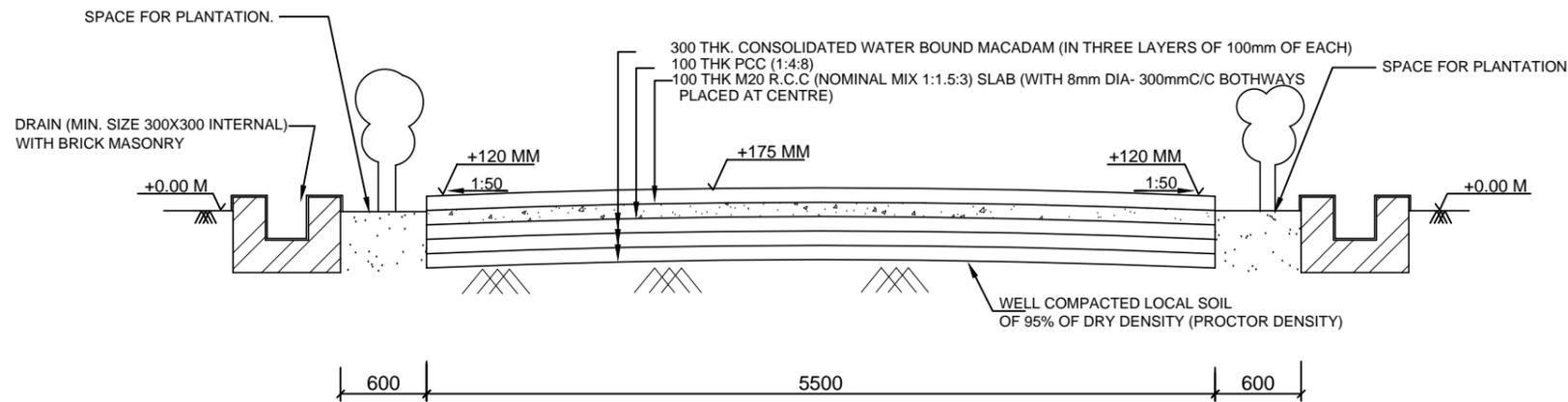
NTS



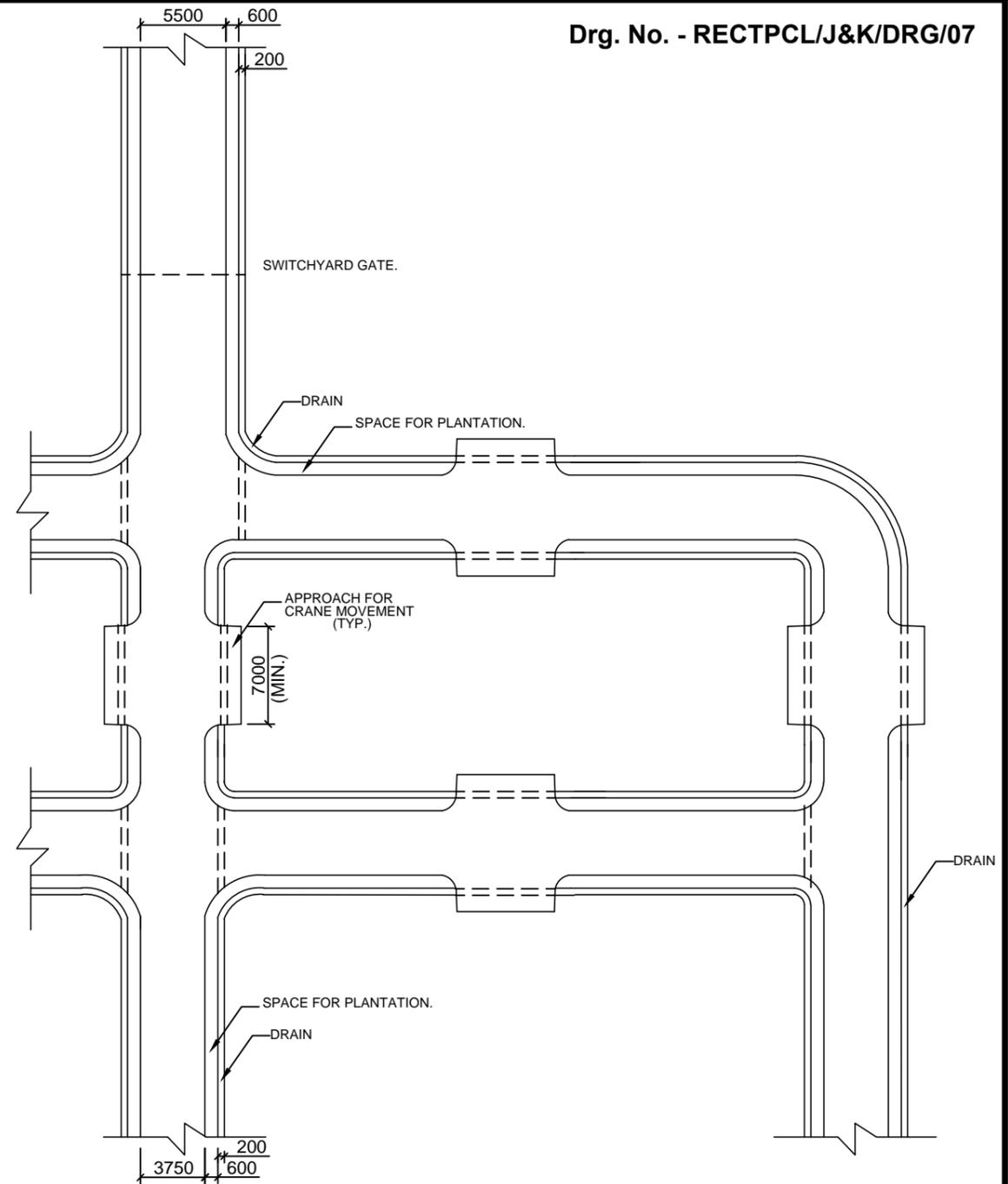
TYP. CROSS SECTION OF 3.75 M WIDE ROAD
(VALID FOR SWITCHYARD INTERNAL ROADS)



BEDDING FOR HUME PIPE



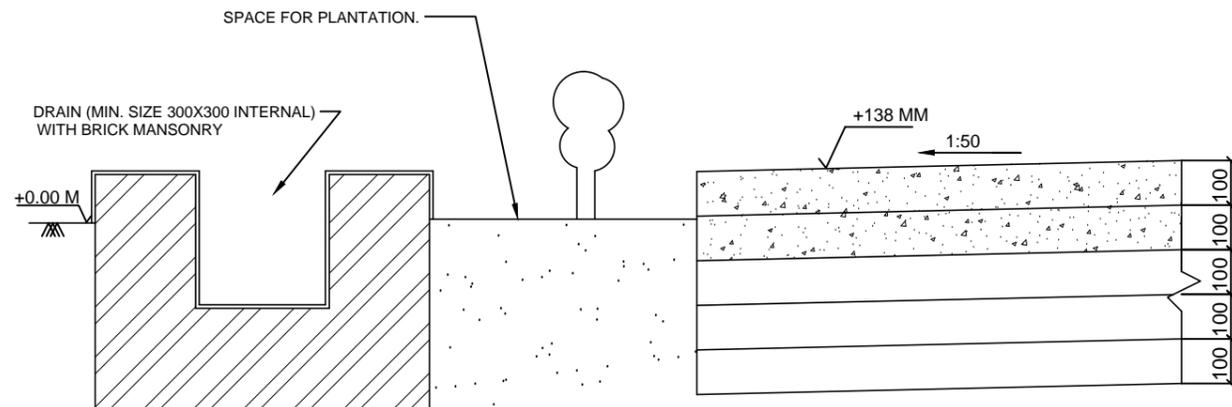
TYP. CROSS SECTION OF 5.5 M WIDE ROAD
(VALID FOR APPROACH TO SWITCHYARD)



TYP. SWITCHYARD ROAD AND DRAIN LAYOUT PLAN

NOTES:

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. CAMBER OF 1:50 SHALL BE PROVIDED
3. EXPANSION JOINT (12 MM THICK) SHALL BE PROVIDED AT EVERY 8.0M. EXPANSION JOINT SHALL ALSO BE PROVIDED AT CENTRE.
4. POLYTHENE SHEET OF 125 MICRONS SHALL BE PLACED BETWEEN THE PCC AND RCC SLAB. (TOP SLAB)
5. 100MM DIA. RCC HUME PIPE (NP-3) SHALL BE PLACED ACROSS THE ROAD AT EVERY 100M INTERVAL ALONG THE ROAD.
6. FINISHED TOP OF ROAD CREST SHALL BE 175 MM (MIN.) ABOVE F.G.L. (SWITCHYARD FORMATION LEVEL)



