

North Western Railway - Jodhpur Division - Electrical/G Department					
Schedule of Rate & Quantities					
Name of work:- Electrical work in connection with (a) Construction of 01 no. pit line with associated facilities at Barmer. (b) Essential infrastructure facilities for SPART, BME and allied facilities at Barmer.					
S. N.	Description of Item	Unit	Qty	Rate	Amount (Rs)
1	Supply,installation,testing & commissioning of MDB with three phase electronic Energy meter,digital ampere meter with CT, selector switch, suitable digital voltmeter and indication lamp with following incoming & outgoing Incoming- MCCB 4 pole 400A,35KA 2 Nos. Outgoing- MCCB 4 pole 250A,35KA-06Nos.	Nos	2	251730.77	503461.54
2	L.T. Panel-I Manufacturing, supplying, testing and commissioning of wall/floor mounted (as per site requirement) LT Distribution board with 01 No. 200 Amp. 4 pole 415 Volt, 50 Hz, thermal magnetic MCCB as incoming and 02 No.100 Amp. 4 pole MCCB, 03 Nos. 40 Amp. 4 pole MCCB as outgoing. .(As per Specification attached)	Nos	4	75784.33	303137.32
3	Supply. fixing, testing and commissioning of TPN DB 8-way with provision of incoming MCCB of 125A,IP 43/IK09, double door at suitable locations.	Nos	6	14474.29	86845.74
4	Supply & Fixing of MCB to be provided in the MCBDB given above including supply of material as required & as per specifications attached.				
	i) MCB (SP-) 6-32 A	Nos.	84	225.67	18956.28
	ii) RCCB - 25 A/30mA	Nos.	44	2379.24	104686.56
	iii) MCB(TPN)-63A	Nos	8	1974.02	15792.16
	iv) MCCB 4-pole 100/125A, 25 KA	Nos	6	13033.26	78199.56
5	Supply and Fixing Re- roll plug socket 20 A with single pole 20A MCB & Re-roll plug top and as per specification.	Nos	20	841.47	16829.4
6	Supply. fixing, testing and commissioning of SPN DB 8-way with provision of incoming MCB of 63A,IP 43/IK09, double door at suitable locations.	Nos	24	2405.69	57736.56
7	Supply, fixing, testing and commissioning of RCBO 25A,RCBOdouble pole, 30mA with Earth leakage, overload and short circuit protection as per spec	Nos	12	2154.58	25854.96
8	Supply, fixing, testing and commissioning of RCBO 63A,RCBO Four pole, 30mA with Earth leakage, overload and short circuit protection as per spec	Nos	5	3266.34	16331.7
9	Supplying., laying of GI pipe size 50 mm dia. B class as per IS1239 for cable use as per specification enclosed	Mtrs	100	323.17	32317
10	laying cable in Air/Wall/Pole with fixture(02 nos. per mtrs) as per specification	Mtrs	1500	22.83	34245

11	Supply and laying of HDPE pipe conforming to IS 4984:1995, 50 mm dia, wall thickness 3 mm, PN 6 under the road. The work involves laying of HDPE pipe.	Mtrs	1600	92.58	148128
12	Digging and filling of trench size 0.4 x 0.8 mtr as per spec ( trench work may be on kuchcha/ pucca land and all type of soil as per site requirement and without protective layer of brick). Surface of trench shall be made good in all respect and satisfaction of site engineer.	Mtrs	1600	38.2	61120
13	Drilling of horizontal bore below track/road by pushing method for laying of RCC/HDPE/DWC pipe of various sizes (As per specifications)	Mtrs	250	1337.13	334282.5
14	Supply, erection and commissioning of auxiliary cable tray made from angle 35x35x5 mm and MS plate 35x5 mm to be fixed on already grouted MS bolts on the pillar/ platform or washing line of 260 mm vide & (as per technical specification attached.)	Mtrs	800	460.37	368296
15	Supply & laying of HDPE pipe, dia 160 mm under road/ground/floor/railway track or as per site requirement in already excavated trench. (As per specification)	Mtrs	400	741.75	296700
16	Laying, connecting & commissioning of cable in pipe/trench etc. with complete lug, glands & transportation of cable etc. as per specification	Metre	400	234.15	93660
17	J' type cable route marker made of cast iron as per approved Railway drawing.	Nos	16	208.01	3328.16
18	Supply of material & wiring of sub-main with 2x6 sq mm PVC insulated multi-strand ( 84 / .30 mm ) copper conductor cable in existing laid ( surface / recessed ) PVC conduit pipe and continuous running of PVC insulated copper earth wire of 1 Sq.mm. as per specifications attached as required.	Mtr	60	117.72	7063.2
19	Supply of material & wiring of sub-main with 2x4 sq mm PVC insulated multi-strand ( 56 / 0.3 mm ) cooper conductor cable in existing laid ( surface / recessed ) PVC conduit pipe and continuous running of PVC insulated copper earth wire of 1 Sq.mm. as per specifications attached as required.	Mtr	460	83.31	38322.6
20	Wiring of main (for individual qtr.) with 2x4 sq mm 56/.30 PVC insulated multi-strand copper cable in 19/20 mm dia MS conduit pipe to be fixed properly with saddles, gutties & other fixtures and continuous running of PVC insulated copper earth wire as per specifications attached. Including supply of material as required.	Mtr	30	122	3660
21	Supply of material & wiring of sub-main with 2x2.5 sq mm PVC insulated ( 36 / 0.3 mm ) multi-strand copper conductor cable in existing laid ( surface / recessed ) PVC conduit pipe and continuous running of PVC insulated copper earth wire of 1 Sq.mm. as per specifications attached as required	Mtr	700	65.43	45801