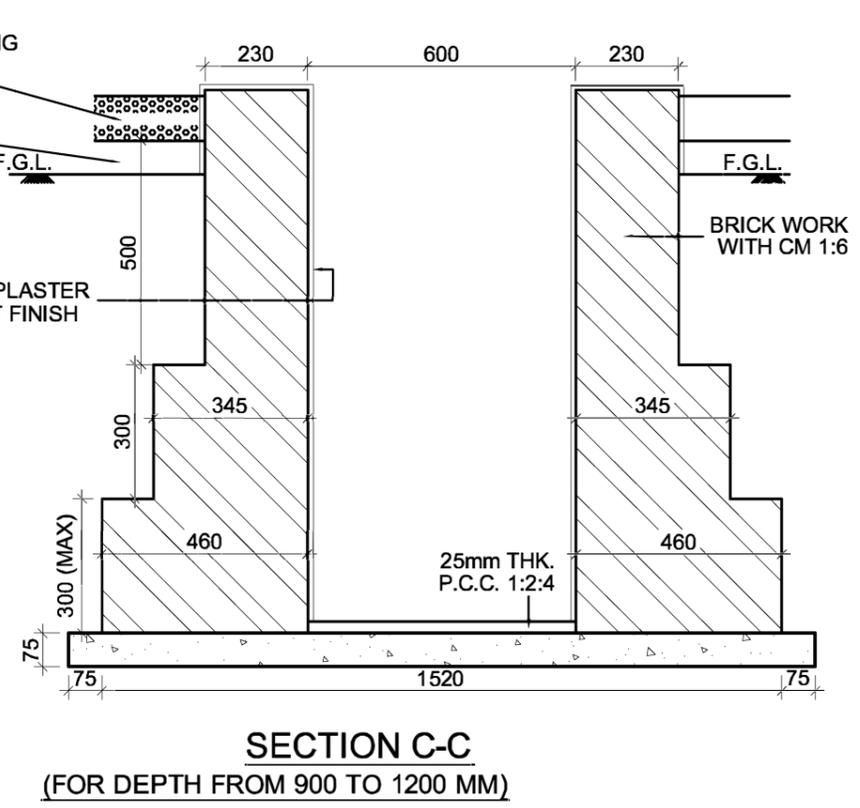
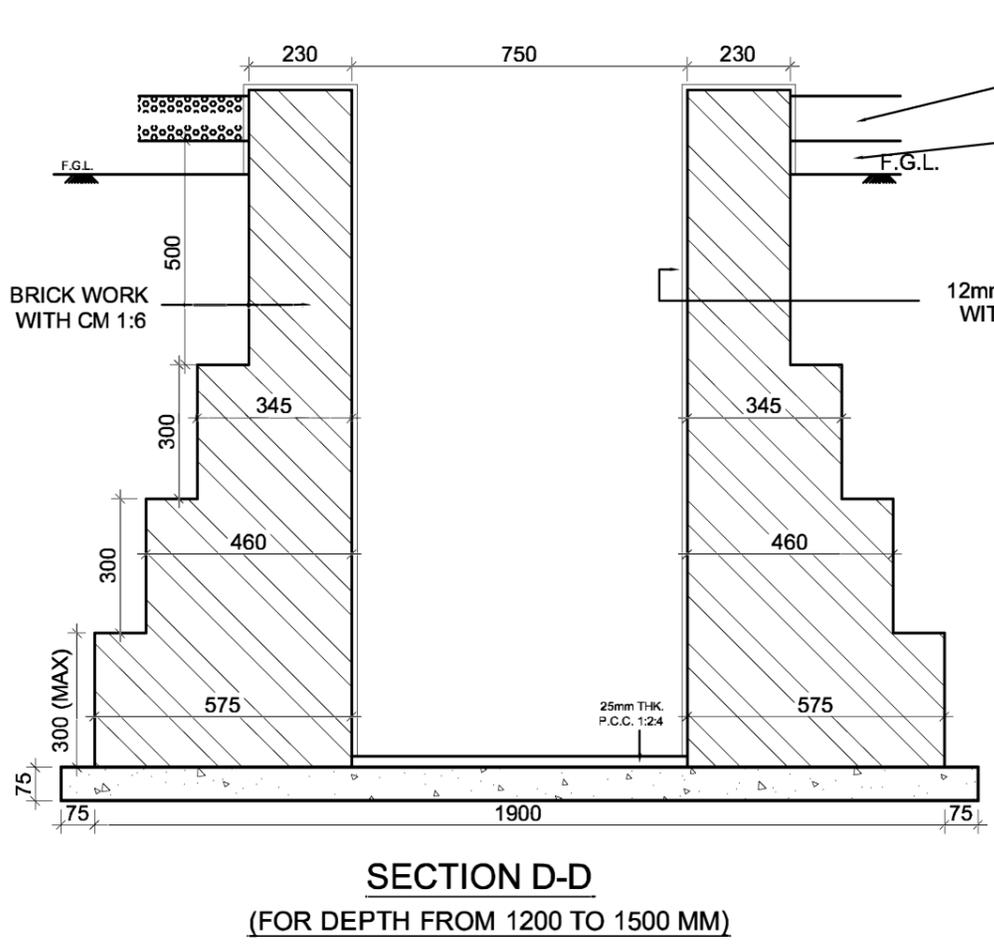
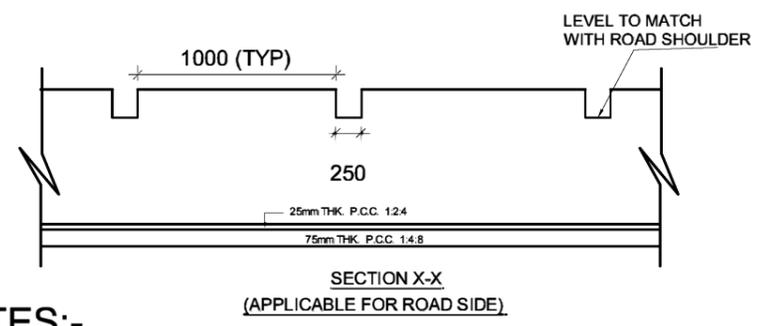
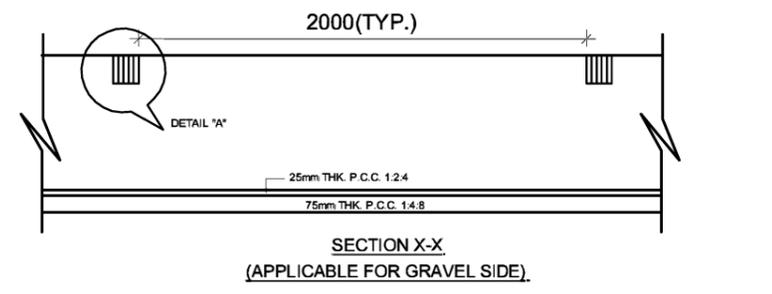
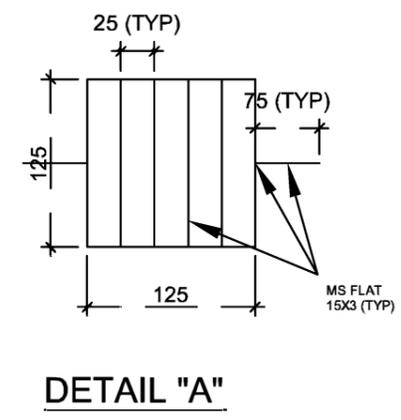
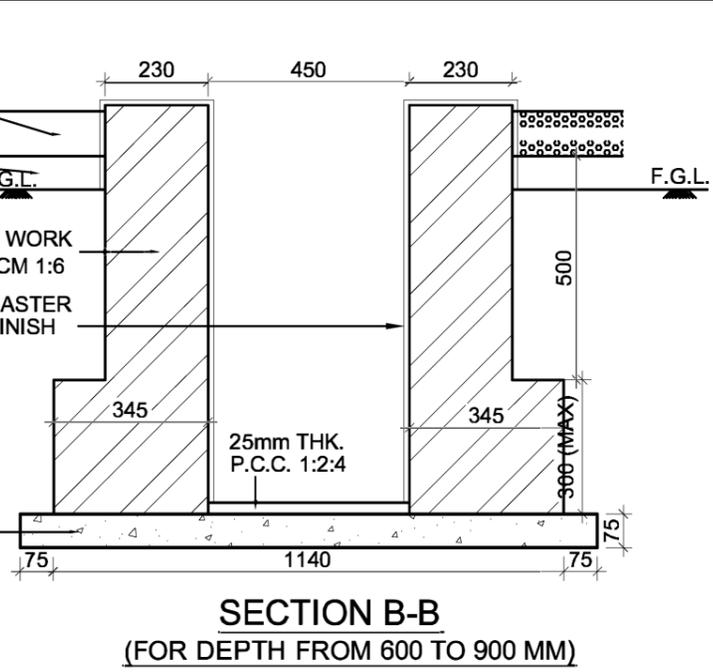
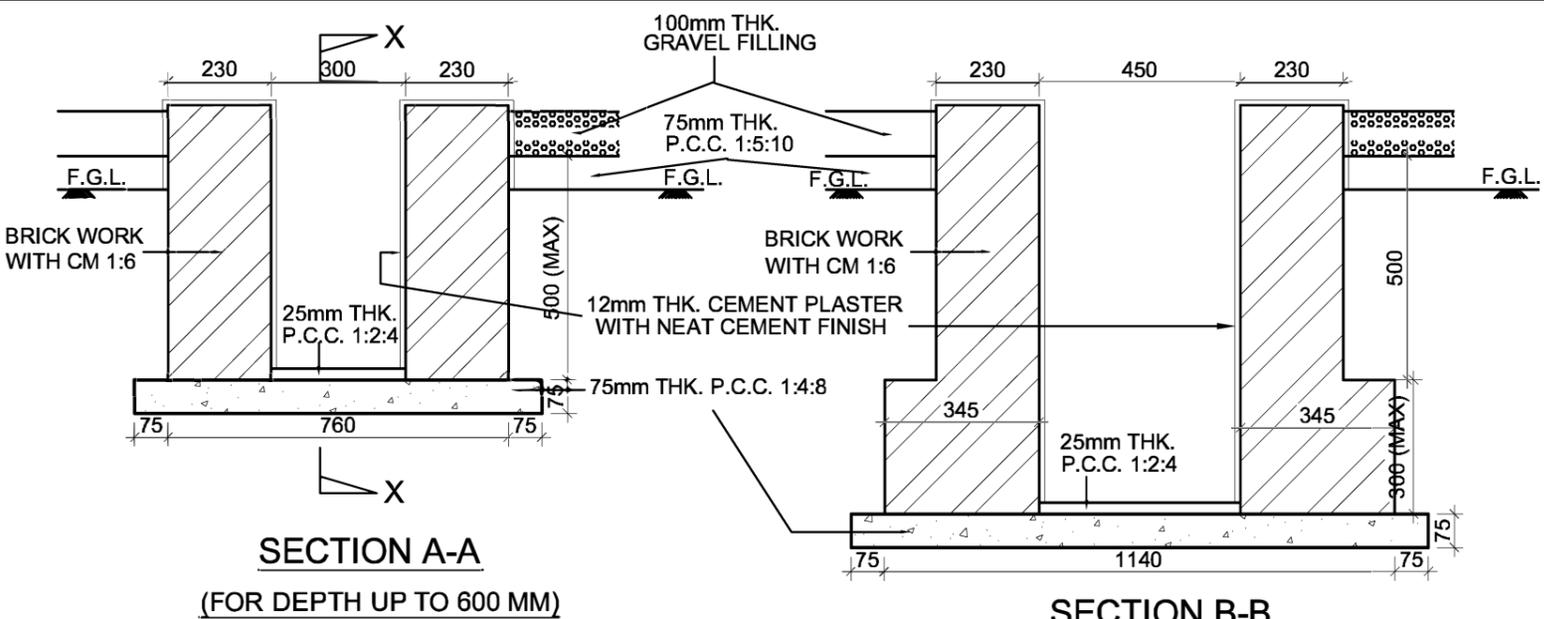
DETIAL - 2

RELEASED FOR TENDER

REC TRANSMISSION PROJECTS COMPANY LTD.

PROJECT : 765 / 400 / 220 Kv SUBSTATIONS

TITLE : DETAIL OF CONCRETE ROAD (RIGID PAVEMENT)
IN SWITCHYARD AREA



NOTES:-

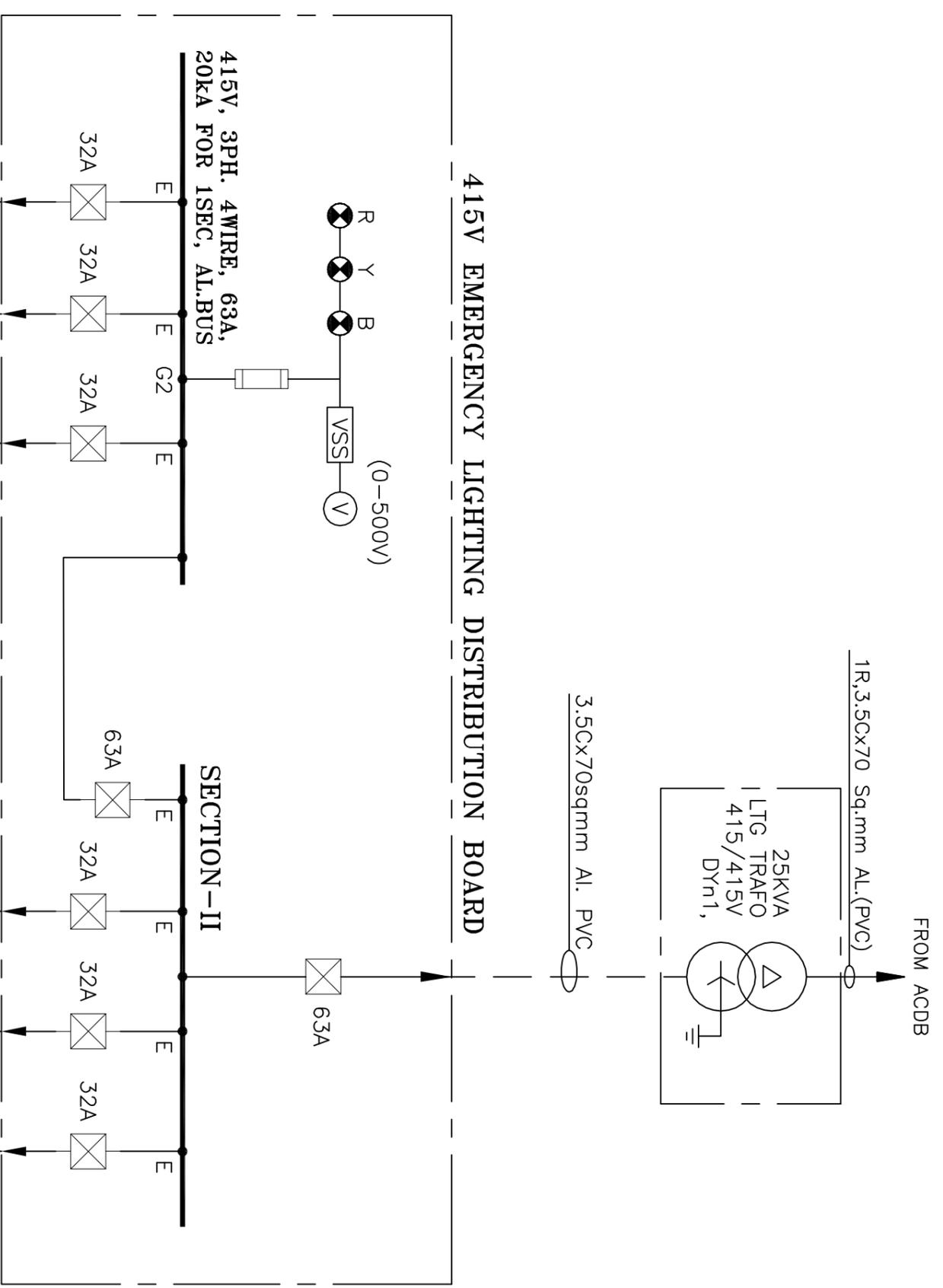
1. ALL DIMENSIONS ARE IN MM. & ELEVATIONS ARE IN METRE UNLESS NOTED OTHERWISE.
2. ALL DRAINS SHALL BE GIVEN A MINIMUM SLOPE OF
 - 1: 1000 IN THE LONGITUDINAL DIRECTION
3. MINIMUM DEPTH OF DRAIN SHALL BE 300MM BELOW FGL.
4. WHERE EVER TWO SECTIONS ARE MEETING A TRANSITION ZONE SHALL BE CONSTRUCTED HAVING LENGTH 1000mm.
5. 75X75mm WEEP HOLE SHALL BE PROVIDED AT SPACING OF 1500mm HORIZONTALY & 300mm VERTICALLY IN STAGGERED MANER.
6. DEPTH OFF DRAIN IS TAKEN AS HEIGHT FROM TOP OF DRAIN TO INVERT OF DRAIN
7. LAYOUT OF DRAIN WILL BE ISSUED DURING EXECUTION STAGE

RELEASED FOR TENDER

PROJECT :	STANDARD SUBSTATION DRAWING
TITLE :	DETAILS OF DRAIN
Dr. No. - RECTPCL/J&K/DRG/09	

LEGEND:-

SYMBOL	DESCRIPTION
	LTG TRANSFORMER
	4POLE MCCB
	FUSE
	INDICATING LAMP
	VOLTAGE SELECTOR SWITCH
	VOLTMETER



RELEASED FOR TENDER

Drq. No. - RECTPCL/J&K/DRG/10

REC TRANSMISSION PROJECTS COMPANY LTD.

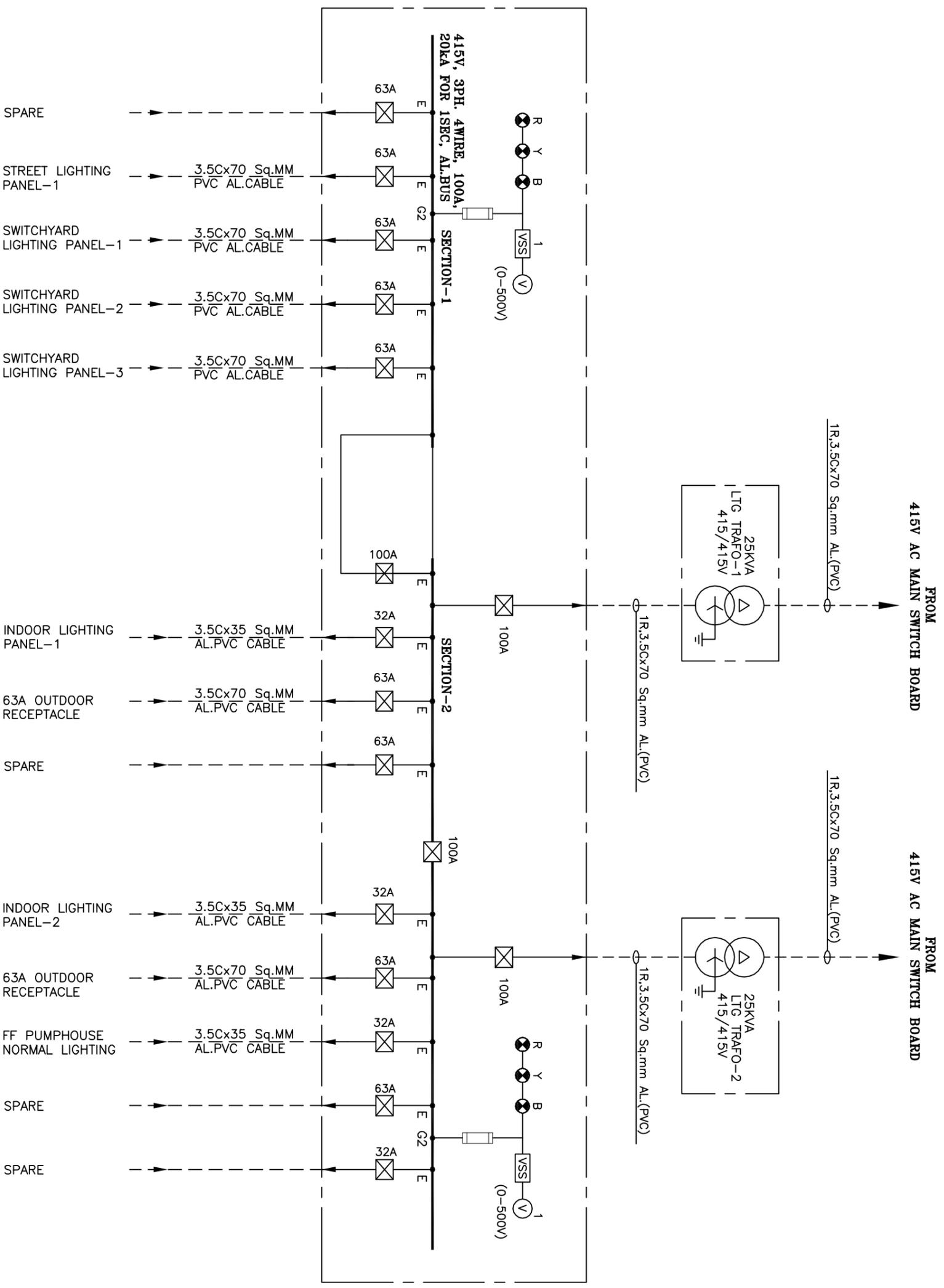
PROJECT : **220/33KV GIS LASSIPORA SS**

TITLE : **SLD FOR EMERGENCY LIGHTING DISTRIBUTION BOARD**

SHEET 1 OF 1

LEGEND:-

SYMBOL	DESCRIPTION
	LTG TRANSFORMER
	4POLE MCCB
	FUSE
	INDICATING LAMP
	VOLTAGE SELECTOR SWITCH
	VOLTMETER



Drq. No. - RECTPCL/J&K/DRG/13

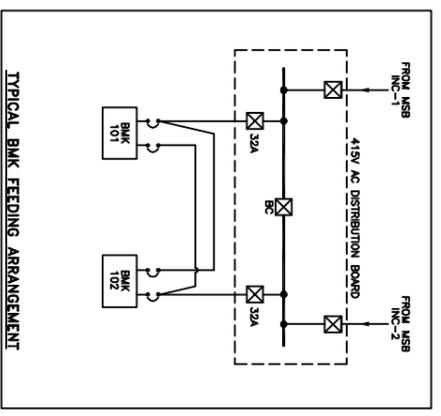
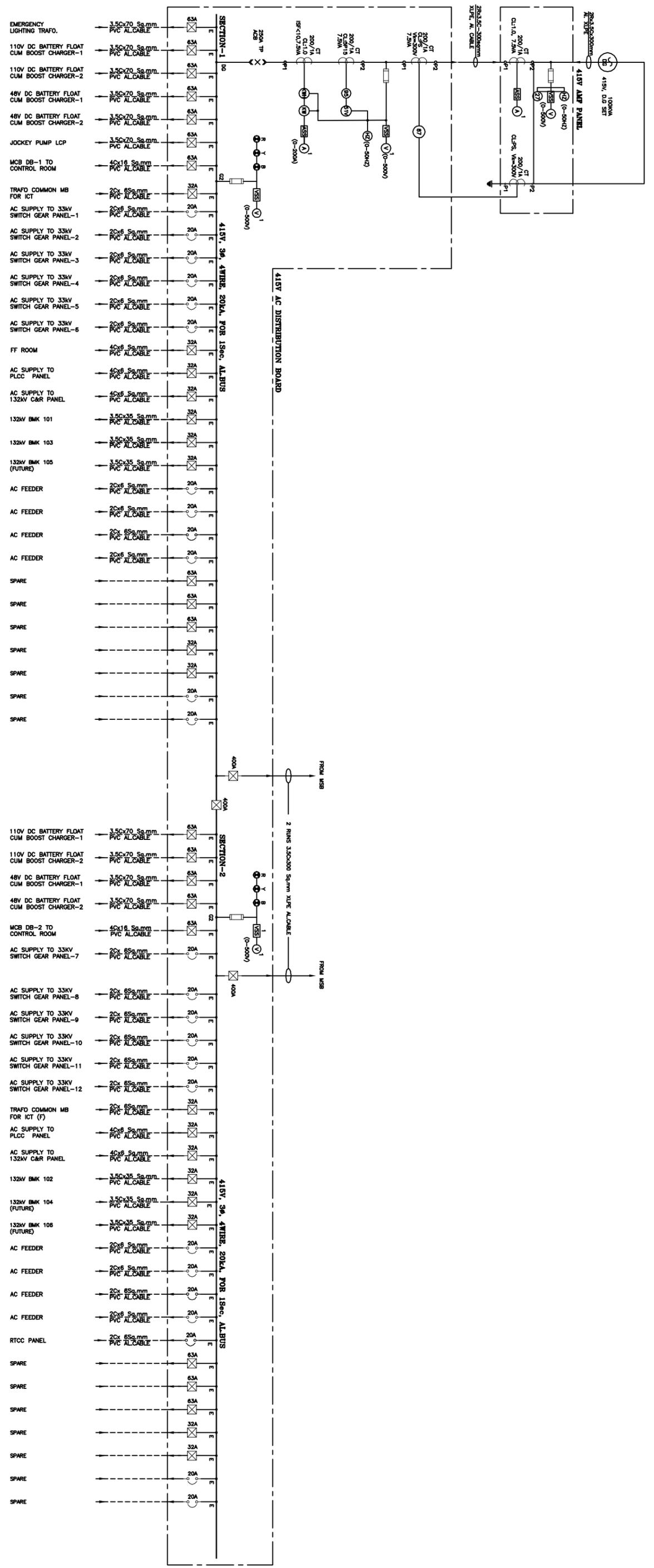
RELEASED FOR TENDER

REC TRANSMISSION PROJECTS COMPANY LTD.