22	Supply and Fixing of 20 mm dia medium class P.V.C. Pipe along with accessories as required in recess on walls/roof properly including cutting of wall /roof and making good the damages as per specifications attached.	Mtr	800	76.18	60944
23	Supply and Fixing of 20 mm dia medium class PVC Pipe along with accessories as required in surface on walls/roof properly with saddles and wooden gutties etc. complete as per specifications attached.	Mtr	300	49.91	14973
24	Supply of material and wiring of LP/TP/FP/Ex.Fan point with 1.5sqmm PVC single core multi-stranded copper wire insulated concealed in stone/brick masonry wall in 19/20 mm PVC conduit with 1.5sqmm PVC wire insulated copper for earth wire 1-way/2-way switch 5/6A as required and good quality ceiling rose including connection (MODULAR) as per spec	Nos	200	372.09	74418
25	Supply and fixing 5/6A plug 5-pin 230V with switch, board and wiring with 2.5sqmm PVC CU cable as per spec.	Nos.	140	194.69	27256.6
26	Supply and fixing 15/16A power socket with switch on flush type sheet metal box and connection as per spec	Nos.	35	193.67	6778.45
27	Supply and fixing ceiling of fan regulator electronic type 5-step as per spec	Nos.	60	322.1	19326
28	Supply and fixing 12 module plate for fixing of switches and sheet metal box of good quality concealed fixing of MS/PVC	Nos.	81	242.59	19649.79
29	Supply and fixing 8 module plate for fixing of switches and sheet metal box of good quality concealed fixing of MS/PVC	Nos.	40	220.16	8806.4
30	Supply and fixing 6 module plate for fixing of switches and sheet metal box of good quality concealed fixing of MS/PVC	Nos.	80	167.16	13372.8
31	Supply and fixing 4 module plate for fixing of switches and sheet metal box of good quality concealed fixing of MS/PVC	Nos.	40	131.26	5250.4
32	Supply and fixing 2 module plate for fixing of switches and sheet metal box of good quality concealed fixing of MS/PVC	Nos.	34	86.19	2930.46
33	Supply, fixing and connecting modular type exhaust fan 225/250mm as per spec	Nos.	30	762.61	22878.3
34	Supply and providing pedestal fan 400mm sweep as per spec	Nos	8	1999.58	15996.64
35	Supply, fixing, testing & commissioning of three phase Electronic KWH meter make HPL Long Range meter model no. TPPB1U2314 or similar model (as per specifications attached) complete and earthed properly including supply of material.	Nos	2	13672	27344
36	Supply of material & commissioning of PVC casing capping 25X12 mm with accessories for surface wiring as per specification.	Mtr	1200	22.95	27540
37	Supply, testing, fixing & commissioning of Exhaust fan 300 mm sweep 1440 RPM and as	Nos	11	2167.35	23840.85

	per specification attached.				
38	Supply, Testing & Fixing of wall mounted cabin fan with regulator three speed, suitable for 220-230 volt ,50HZ AC supply .Model No-Media BW 04 of Bajaj or similar to Usha/ Crompton Greaves /Philips .	Nos	16	1842.88	29486.08
39	"B" Class 50 mm dia GI pipe earth Station with digging pit & refilling with charcoal & salt as per specification.	Nos	25	1300.64	32516
40	Inspection Chamber with cover as per specification	Nos	25	362.76	9069
41	Supply & laying of earth connection from earth electrode with 4 mm GI wire properly fixed on wall with wooden gutties etc. as required.	Mtrs	250	11.01	2752.5
42	Supply and making connection of 3 Core 2.5 sq. mm PVC Copper Circular Sheathed Cable with Rigid Conductor as per spec	Mtr	800	110	88000
43	Supply fabrication, erection, testing and commissioning of G.I. octagonal pole 5 mtrs. long double arm suitable for street light fixture, 2 x 14w/4 x 14 w including digging of pit, making foundation and muffing with cement, concrete 1:2:6. As per specification.	Nos	15	9785.24	146778.6
44	Supply, fixing, testing and commissioning of fabricated Feeder Pillar distribution box made of MS sheet 1.6mmthick size 600x300x600mmwith suitable MS stand Copper bus bar of 200Acapacity and 2x63A MCB 4pole as per spec	Nos	4	5406	21624
45	Assembling, fixing, hanging and making connection of Surface pendent mounted box type tube light fitting/street light fitting as per specification.	Nos	160	68.59	10974.4
46	Supplying, fixing ,testing & commissioning Automatic operation street light timing switch box having lighting control (on-off) through astronomical calculation and pre-wired with suitable size of contactors, copper conductor etc. at specified locations as per specification attached and Similar to model no 04764 of LEGRAND make or similar of Siemens/ABB.	Nos	1	19621.47	19621.47
47	Submersible pump set ISI marked minimum 224 mtr head with maximum OD 142mm submersible cable size length 3 mtr 2900 RPM , capacity 15 HP suitable for operation on 415 volt +/- 5%, 3 phase, 50 hz conforming to IS 8034-2002 or latest, 2 inch (50mm) outlet, Make- KSB model UQDs 182/20 or similar.	Nos	1	43434	43434
48	Supply of ISI mark, energy efficient submersible pump motor set 10 HP 20 Stage ,415 volt AC , three phase , H/Range 100-186 mtrs , discharge 233-83 LPM , del.size 50 mm,SD ,suitable for 150 mm borewell water lubricated type, confirming To IS no.8034/2002 or latest . Accepted make:-	Nos	1	40761.92	40761.92