PROJECT: 220/33KV GIS LASSIPORA SS

TITLE: SLD FOR MAIN LIGHTING DISTRIBUTION BOARD

SHEET 1 OF 1



LEGEND:-

SYMBOL	DESCRIPTION
⊗	VOLTMETER SELECTOR SWITCH
⊙	KILO WATT METER
⊕	KILO WATT HOUR METER
⊖	FREQUENCY METER
⊗	2 POLE INSTANTANEOUS UNDER VOLTAGE RELAY + ADJUSTMENT RELAY + TRIPER
⊕	1PH OVER CURRENT RELAY
⊖	1PH EARTH FAULT RELAY
⊗	VOLTAGE CONTROLLED DEFINITE TIME O/C RELAY
⊕	DPT. PROTECTION RELAY
⊖	DIESEL GENERATOR SET
⊗	OVERLOAD ALARM RELAY

LEGEND:-

SYMBOL	DESCRIPTION
⊗	DRAWNOUT TYPE 3 POLE AIR CIRCUIT BREAKER (DRAWNOUT TYPE)
⊕	4POLE WOUND CASE CIRCUIT BREAKER (ACCB) (NON DRAWNOUT TYPE)
⊖	DOUBLE POLE MOB
⊗	INDICATING LAMP
⊕	CURRENT TRANSFORMER
⊖	AMMETER
⊗	VOLTMETER
⊕	AMMETER SELECTOR SWITCH

NOTE :-

1. INTERLOCK SHALL BE PROVIDED BETWEEN INCI, INCG & B/C SUCH THAT ONLY TWO BREAKERS SHALL BE IN SERVICE AT A TIME IN MAIN SWITCHBOARD.
2. NO TWO AC SOURCE SHALL BE PARALLELED AT ANY STAGE.
3. DC SET SHALL BE AUTO START TYPE.
4. EACH BAY MB & TRANSFORMER MB SHALL BE FED BY ATLEAST ONE SOURCE FROM 415V ACDB. SECOND SOURCE SHALL BE LOOPED FROM NEAREST BAY MB & TRANSFORMER MB WHICH SHALL BE FED FROM ANOTHER SOURCE FROM 415V ACDB.
5. 1PH & 3PH AC SUPPLY FOR ALL BAY EQUIPMENTS SHALL BE FED FROM THE BMK.
6. AUTOMATIC SUPPLY CHANGE OVER SHALL BE ACHIEVED AS PER TECHNICAL SPECIFICATION, SECTION -LT SWITCHGEAR.
7. AS SUPPLY IS RESTORED, THERE THE FINE INDICATED SINGLE PHASE FEEDERS.

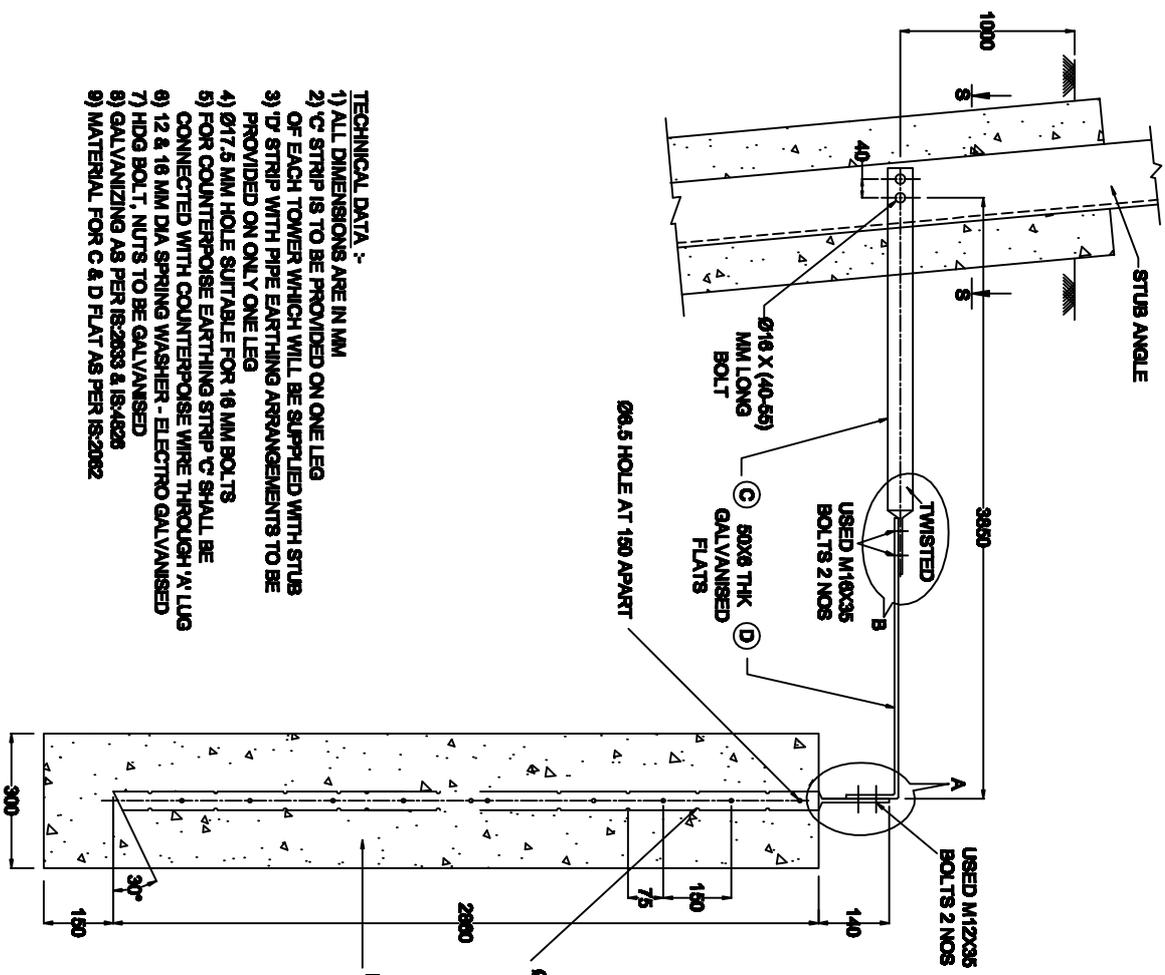
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REC TRANSMISSION PROJECTS COMPANY LTD.

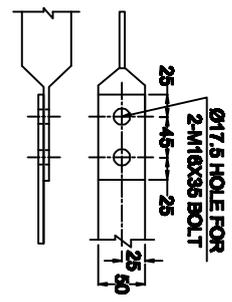
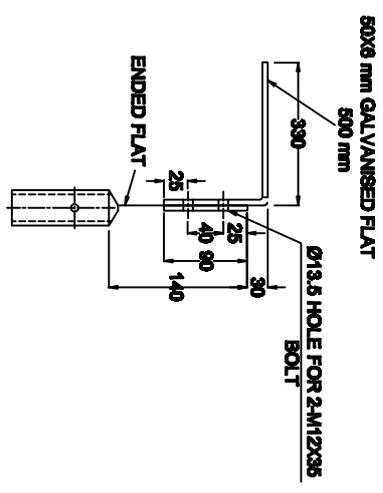
PROJECT: 220/33KV GIS LASSIPORA SS

TITLE: SINGLE LINE DIAGRAM FOR 415V ACDB

SHEET 1 OF 1



- TECHNICAL DATA :-**
- 1) ALL DIMENSIONS ARE IN MM
 - 2) 'C' STRIP IS TO BE PROVIDED ON ONE LEG OF EACH TOWER WHICH WILL BE SUPPLIED WITH STUBS
 - 3) 'D' STRIP WITH PIPE EARTHING ARRANGEMENTS TO BE PROVIDED ON ONLY ONE LEG
 - 4) Ø17.5 MM HOLE SUITABLE FOR 16 MM BOLTS
 - 5) FOUR COUNTERPOISE EARTHING STRIP 'C' SHALL BE CONNECTED WITH COUNTERPOISE WIRE THROUGH 'A' LUG
 - 6) 12 & 16 MM DIA SPRING WASHER - ELECTRO GALVANISED
 - 7) HDG BOLT, NUTS TO BE GALVANISED
 - 8) GALVANIZING AS PER IS:2633 & IS:4828
 - 9) MATERIAL FOR C & D FLAT AS PER IS:2062



DETAIL AT 'A'