	KSB,CG,CRI, or similar.				
49	Design, manufacture, Supply, fixing, testing & commissioning of Fully automatic type Star Delta Starter panel for Submersible pumps Of Model No.MUG-20 Relay Range 13-21 of L&T or Similar model of BCH,C&S	Nos	2	9179.12	18358.24
50	Design, manufacture, Supply, fixing, testing & commissioning of Fully automatic type Starter panel for Submersible pumps Of Model No.MU G10 DOL Relay range 13-21of L&T or Similar model of BCH,C&S	Nos	2	9090	18180
51	Supply and drawing of PVC insulated 3 core sheathed Flat copper submersible cable 1100 volt grade conf. to IS: 694/1990 with latest amendments, size 6 sq mm. Approved make list is attached.	Mtrs	200	283.43	56686
52	Supply of 5 HP/ 3.7 kW Submersible energy Efficient pump set (3 star or Above) 3- Phase , 415 V AC, Discharge Head: 100 mtrs, Number of stage : 11 , ISI Marked Submersible cable 4 core flat with copper conductor to IS 694 :- Yes,Control Panel with starter, ISI marked MCB /main switch , ammeter, voltmeter and water level indicator, single phase preventer, Bore size:- 150mm, Delivery size: 40 mm as per spec	Nos	1	29029	29029
53	Supplying, connecting, fixing and lowering of GI pipe 2" Dia ISI marked medium density within the tube well / UG tank including supply & fixing of suitable size accessories like flange ,safety clamp , cable clamp, pipe fittings, bends, socket etc. as required and excluding flat copper cable. This work is to be replaced with existing work and released GI pipe shall be deposit in the store of site supervisor. Approved make list is attached.	Mtrs	50	533.29	26664.5
54	Battery Charging rectifier set complete with all accessories having, earthing connection and masonry works e.t.c. as required. at site. The Rectifier set shall have 2 set of Knife Switches as outgoing as per specifications attached Input- 3 phase 415 Volts A.C. Output -110 volt to 150 volt 200 Amp. D.C.	Nos	2	217378.8	434757.6
55	Supply of material, fabrication, installation and commissioning of Rolling in Examination lighting MS box of suitable dimensions as per specifications attached at specified locations.	Nos	46	5752.2	264601.2
56	Fabrication, supply, fixing and commissioning of Battery charging board /box emergency terminal box two ways outdoor type as per RDSO Drg. No. SKE-3929 as per specifications attached.	Nos	41	827.6	33931.6
57	Supply, erection, testing and commissioning of pre-cooling points having BCH 500 volt 63 A plug switch unit combined set (male-female both) including aluminum four pole bus bar chamber of 250 Amps capacity complete inside MS enclosure having suitable design for	Nos	25	17361	434025

	incoming and outgoing 3 ½ core 120 sq. mm XLPE cable with earthing of the pre-cooling point as per the detailed technical specification and site requirement this item includes the supply of 63 amp. MCCB 4pole. size of MS box (70 x40x30mm)as per site requirement and drawing.				
58	Supply fixing, testing commissioning of 15 kVA 415/48 Volt 3 phase copper wound VPI dry type transformer as per specification.	Nos.	6	61914.24	371485.44
59	SITC of under LED BASED PIT LIGHT FITTING 16/20W, SUITABLE FOR 48-72 VOLT, SINGLE PHASE AC SUPPLY, INGRESS PROTECTION IP-67, input voltage : 48 V AC +/- 10%, Power factor : > 0.90, LED matrix : 12 LEDs matrix, Approximate light output : 1300 - 1400 lumens,high impact resistance i.e. IK10, IP67 or similar to IR-GOLD-C1 of M/s Goldwyn Limited	Nos.	300	1532.82	459846
60	Supply, erection, testing and commissioning of outdoor feeder pillar consisting of copper bus bar 200Amp with LED type indication lamp for RYB in incoming side in a CRS sheet with double door provision & locking arrangement. The panel shall be consist of :I/C: 1X100AMCCB 4P 35KA with multifunction energy meter with 100/5ACTs, outgoing: 2X63AMCB TPN 10KA,4x32A MCB TPN 10KAsize:800mmX600mmX375mm approx, sheet :1.6mm thick, Angle:40x40x6mm, Channel:75X40mm) on the brick pedestal "	Nos.	10	30373.59	303735.9
61	Supply & erection suitable enclosure duly painted for protection of Pit light fitting made of MS angle iron size25mmX25mmX3mm & MS wire mesh 25 mm 25mm x dia. 2 mm.	Nos.	300	445.95	133785
62	SITC of 22 Watt catwalk LED light fittings as per thefollowingdescription/specification/dimensio ns. i) Dimension of the fitting (in mm): L-290 X B-210 X H-75 ii) Housing: PDC aluminium iii) Mounting: Surface/recessed iv)Voltage: 48volt AC +/-10% v) Wattage:22 watt+/-10% vi)IP-67 vii) IK-10 viii) LED type: SMD ix) Protection: Reverse polarity protection, Short circuit protection, Open circuit protection	Nos	300	2001.16	600348
63	Supply, install, test & commissioning of load change over switch in steel sheet enclosure 630 Amp. ( as per specification)	Nos	1	23879.79	23879.79
64	Supply, install, test & commissioning of load change over switch in steel sheet enclosure 250 Amp. ( as per specification)	Nos	3	11927.99	35783.97
65	Supply of Phenolic top sheet wooden board size 7" x 4" with one no. 5x15 amp switch socket combined & one nos. 5 amp switch ISI mark make- Anchor/Vinay/ABB/Cona/Legrand as per specification	Nos	50	135	6750
66	Supply of Phenolic top mobile charging wooden board size 6"x15" fitted with 4 nos. switch & 4 nos. socket of 6 amps with internal	Nos	80	348	27840

	wiring of 1.5 sq. mm with base plate of both side particle board for mobile with hanging clip as per specification				
67	Supply, installation, testing & commissioning of cable junction boxes IP 65 of various cable sizes with metric knockouts for cable entry Box dimensions (LxBxH) (mm): 200x160x98 with 100 Amp copper bus bar including other required materials for fixing, mounting & masonry work if required.	nos	25	3187	79675
68	Supply, fabrication, installation & commissioning of junction box for through cable & tapping of fittings with gland & 25x3mm strip. As per specification	nos	1000	301.45	301450
69	Supply, fabrication, installation & commissioning of junction box with "B series MCB and RCCB for incoming supply control. As per specification	nos	80	1985.15	158812
70	Supply, fixing of PVC cable duct 40X60 (W X H) 1M STD slot greenish gray of standard make. As per specification	mtr	1400	82.72	115808
71	Supply, installation, testing & commissioning of (150 mm width x 50 mm depth x 1.6 mm thickness) perforated Hot Dipped Galvanized Iron Cable Tray (Galvanization thickness not less than 50 microns) with perforation not more than 17.5%, in convenient sections fixed with MS Angle frame duly painted of 35 mm x 5 mm thick and all hardware complete in all respect.	mtr	20	699.99	13999.8
72	Supply, installation, testing & commissioning of (100 mm width x 50 mm depth x 1.6 mm thickness) perforated Hot Dipped Galvanized Iron Cable Tray (Galvanization thickness not less than 50 microns) with perforation not more than 17.5%, in convenient sections fixed with MS Angle frame duly painted of 35 mm x 5 mm thick and all hardware complete in all respect	mtr	20	649	12980
73	Supply of Three Phase FRP Telescopic Earth / Discharge Rod Length 15/18 Feet in three Steps ,Discharge Range 11 KV to 132 KV , Manufactured from high Quality Epoxy Resin in automatic Pultrusion Plant ,Strong and Sturdy, Super Smooth Glossy Finish Prevent Moisture, Excellent Dielectric Strength, Equipped with FRP/Rubber insulator to increase Creepage distance, bottom provided with slip resistance rubber grip, canvas cover bag for protection of equipment, Tested as per IS & IEC Standard, HT /LT Discharge Rod Short Circuiting Rod for 11to 33 KV, Voltage: 11 KV, 22 KV, 33 KV, 132KV, Weight 05 Kg. Makes/Brands: ESAFE/National/Kusum-Meco	Nos	6	10092.5	60555
74	Supply, fixing, testing and connecting of wall mounted heavy duty Air Circulator of 24"(600mm) size with built in 3 speed regulator, delivers Air 280Cu.m/min, similar to M/s Almonard make with all accessories	Nos	15	9357.61	140364.15

	complete confirming to IS specification with latest amendments. The Air Circulator is to be fixed by suitable MS clamps of size 50x50x6mm / flats of size 40x6mm with bolts and nuts etc., complete as desired by site engineer.				
75	Supply, fixing, testing & connecting of LED backlit single sided signage boards withn IP-65 CRCA housing, vinyl print on acrylic sheet which is backlit with high grade, high brightness LED modules, inbuilt SMPS driver, without battery backup, operating voltage 80v-270V AC, life period >50000 hrs, LPM technology, including fabrication and supply of clamping arrangements as desired by site engineer.	Sqft	40	1419.86	56794.4
76	Bosch Fibre Body Handheld Electric Blower, as per spec	Nos	6	6798.26	40789.56
77	PVC insulated armoured Cable 3x10sqmm	mtrs	200	612	122400
78	Tool kit for maintenance of portable generator set as per make of Gen. set	Set	2	15000	30000
					<b>79,24,394.05</b>

CTA/W/JU

ADEE/JU

Sr.DEE/G/JU



## **TECHNICAL SPECIFICATION**

**Name of Work: Electrical work in connection with (a) Construction of 01 no. pit line with associated facilities at Barmer. (b) Essential infrastructure facilities for SPART, BME and allied facilities at Barmer.**

All the work shall be carried out as per IE rules & regulation and also as per IS-732 Code of practice for Electrical Wiring Installation.

All electrical installations works shall conform to relevant Indian Standard Code of Practice and carried out as per relevant safety code of Practices, Guide for Safety Procedures in Electrical work as per I.S 5216/Pt.I& II /1982 shall be observed.

### **1. SCOPE OF WORK INVOLVES**

1.1 The Electrical work shall be carried out as per standard at BME and associated locations over JU Division to the satisfaction of Railways.

1.2 Any damage to building or railway property should be made good to the satisfaction of railway by contractor; else it will be recovered by contractor.

1.3 The list of standard and approved make of equipment and other items is enclosed in tender document. After completion of Electrical work the contractor will undertake the Civil Engg Work to repatch the wall plaster and fill up the recesses etc. in the wall occurred during dismantling of old wiring and rewiring/fitting of the same.

### **NOTE- INSPECTION OF MATERIAL-**

1. The major/high value items costing more than Rs 5 lakh shall be inspected by RITES or as decided by Sr.DEE/G/JU. Inspection shall be at manufacturer's premises to conduct the test, if necessary. Contractor shall provide all necessary assistance in carrying out test.

2. The inspection charges for RITES inspection shall be borne by Railways.

3. For remaining items sealed samples should be submitted by contractor/supplier to site engineer. He will submit the samples with sample register and get it approved from ADEE/ DEE/Sr.DEE.

4. Any sample, if necessary, may be sent by Railway's representative to manufacturer/test house for ascertaining originality /parameters as per specifications and cost of test shall be borne by the contractor. Pre commissioning test if needed on various equipment may be carried out jointly by the contractor.

### **1. Standard Specification**

Wherever a reference to any I.S. specification appears in this tender paper, the same shall be taken as a reference to the latest version of the said specification.

### **2. Standard Makes -**

(i) All Items endorsed by BEE under star rated labeling scheme should be of 3 star or above rated.

(ii) Items not covered in above para should be ISI marked of reputed brand and as per technical specifications given in tender document. List of applicable IS codes is attached. The contractor has to supply & provide ancillary materials such as nut, bolt, clamps, brackets etc required for the work even if they are not mentioned in the tender schedule.