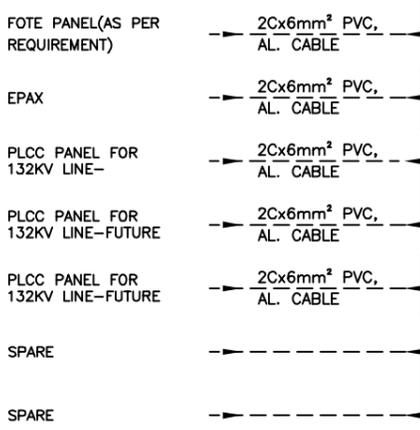
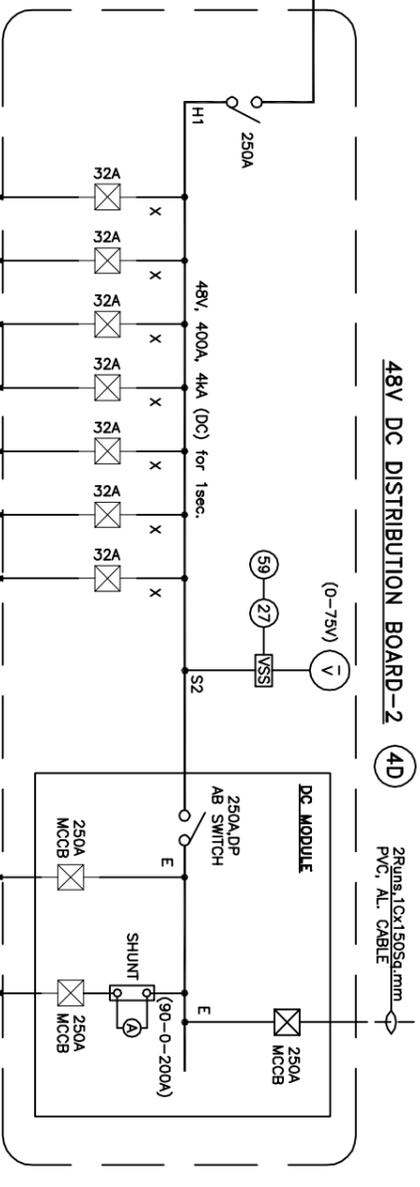
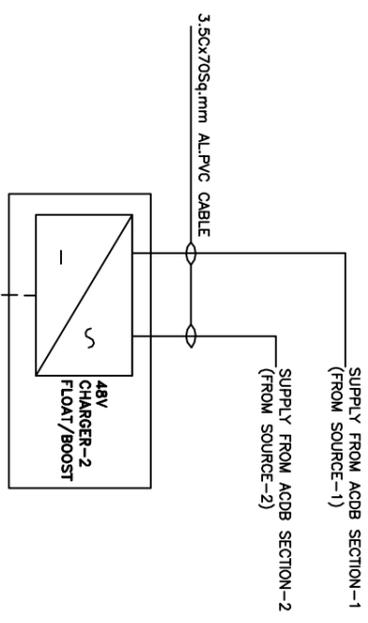
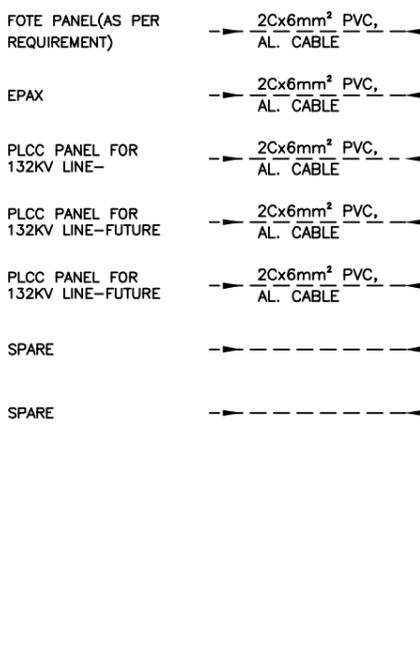
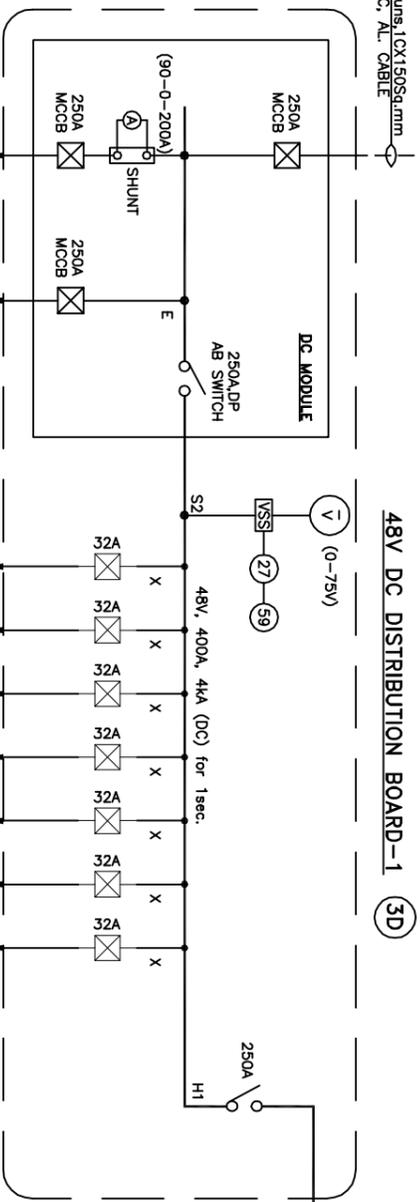
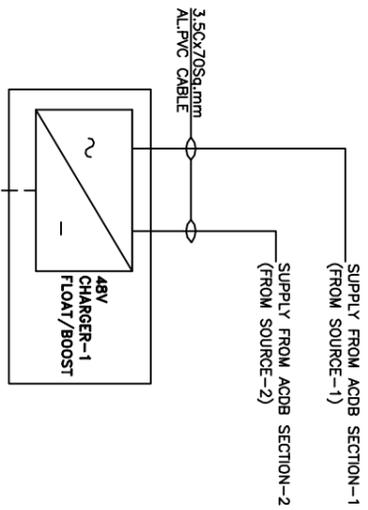
DETAIL AT 'B'

Ø25 NB HEAVY DUTY GALV. WIRE
- 3000 MM LONG (IS:1164/123):
FINELY BROKEN COAL & SALT
MAX GRANULAR SIZE 25 MM

LIST OF BOLTS & NUTS / TOWER		
SL. NO.	SIZE	QTY.
1	16X35 LG	2
2	12X36 LG	2
3	16 MM DIA SPRING WASHER	2
4	12 MM DIA SPRING WASHER	2

1/1 : ON SHEETS

FOR TENDER PURPOSE ONLY	
REC TRANSMISSION PROJECTS COMPANY LTD.	
TITLE	PIPE EARTHING ARRANGEMENT
Drg. No. - RECTPCL/J&K/DRG/15	



LEGEND:-

SYMBOL	DESCRIPTION
	DOUBLE POLE MCCB
	AMMETER
	VOLTMETER
	VOLTMETER SELECTOR SWITCH
	U/V RELAY
	O/V RELAY

- NOTES:-**
1. DCDB SHALL MEET REQUIREMENT AS PER SECTION LT SWITCHGEAR OF TECHNICAL SPECIFICATION.
 2. ALL DIGITAL/ANALOGUE INPUT/OUTPUTS REQUIRED FOR SAS SYSTEM SHALL BE CONSIDERED BY THE LT SWITCHGEAR MANUFACTURER.

RELEASED FOR TENDER

Drq. No. - RECTPCL/J&K/DRG/16

REC TRANSMISSION PROJECTS COMPANY LTD.

PROJECT : 220/33KV GIS LASSIPORA SS

TITLE : SINGLE LINE DIAGRAM FOR 48V DCDB

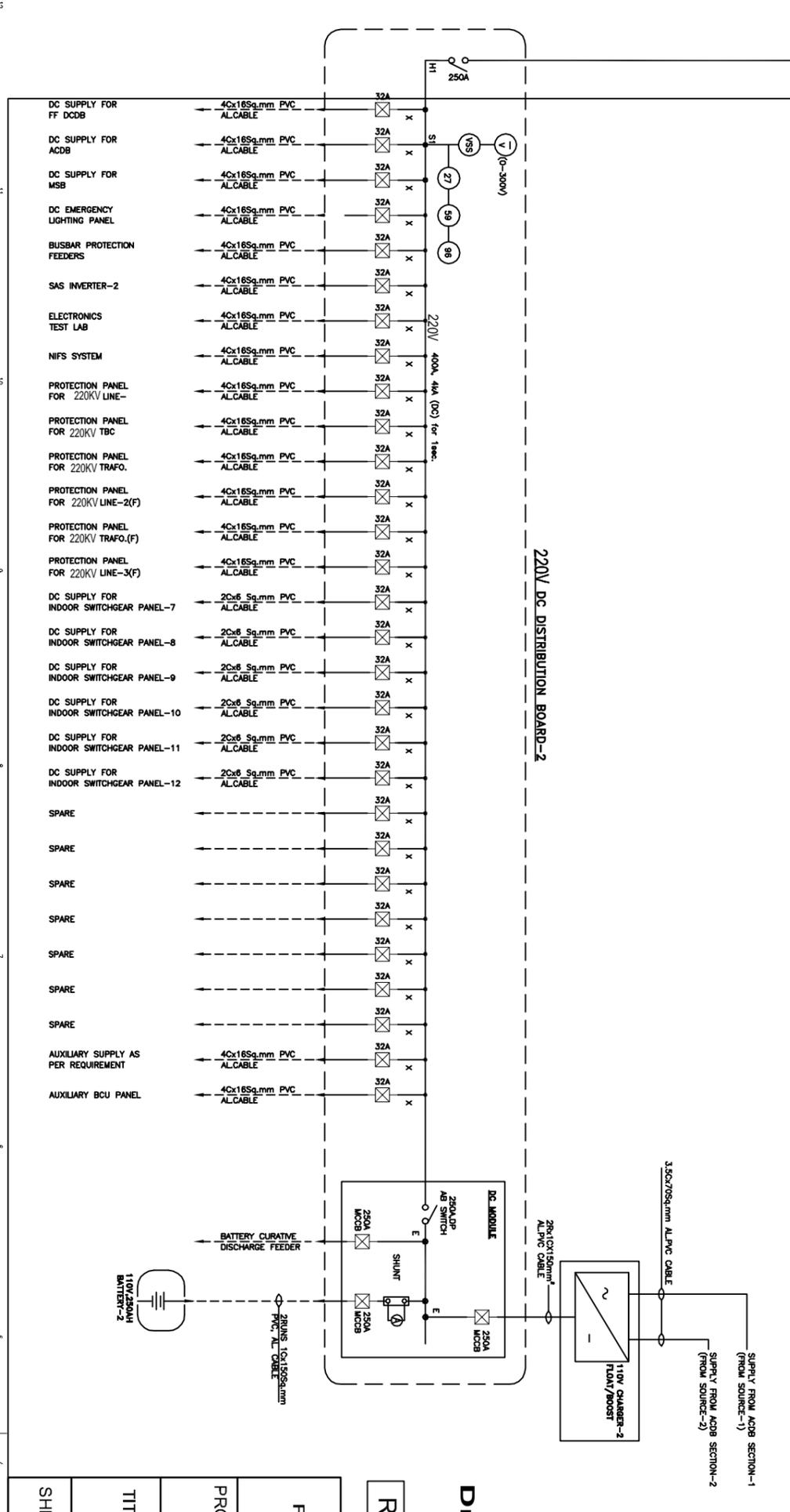
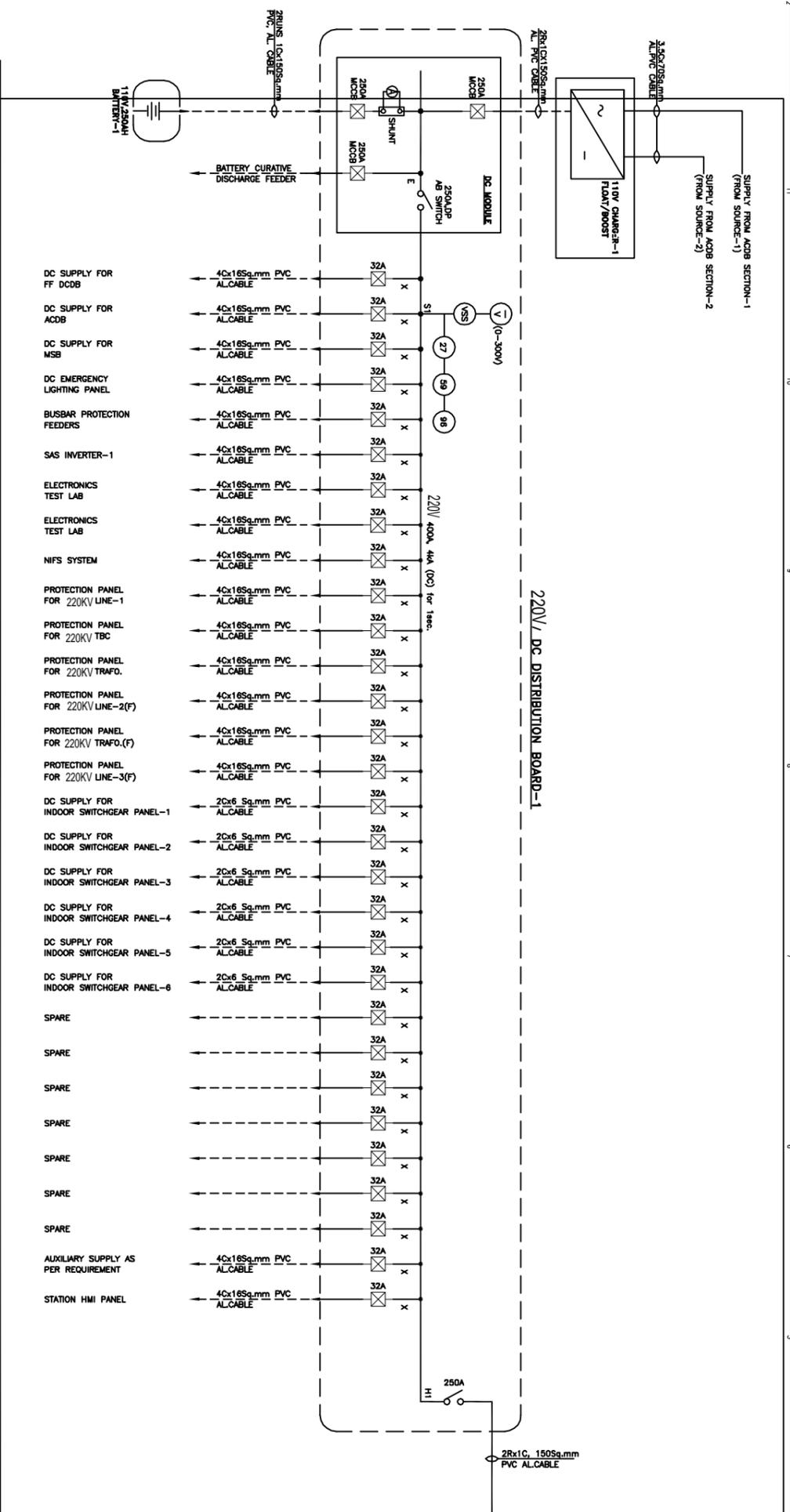
SHEET 1 OF 1