(iii) If any disputes arise during execution, then decision of Sr.DEE/G/JU/NWR will be final & binding upon contractor. For any contradiction in schedule of rate and specification; decision of Railway authority will be final & binding to contractor as per railway requirement.

(iv) The unit rate in the rate schedule includes supply, installation, testing, & commissioning including all contingent material if not specified in the rates schedule.

(v) Electrical works shall be carried out by the contractor in supervision of the railway Engineers and contractor shall inform the railway representative before starting the work. All the hidden work i.e. foundation work, laying of cables etc. shall be carried out in the presence of railway supervisor / representative.

Technical specification details NS wise is being given as below:-

N.S.	Description of Item
NS 01	<p>1. The contractor shall have to design, supply, install, testing &amp; commissioning the Main distribution board 400Amp capacity. The main distribution board shall be fabricated out of 2mm thick MS sheet and standard angle/channels as required in design.</p> <p>2. The main distribution board shall be pillar type, cubical type self-supporting floor mounted dust &amp; vermin proof. The board should be with hinged doors &amp; locking arrangements at the front &amp; bolted for hinged cover at either side/back side. It should also be provided with bottom opening of removable gland plates. The board should be suitable for 3 phases, 4 wires, 415 volt 50 cycle AC supplies. The board shall be treated with rust protection such as degreasing, phosphating &amp; painted with two coats of red oxide primer &amp; final two coats of leaf green paint.</p> <p>3. The bus bar shall be electrolytic tinned copper having cross section area as main bus bar of MDB 300mm<sup>2</sup> &amp; branch bus bar 200mm<sup>2</sup> respectively. The bus bar shall have to be suitably mounted with PVC sleeve/taps.</p> <p>4. The contractor shall have to submit the design &amp; dimensional drawing of the distribution board for approval before fabrication.</p> <p>5. Adequate space inside the board shall be provided for bus bar, the cable alley shall be provided to accommodate the incoming &amp; outgoing cables separately in a proper manner. Knock out gland plates as applicable shall be provided in the distribution board for incoming &amp; outgoing cable.</p> <p>6. Circuit identification &amp; cable size by means of engraved on poly prop lane sheet as approved by Rly. shall be provided.</p> <p>7. All power connection shall be secured adequately with spring washer, flat washer, bimetallic washer wherever applicable, G.I. bolts, tinned brass washer. Caution board &amp; danger notice in English &amp; Hindi shall be provided &amp; shall be of metallic type approved by Rly.</p> <p>8. Minimum two earth terminal shall be provided &amp; a separate earth GI earth strip at the back side of distribution board minimum of 25x6mm shall be provided with two earthing terminals.</p> <p>9. The contractor shall arrange RITES inspection or specified by Railway from time to time.</p> <p>10. The contractor shall have to submit manufacturer test certificate of all the component used in the fabrication of the board and also submit the calibration test report of all the meters used in the board.</p> <p>11. Main distribution board shall be provided with incoming &amp; out going as under:  a) Incoming side- MCCB 4 pole 400 Amp. 35 kA = 02Nos. (with adjustable T&amp;M setting)  b) Outgoing side-. MCCB 4 pole 250 Amp. 35 kA = 06Nos. (with adjustable T &amp; M setting)</p> <p>12. The distribution board shall be provided with suitable 3 phase Electronic energy meter with CT, Voltmeter size (96x96mm) 0-500 Volt, LED type indication lamp for OFF &amp; ON &amp; trip on incoming side and Ampere meter (size 96x96mm) 0-300 Amp. With CTs on outgoing side.</p> <p>13. The distribution board shall be completed in all respect with wiring. The board shall be mounted above 1.1/2 to 2' (feet) above the ground level with cement concrete base with proper grouting.</p> <p>14. The distribution board shall be provided with standard cable entry for incoming &amp; outgoing cables &amp; suitable hole shall be drilled at site for accommodating the incoming &amp; outgoing cables. The bus bar shall be covered with PVC adhesive colored tape.</p> <p>Supply, fabrication, installation, testing and commissioning of LT panel. The drawings of the panel are to be got approved from ADEE/DEE/SrDEE/JU before fabrication. The make of switchgears, metering, measuring and indicating instruments shall be from the approved makes. The make and the particular model numbers shall be particularly mentioned in the drawings being furnished for approval.</p>

	<p><b>Techno Modular Enclosure:</b></p> <p>The techno modular enclosure shall be procured from the firm/manufacturer bearing CPRI test certificate.</p> <p>1.1 The enclosure shall bear techno modular construction, fully compartmentalized (if required), bolted construction (in order to enhance further on requirement).</p> <p>1.2 The main frame of the enclosure shall be built from 2mm CRCA and the doors and covers from 1.6 mm CRCA. The mounting plates shall be of 2mm thickness. Cable entry plates of 3mm. Lifting angles 75 x 75 x 6 mm.</p> <p>1.3 The enclosure shall be dust proof and vermin proof with IP protection for outdoor installation. Use of PU foam gasket shall be made to ensure proper IP protection.</p> <p>1.4 Temperature withstand capacity shall be as per relevant standards. Test Certificate from authorized agency may be asked to produce during factory inspection. The enclosure shall be resistant to mild acids and solvents.</p> <p>1.5 The enclosure shall be powder coated with epoxy based paint of 500 hours certified. The colour shall be of Grey structure finish for enclosure. The powder coating thickness shall be 65 to 80 microns.</p> <p>1.6 The enclosure shall comprise top cover, front door and rear door. Proper cuttings /openings shall be provided in order to operate the switchgears without opening any door. The metering and measuring instruments shall be provided in front properly flushed with the surface.</p> <p>1.7 The size of the enclosure shall be sufficient enough to incorporate all the components given below with proper clearance as per IER and latest standards keeping in view the safety aspect.</p>
NS 02	<p>Manufacturing, supplying, testing and commissioning of wall/floor mounted (as per site requirement) LT Distribution board 2 mm CRCA sheet steel fabricated, cubicle outdoor type IP protection, painted by one coat of red oxide primer and with two coats of synthetic enamel grey paint complete with top/bottom removable double compression cable gland plate as required, earth bus, hinged and lockable doors, dust and vermin proof, complete with all interconnections. Necessary wiring of LT panel shall be done with copper cable of adequate size &amp; control wiring by min. of 2.5 Sq.mm copper cable. The electrolytic Tinned copper bus bar shall be of suitable length 415 V, 3 phase 50 Hz, 200 A, suitable for four pole system as per relevant IS (latest version) insulated by heat shrinkable sleeves with shrouded joints. The instrument chamber shall be separate and comprise of flush type ammeter, voltmeter, selector switches, with CTs, feeder name plate and danger board on (approximate size of panel 1250mm x 950mm x 300 mm and electrolytic tinned copper bus bar of 25mm x 10mm for incoming MCCB and bus coupler and 20mm x 6mm for outgoing MCCB, earth bus of suitable size of electrolytic tinned copper)</p> <p><b>INCOMING:</b> MCCB – 01 No. – 200 amps, 4Pole, 36kA, Thermal setting -80-100% In or Magnetic setting 6-10In, Icu=Ics=100%. Similar to Cat No. CM92109OON1OG of L &amp; T.</p> <p><b>OUTGOING:</b> MCCB – 02 Nos. - 100amps, 4Pole, 36 kA, Thermal setting -80-100% In or Magnetic setting 6-10In, Icu=Ics=100% Similar to Cat No – CM92108OOL1OG of L&amp;T.</p> <p>MCCB - 03 Nos. - 40/63 amps, 4Pole, 25 kA, Thermal setting -80-100% In, Magnetic setting 6-10In, Ics=100% Icu Similar to Cat No – SL98615OOOO of L&amp;T.</p> <p>1 no. of 0-500 V, 96 x 96 mm square dial flush mounted voltmeter(digital) with selector Switches protective fuses in incoming.</p> <p>1 no. 96 x96 mm square dial flush mounted ammeter(digital) of suitable range with selector switches, CTs &amp; protective fuses, multi LED indication lamps on each incoming and outgoing feeder and 3 phase panel energy meter type CT-2M shall be provided with each outgoing feeder. This includes the shifting/termination/connection of existing supply from existing point to new point with complete lugs and glands etc.</p> <p>(a) Caution board in English/Hindi shall be provided of metallic type.</p> <p>(b) The contractor shall have to submit the design and dimensional drawing of the Distribution board for approval before fabrication.</p> <p>(c). The contractor shall arrange inspection/testing of the board when it is completed in all respected at his own cost.</p> <p>(d). Foundation of panel and trenching work is included upto the satisfaction of site supervisor.</p> <p>(e) Circuit identification by means of engraved on poly propylene sheet as per design approved by railway shall be provided. Note: - LT panel manufacturer shall have test reports</p>

	of CPRI or any NABL certified LAB.
NS 03	<p>Supply, fixing, testing and commissioning of TPN DB 8-way having provision for incoming MCCB of 125A, IP 43/IK09, double door enclosure for outdoor purpose and having provision for SP/TP MCB for outgoing-</p> <ol style="list-style-type: none"> <li>The DBs shall comply with IEC 61439.</li> <li>The DBs should have IP 43(double door) for indoor application and IP 54 for outdoor application.</li> <li>The DB shall have good quality gasket to provide IP 43 and IP 54 protection.</li> <li>It should be IK09 protection confirming to IS-8623 with latest amendments.</li> <li>The DBs should be made of CRCA steel with minimum thickness of 20 gauge.</li> <li>It should have factory made 125 amp copper bus bar assembly for mounting the MCB/MCCB</li> <li>It should have insulated neutral bar and bus bar assembly.</li> <li>The DB shall be supplied with all insulated N. Bar riveted on Din channel frame and should not restrict cable entry from top or bottom.</li> <li>It should be fixed on walls /Floor properly with nuts &amp; bolts /screws./Foundation as required.</li> </ol>
NS 04 (i)	<p>The contractor shall have to supply, Fixing of MCB (SP-) 6-32 A to be provided in the MCB DB including supply of material as required as per direction of site engineer.</p> <p>The MCB shall comply to IS:8828/IEC 60898.</p> <p>The MCB housing shall have unique property of di-electric strength, arc resistance, insulation, flame retardancy and temperature resistance.</p> <p>The MCB shall have Minimum Breaking Capacity of 10kA as per IS/IEC 60898.</p>
NS 04 (ii)	Supply, Fixing of RCCB to be provided in the MCBDB given above including supply of material as required -RCCB - 25 A/30mA
NS 04 (iii)	Supply, Fixing of MCB TPN to be provided in the MCBDB including supply of material as required & as per specifications attached-MCB(TPN)-63A
NS 04 (iv)	<p>Supply, installation, testing &amp; commissioning of 4-POLE MCCBs THERMO-MAGNETIC BASED: - 125Amps. MCCB rating should be confirming to IEC 60947-2.</p> <p>MCCB shall be capable of clearing faults up to <math>I_{cs} = 100\%I_{cu}</math></p> <p>This is to be installed in VTPN type metal double door type 8 way DB/LT panels /DB etc for outdoor purpose and complete in all respect as per direction of site engineer.</p>
NS 05	<p>Supply, install, test &amp; commission of box type metal clad plug &amp; socket of 20 Amps capacity.</p> <p>The metal clad socket shall be provided with 32 amps SP MCB "C" series 10kA confirms to IS: 8828:1996 or latest. The wiring shall be carried out with earth wire and to be tapped from available MDBs / SDBs etc or as per decided by the site engineer. The metal clad plug shall be fixed on the wall on 04nos. wooden gitties with suitable steel screws and washers etc as per direction of site engineer.</p>
NS 06	Supply, fixing, testing and commissioning of SPN DB 8-way with provision of incoming MCB of 63A, IP 43/IK09, double door at suitable locations as per direction of site engineer.
NS 07	Supply, fixing, testing and commissioning of RCBO double pole. Confirming to IEC 61009 or latest, sensitivity 30mA with connections capacity 25A, 230V or above, 50Hz AC on existing/separate main board as per site requirement. The RCBO to be connected in the existing/Separate board as per requirement by making proper connection in the main board and fixing the RCBO. Any alteration in the wiring of main board if required is to be done by the contractor. The features of RCBO should have inclusive of following features: (a) Isolation with positive break indication. (b) Immune to nuisance tripping due to transit over voltage (Lighting, switching surges) (c) Trip indication.
NS 08	RCBO: Supply, fixing, testing and commissioning of RCBO. Confirming to IEC 61009 or latest, sensitivity 30mA with connections capacity 63A, 4-pole, 50Hz AC on separate main board as per site requirement. The RCBO to be connected in the Separate board as per requirement by making proper connection in the main board and fixing the RCBO. Any alteration in the wiring of main board if required is to be done by the contractor. The features of RCBO should have inclusive of following features: Isolation with positive break indication. (b) Immune to nuisance tripping due to transit over voltage (Lighting, switching surges) (c) Trip indication.
NS 09	The contractor shall have to supplying, laying of GI pipe size 50 mm dia. B class as per IS1239 for cable use as per site requirement and supervision of site engineer.
NS 10	The cable shall be laid in Air/Wall/Pole/pipe with suitable fixture as per direction of site