LEGEND:-

SYMBOL	DESCRIPTION
	DOUBLE POLE MCCB
	DOUBLE POLE AIR BREAK SWITCH
	DOUBLE POLE MCB
	AMMETER
	VOLTMETER
	VOLTMETER SELECTOR SWITCH
	U/V RELAY
	O/V RELAY
	EARTH LEAKAGE RELAY

NOTE :-

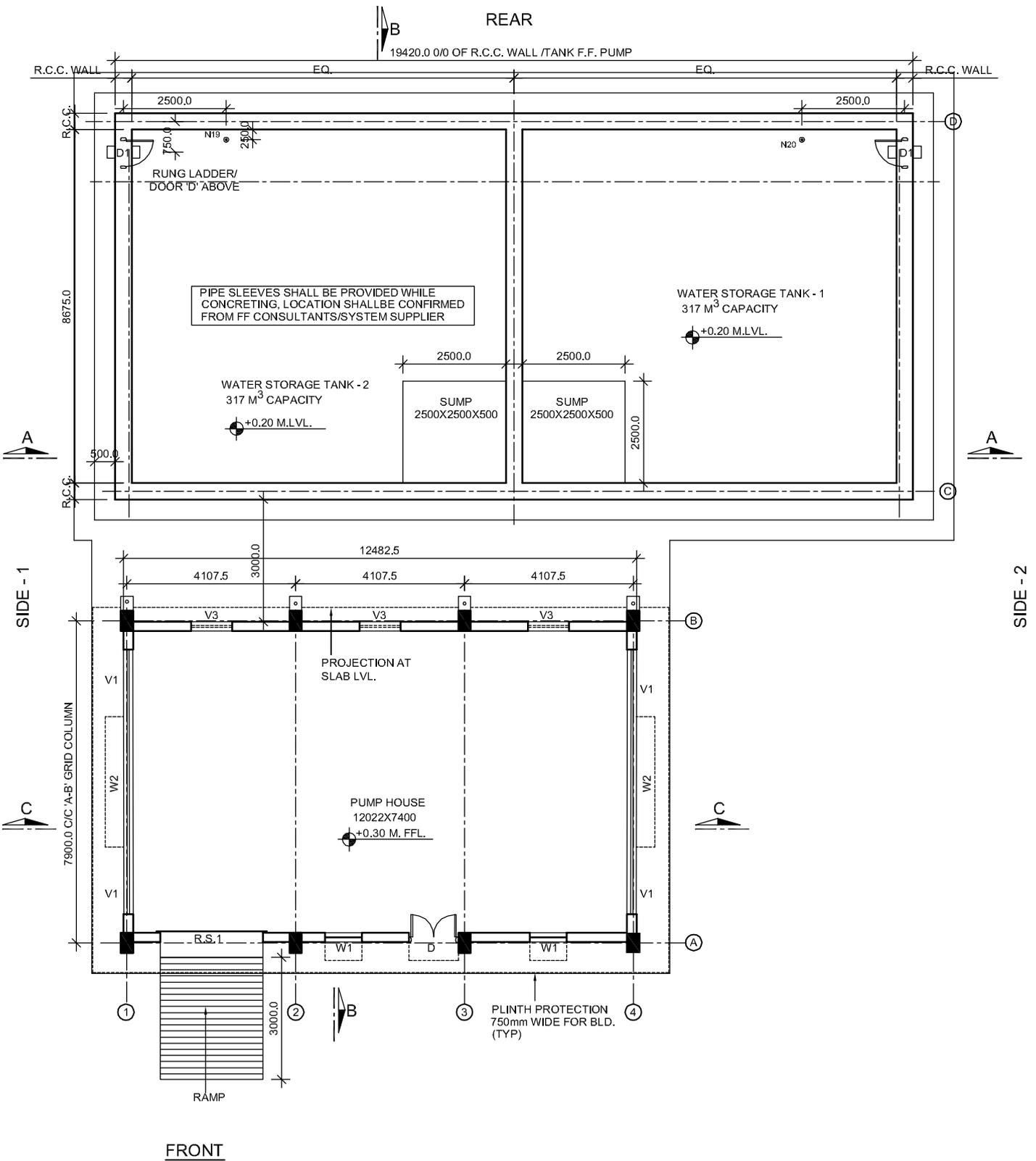
1. NUMBER OF FEEDERS SHALL BE PROVIDED IN EACH BOARD AS PER REQUIREMENT OF SUB-STATION.
2. ONE DC 'X' TYPE MODULE IN EACH 110V DCDB SHALL BE PROVIDED FOR EACH LINE, TRANSFORMER, BUS REACTOR, TBC, BC BAY INCLUDING FUTURE BAYS AS SHOWN IN SUBSTATION SLD.
3. RATING OF BUS BARS/FEEDERS INDICATED IN THIS DRAWING ARE MINIMUM REQUIREMENT AND MAY BE INCREASED DURING DETAILED ENGINEERING IF FOUND INADEQUATE RESPECT TO OFFERED LOADS / SYSTEM.
4. ALL DIGITAL/MANUOLETE INPUT/OUTPUTS REQUIRED FOR SAS SYSTEM SHALL BE CONSIDERED BY THE LT SWITCHGEAR MANUFACTURER.
5. AS PER VENDOR DRAWINGS OF 33KV GIS PANEL, ONLY ONE DC SUPPLY IS USED. HENCE WE HAVE INDICATED SIX GIS PANELS IN DCDB-1 & ANOTHER SIX PANELS IN DCDB-1L.



DrG. No. - RECTPCL/J&K/DRG/17

RELEASED FOR TENDER

REC TRANSMISSION PROJECTS COMPANY LTD.	
PROJECT :	220/33KV GIS LASSIPORA SS
TITLE :	SINGLE LINE DIAGRAM FOR 110V DCDB
SHEET	1 OF 1



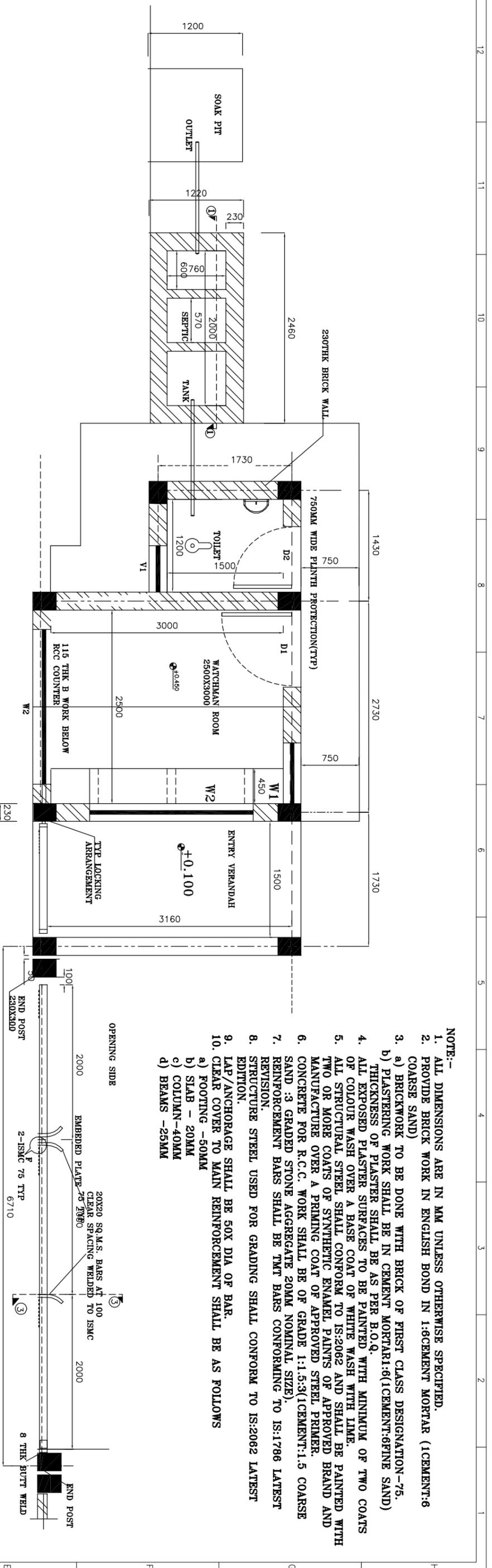
GROUND FLOOR PLAN FOR FFPH

RELEASED FOR TENDER & CONSTRUCTION.

REC TRANSMISSION PROJECTS COMPANY LTD.

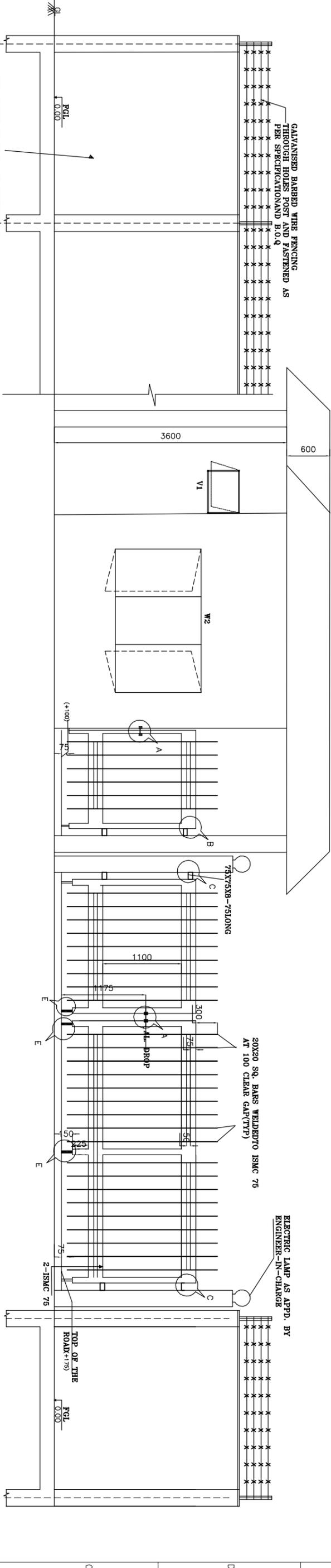
FIRE FIGHTING PUMP HOUSE

TITLE: GROUND FLOOR PLAN FOR FIRE WATER PUMP HOUSE & WATER TANK



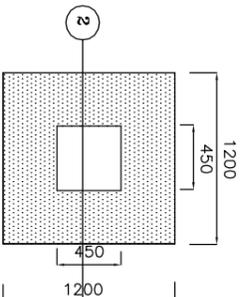
- NOTE:-**
1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
 2. PROVIDE BRICK WORK IN ENGLISH BOND IN 1:6 CEMENT MORTAR (1 CEMENT:6 COARSE SAND)
 3. a) BRICKWORK TO BE DONE WITH BRICK OF FIRST CLASS DESIGNATION-75.
b) PLASTERING WORK SHALL BE IN CEMENT MORTAR:1:6(CEMENT:6 FINE SAND) THICKNESS OF PLASTER SHALL BE AS PER B.O.Q.
 4. ALL EXPOSED PLASTER SURFACES TO BE PAINTED WITH MINIMUM OF TWO COATS OF COLOUR WASH OVER A BASE COAT OF WHITE WASH WITH LIME.
 5. ALL STRUCTURAL STEEL SHALL CONFORM TO IS:2062 AND SHALL BE PAINTED WITH TWO OR MORE COATS OF SYNTHETIC ENAMEL PAINTS OF APPROVED BRAND AND MANUFACTURE OVER A PRIMING COAT OF APPROVED STEEL PRIMER.
 6. CONCRETE FOR R.C.C. WORK SHALL BE OF GRADE 1:1.5:3(CEMENT:1.5 COARSE SAND :3 GRADED STONE AGGREGATE 20MM NOMINAL SIZE).
 7. REINFORCEMENT BARS SHALL BE TMT BARS CONFORMING TO IS:1786 LATEST REVISION.
 8. STRUCTURE STEEL USED FOR GRADING SHALL CONFORM TO IS:2062 LATEST EDITION.
 9. LAP/ANCHORAGE SHALL BE 50X DIA OF BAR.
 10. CLEAR COVER TO MAIN REINFORCEMENT SHALL BE AS FOLLOWS
 - a) FOOTING - 50MM
 - b) SLAB - 20MM
 - c) COLUMN-40MM
 - d) BEAMS - 25MM

PLAN OF SECURITY ROOM AND GATE



FRONT ELEVATION OF SECURITY ROOM & GATE

DOOR WINDOW SCHEDULE				
TYPE	SIZE	LEVEL	LINTEL LEVEL	TOTAL NOS
D1	900X2100	+0.450	+2.55	1
D2	750X2100	+0.450	+2.55	1
W1	900X1200	+1.350	+2.55	1
W2	2000X1200	+1.350	+2.55	2
V1	600X450	+2.100	+2.55	1



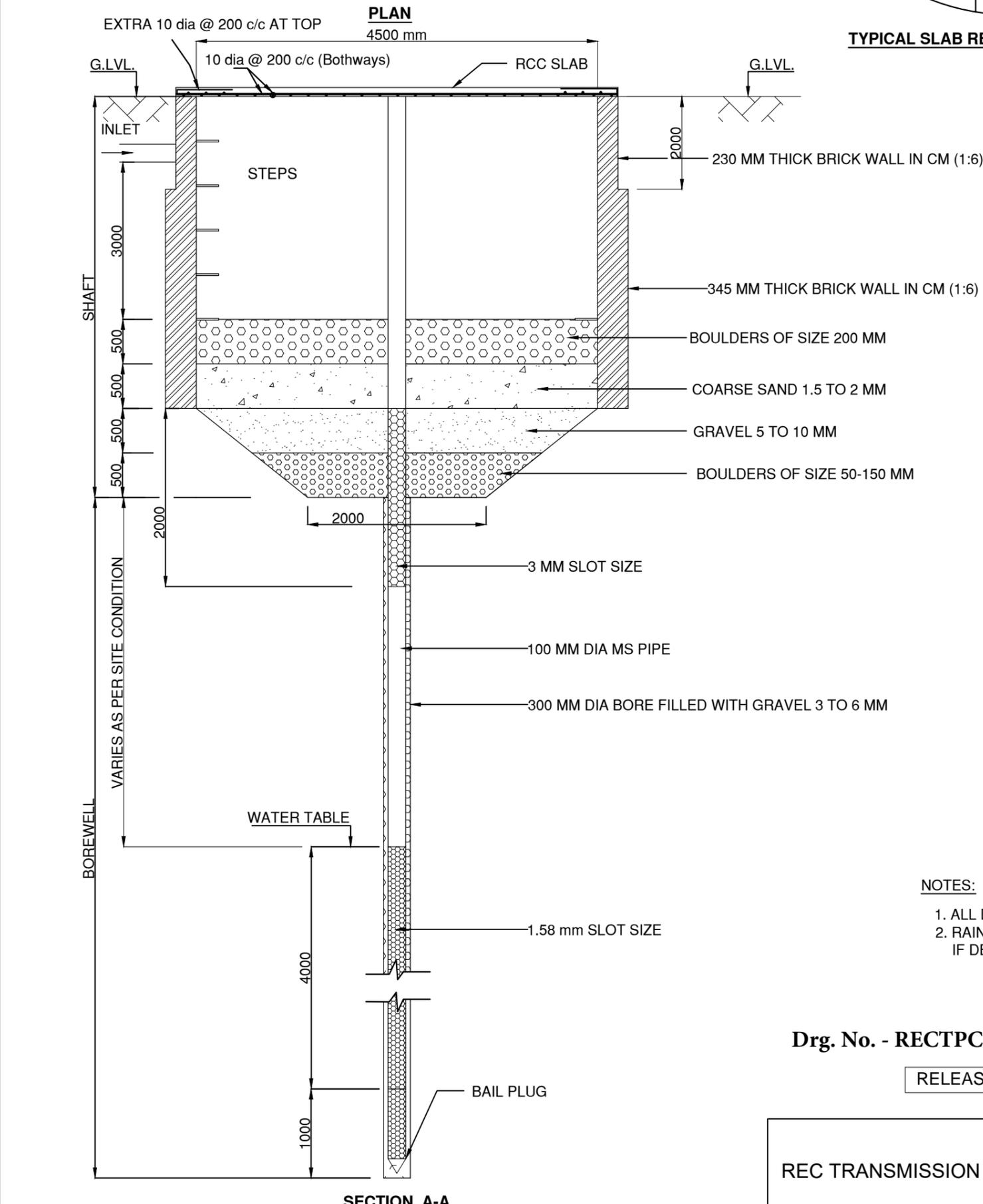
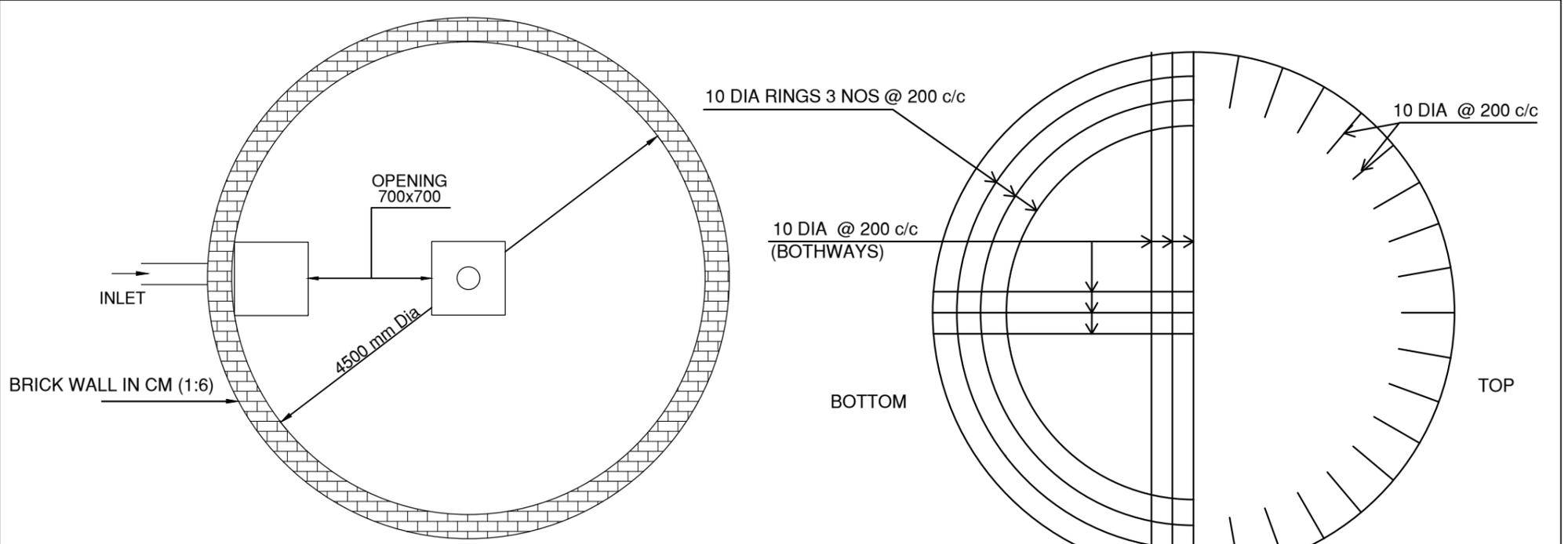
SOAK PIT PLAN

Drng. No. - RECTPCL/J&K/DRG/19

FOR TENDER PURPOSE ONLY

REC TRANSMISSION PROJECTS COMPANY LTD.