	engineer.
NS 11	Supply and laying of HDPE pipe confirming to IS 4984:1995, 50 mm dia, wall thickness 3 mm, PN 6 under the road in already excavated trench. It involves supply and laying of HDPE pipe minimum at suitable depth. After laying of HDPE pipe, the trench should be refilled with same soil and restored to original position & pipe should be laid in trench such that possible to withdraw the cables for repair or replacement without disturbing the Railway work. The pipes shall be laid with a gradient to facilitate drainage of water and it shall be at right angle to the track. This above scope is including laying of cable in HDPE pipe also. The contractor shall have to submit manufacturer's test reports of HDPE pipe.
NS 12	Digging and filling of trench size 0.4 x 0.8 mtr as per spec (trench work may be on kuchcha/pucca land and all type of soil as per site requirement and without protective layer of brick). Surface of trench shall be made good in all respect and satisfaction of site engineer. The minimum width of trench for laying single cable shall be 0.4 m x 0.8 m in case of LT cable. The depth of trench is increase to 1.2 mtr in case of cable above 1.1 KV. Adequate precaution should be taken not to damage any existing cable, pipe or other such installation in the proposed route during excavation. The bottom on trench shall be level and free from stones, bricks bats etc. The trench shall then be provided with a layer of clean dry sand cushion of not less than 10cm in depth. The trench shall be than back filled in with excavated earth free from stone and other sharp edged debris and shall be rammed in successive layers not exceeding 30 cm up to top. The cable shall be protected by HDPE pipe as a protection cover. Where more than one cable is to be laid in same trench Horizontal formation of the cables laying should be such that inter axis distance between the cable must be 20 cm at least and brick is to be laid. No extra payment will be paid for laying more than one cable in one trench.
NS 13	Drilling of horizontal bore below track/road by pushing method for laying of RCC/HDPE/DWC pipe of various sizes. This item covers drilling of Horizontal bore by pushing method (trenchless technology) in all types of soil/rock for laying of RCC/HDPE/DWC pipe from 50 to 150 mm to 450 mm by pushing method in presence of Railway representative without disturbing the Railway track taking all necessary safety precautions related track and movement of trains. Horizontal boring will be done at minimum 1 Mtr. Below from ground level at railway track portion but in case, where bank height of track is high then boring should be such that outer side and under track RCC/HDPE/DWC pipes are in same alignment.
NS 14	The contractor shall to fabricate, supply, and fix the MS angle iron tray below the platform. The fixing arrangement shall be robust & the fixing shall have to done by fabricating of MS clamp nut bolts along with the rail poles. The cable tray shall be 200mm wide & both the outer side MS angle shall not be less than size 35x35x5mm. In case non availability of the required size higher size can be used. The cable tray shall be provided with as MS flat of size 35x5mm in between the MS angle by welding. The space in between the MS flats shall not be more than 15 cms. The cable tray shall be firmly fixed/supported on the existing rail pole/structure through MS angle iron clamps of higher size than the section of the angle of the tray with nut & bolts of suitable size. The clamp of MS flat shall be provided for holding the charging/precooling cable on the tray and should be bolted so that the cables can be straight. Spacing between clamps holding the cables shall be one mtr. Both cable tray and clamps shall be painted with one coat of red oxide and two coat of black. The design of the cable tray should be got approved before manufacture.
NS 15	This item covers supply & laying of HDPE pipe including laying of cable in HDPE pipe in already excavated trench/bore under road/ ground/floor/railway track etc. as per requirement with technical specification 160 mm dia (OD), wall thickness between 6.2 mm to 7.1 mm, material grade PE-80 and class of pipe should be PN-4 with confirming to IS:4984/1995 or latest. Make:-Sangir, Dutron, NOCIL, Hasti, Reliance, Supreme or equivalent. After laying of HDPE pipe, the trench/horizontal bore should be refilled with same soil and restored to original position & pipe should be laid in trench such that possible to withdraw the cable for repair or replacement. The pipe shall be laid in already excavated trench below the ground level with a gradient to facilitate drainage of water and it shall be right angle to the track. For each power line track crossings, contractor shall have to lay two length of pipe, for 02 Nos. of cable to be laid or as per direction of site engineer. Accessories related with laying of HDPE pipe like fittings, bends, joints/coupler, junction, flange, end cap etc. as per site requirement will be provided by contractor and no extra payment will be given for above items. The contractor shall have to submit manufacturer's