TITLE : SECURITY ROOM & GATE



TYPICAL SLAB REINFORCEMENT DETAILS

- NOTES:**
1. ALL DIMENSIONS ARE IN MM
 2. RAIN WATER HARVESTING SHALL NOT BE DONE IF DEPTH OF WATER TABLE IS LESS THAN 8.0 M

Drg. No. - RECTPCL/J&K/DRG/22

RELEASED FOR TENDER

REC TRANSMISSION PROJECTS COMPANY LTD.	
PROJECT :	STANDARD DRAWING FOR RAIN WATER HARVESTING
TITLE :	DETAILS OF RECHARGE STRUCTURE FOR RAIN WATER HARVESTING
NTS	

LIST OF PROPOSED SUPPLIERS/SUB-CONTRACTORS

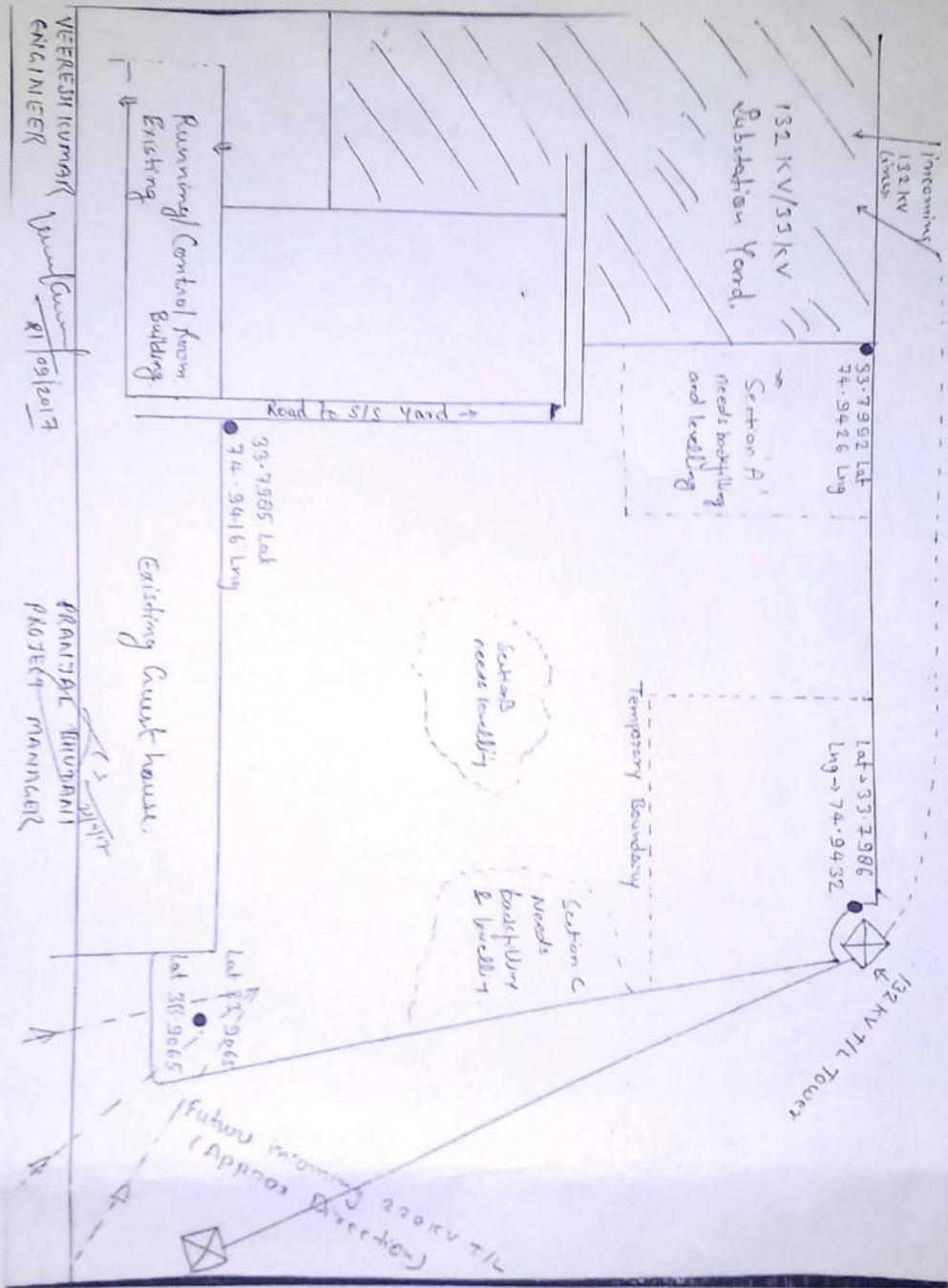
Sl. No.	DESCRIPTION OF EQUIPMENT	NAME OF THE SUPPLIERS
1	220/33kV Power Transformer	Toshiba/CGL/Bharat Bijlee/ABB/Siemens/BHEL/Kanohar/ EMCO/T&R
2	SHUNT REACTOR	CG/ALSTOM/Siemens/TBEA and Other Approved Vendor of POWERGRID
3	245kV Circuit Breaker	CGL/GE/ABB/Siemens/ALSTOM
4	245kV Capacitive Voltage Transformer	CGL/GE/ABB/Siemens/ALSTOM/BHEL/MEHRU
5	245kV Voltage Transformer	CGL/GE/ABB/Siemens/ALSTOM/MEHRU/SCT and Other Approved Vendor of POWERGRID
6	245kV Current Transformer	CGL/GE/ABB/Siemens/Mehru/ BHEL/ALSTOM/TOSHIBA/SCT and Other Approved Vendor of POWERGRID
7	245kV ISOLATOR	ABB /Siemens/GR Power/S&S/HIVELM/Switchgear & Structures
8	36kV ISOLATOR	ABB /Siemens/GR Power/HIVELM/Universal/Electrolites/Ultima/Switchgear & Structures
9	245 kV & 36kV Surge Arrester	Oblum/Lamco/CGL
10	Control & Relay Panel	Schneider/ABB/Siemens /GE India/BHEL/ALSTOM/ZIV/L&T and Other Approved Venders of POWERGRID
11	Substation Automation	Schneider/ABB/Siemens /GE India/ALSTOM/ZIV/L&T and Other Approved Vendor of POWERGRID
12	DIGITAL PROTECTION COUPLER	ABB/ALSTOM/ZIV-Spain/Siemens and Other Approved Vendor of POWERGRID
13	33kV HT Cable	KEI/Paramount/HAVELLS/Polycab/RPG
14	1.1 kV Power & Control Cables(PVC)	Polycab Cables/ KEI/Gemscab/Paramount Cables/Havells/RPG/ LASER and Other Approved Vendor of POWERGRID
15	1.1 kV XLPE Power Cables	KEI/ Paramount/Universal Gemscab/Krishna/Havells and Other Approved Vendor of POWERGRID
16	110V & 48V Battery	Amara Raja/Exide/HBL
17	110V & 48V Battery Charger	STATCON/HBL/Amara Raja/ Chabbl/Caldyne/Chloride
18	LT Switchgear	Vikas Engg./Unilec/ Jackson/SPACEAGE/Jasper/Nitya/BHEL/Maktel/Control & Switchgear and Other Approved Vendor of POWERGRID
19	LT Transformer	ABB/ TESLA/Toshiba/Technical Associate/East India/Vijay

20	33kV Indoor Switchgear (GIS Type)	Siemen Germany/Switchgear/CGL/ABB/L&T/Scheinder
21	132 & 220 kV INDOOR SWITCHGEAR (GIS TYPE)	ABB/GE/Siemens/NHVS/HYOSUNG/CGL

Note:

1. Contractor may propose new make/sub-vendor meeting technical (qualifying) requirement as stipulated in technical Specification for above mentioned brought-out items within 90 days from the date of NOA for approval of RECTPCL. The cost of assessment shall borne by contractor in case of new vendors as per RECTPCL requirement.

Layout of 132/33 KV Grid station Lassipora including proposed Site plan for 220/33KV, 160MVA GIS sub station. =>



Ex. Engr
TLM B Tnd.

TABLE - 3A-1

PARAMETERS OF GIS CT

**REQUIREMENTS FOR 220 kV CURRENT TRANSFORMER
FOR LINE/TRANSFORMER BAY**

No. of cores	Core no.	Application	Current ratio	Output Burden (VA)	Accuracy Class as Per IEC:	Min. Knee pt. Voltage V_k	Max. CT Sec. Wdg. Resistance (ohm)	Max. Excitation current at V_k (in mA)
5	1	BUS DIFF CHECK	1600-800/1	-	PX	1600/800	8/4	25 on 1600/1tap. 50 on 800/1tap.
	2	BUS DIFF MAIN	1600-800/1	-	PX	1600/800	8/4	25 on 1600/1tap. 50 on 800/1tap.
	3	METERING	1600-800/1	20	0.2S	-	-	-
	4	TRAN BACK UP/ LINE PRTN.	1600-800/1	-	PX	1600/800	8/4	25 on 1600/1tap. 50 on 800/1tap.
	5	TRAN. DIFF/ LINE PRTN.	1600-800/1	-	PX	1600/800	8/4	25 on 1600/1tap. 50 on 800/1tap.

**Protection cores shall be of accuracy class PX as per IEC 61869.
Metering Core shall be of accuracy class 0.2S as per IEC: 61869**

TABLE - 3A-2

REQUIREMENTS FOR 245 kV CURRENT TRANSFORMER

(For Bus Coupler bay)

Core no.	Application	Current Ratio	Output Burden (VA)	Accuracy class as per IEC:	Min knee point voltage V_K	Max. CT sec. Wdg esistance (ohms)	Max. Excitation current at V_K (in mA)
1	Protection	2500-1600- /1	-	PX	2500-1600	12.5 / 8	16 on 2500/1 25 on 1600/1
2	Protection	2500-1600- /1	-	PX	2500-1600	12.5 / 8	16 on 3000/1 25 on 1600/1
3	Metering	2500-1600- /1	20	0.2S	-	-	-
4	Protection	2500-1600- /1	-	PX	2500-1600	12.5 / 8	16 on 3000/1 25 on 1600/1
5	Protection	2500-1600- /1	-	PX	2500-1600	12.5 / 8	16 on 3000/1 25 on 1600/1

Protection cores shall be of accuracy class PX as per IEC 61869.

Metering Core shall be of accuracy class 0.2S as per IEC: 61869

Annexure-5 to Amendment-5

REQUIREMENTS FOR 33kV CURRENT TRANSFORMER

Core no.	Application	Current Ratio	Output Burden (VA)	Accuracy class as per IEC
CT RATIO REQUIREMENT FOR 33kV LINE FEEDER				
1	Protection	1200-600/1	-	PX
2	Protection	1200-600/1	-	PX
3	Metering	1200-600/1	20	0.2S
CT RATIO REQUIREMENT FOR 33kV TRANSFORMER FEEDER				
1	Protection	1600-800/1	-	PX
2	Protection	1600-800/1	-	PX
3	Metering	1600-800/1	20	0.2S
CT RATIO REQUIREMENT FOR 33kV BUS SECTIONALIZER				
1	Protection	2500-1600/1	-	PX
2	Protection	2500-1600/1	-	PX
3	Metering	2500-1600/1	20	0.2S

Core no.	Application	Current Ratio	Output Burden (VA)	Accuracy class as per IEC
CT RATIO REQUIREMENT FOR 33kV LT TRANSFORMER BAY				
1	Protection	100-50/1	-	5P20
2	Protection	100-50/1	-	5P20
3	Metering	100-50/1	7.5VA	0.2S

Annexure - 6 to Amendment-5

PARAMETERS OF CURRENT TRANSFORMER INCLUDING BUSHING CT

Description	Current Transformer Parameters (Transformer)			
	HV Side	HV Neutral Side	LV 1 & 2 Side	LV 1 & 2 Neutral Side
(a) Ratio				
CORE 1	1000/1	1000/1	1600/1	1600/1
CORE 2	600/1	-	1600/1	-
(b) Minimum knee point voltage or burden and accuracy class				
CORE 1	600V, PX / PS	600V, PX / PS	1600V, PX / PS	1600V, PX / PS
CORE 2	0.2 Class 15VA ISF \leq 5	-	0.2 Class 15VA ISF \leq 5	-
(c) Maximum CT Secondary Resistance				
CORE 1	2.5 Ohm	2.5 Ohm	4.0 Ohm	4.0 Ohm
CORE 2		-	-	-
(d) Application				
CORE 1	Restricted Earth Fault	Restricted Earth Fault	Restricted Earth Fault	Restricted Earth Fault
CORE 2	Metering		Metering	-
(e) Maximum magnetization current (at knee point voltage)				
CORE 1	100 mA	100 mA	25 mA	25 mA
CORE 2		-	-	-