	test reports of HDPE pipe.															
NS 16	<p>Installation of cable underground include excavation of a trench of 40 to 45 cms in width and 1m depth(Suitable as per cable rating &amp; site requirement) shall be made and while laying the cable a layer of sand 8cms Thickness should be placed at the bottom of trench and then the cable should be laid over it. After laying the cable a layer of 17 cm thick sand should be placed above the cable and then for mechanical protection good quality of brick/RCC cover should be placed on both sides and top i.e. 18 bricks per meter, After doing this, trench can be filled up with solid/sand available there by. Brick partition also shall be provided under the trench between the two cables.</p> <p><b>Depth-</b> The desired minimum depth of laying from ground surface to the top of cable is as follows:-</p> <p><b>Minimum Depth</b></p> <table><tr><td>High Voltage cables, 3.3 KV to 11 KV rating</td><td>:</td><td>1 m</td></tr><tr><td>High voltage cables, 22 KV, 33 KV rating</td><td>:</td><td>1.05 m</td></tr><tr><td>Low voltage and control cables</td><td>:</td><td>0.75 m</td></tr><tr><td>Cables at road crossings</td><td>:</td><td>1.00 m</td></tr><tr><td>Cables at railway level crossings (measured From bottom of sleepers to the top of pipe)</td><td>:</td><td>1.00 m</td></tr></table> <p>The duct/pipe joints should be covered by collars to prevent settlement of in between pipes. It may be desirable to leave a pilot wire inside the duct.</p> <p>The diameter of the cable conduit or pipe or duct should be at least 1.5 times the outer diameter of the cable. The ducts/ pipes should be mechanically strong to withstand forces due to heavy traffic when they are laid across road/railway tracks.</p> <p>Cables below Railway crossing- When the cables are laid under railway tracks the cables should be laid in reinforced spun concrete or cast iron or steel pipes at such depths as specified in the track crossing regulations-1987 but not less than 1 m measured from the bottom of sleepers to the top of the pipe. In the case of single-core cables the cast iron or steel pipes should be large enough to contain all the three single core cables forming the circuit in the same pipe.</p> <p>When the cables are laid under the tracks, the same shall be laid as per the track crossing regulation 1987.</p> <p>All cables should be properly terminated with standard size of lugs.</p> <p>Before and after laying the cable the I.R. value should be checked, all the instruments for testing shall be arranged by the contractor.</p> <p>Armouring of cable should be earthed at both the ends.</p> <p>Wherever the cables emerge out of ground at least one loop of sufficient radius should be provided under the ground.</p> <p>While laying the cable it should be ensured that no obstruction should come in way like drainage power cables, telecommunications cables, etc. The water logging area should be avoided. Wherever the cable routs changes or takes a turn a cable marker of approved design should be provided.</p> <p>While terminating the cable to the overhead rail pole a 3 meter long 100 mm dia heavy duty _B' class GI pipe is also provided on each Rail pole. One end of which should be grouted in the two muffing and the other end of which should be provided with PVC bushing. M.S. flat clamps of size 40 x 6mm shall be provided to secure the pipe.</p> <p>The cable other than overhead track crossing be along the wall/pole above the ground level and floor level should be protected by G.I. pipe up to a height of 1.5 mtrs of suitable dia to prevent the cable from external damage.</p> <p>After completing laying of cable as per above instructions remaining refilling of the trench with soil as above proper ramming and surfacing similar to surrounding should be done by contractor to the satisfaction of railway.</p>	High Voltage cables, 3.3 KV to 11 KV rating	:	1 m	High voltage cables, 22 KV, 33 KV rating	:	1.05 m	Low voltage and control cables	:	0.75 m	Cables at road crossings	:	1.00 m	Cables at railway level crossings (measured From bottom of sleepers to the top of pipe)	:	1.00 m
High Voltage cables, 3.3 KV to 11 KV rating	:	1 m														
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Low voltage and control cables	:	0.75 m														
Cables at road crossings	:	1.00 m														
Cables at railway level crossings (measured From bottom of sleepers to the top of pipe)	:	1.00 m														
NS 17	Supply and fixing of J' type cable route marker made of cast iron as per site requirement. Drg. Should be approved before supply.															
NS 18	Supply of material & wiring of sub-main with 2x6 sq mm PVC insulated multi-strand copper conductor cable in existing laid (surface / recessed) PVC conduit pipe and continuous running of PVC insulated copper earth wire of 1 Sq.mm as per direction of site engineer.															
NS 19	Supply of material & wiring of sub-main with 2x4 sqmm PVC insulated multi-strand copper conductor cable in existing laid (surface / recessed ) PVC conduit pipe and continuous running of PVC insulated copper earth wire of 1 Sq.mm as per direction of site engineer.															

NS 20	Wiring of main (for individual qtr.) with 2x4/6sqmm PVC insulated multi-strand copper cable in 20 mm dia MS conduit pipe to be fixed properly with saddles, gutties & other fixtures and continuous running of PVC insulated copper earth wire. This is including supply of material as required.
NS 21	Supply of material & wiring of sub-main with 2x2.5 sq mm PVC insulated multi-strand copper conductor cable in existing laid (surface / recessed) PVC conduit pipe and continuous running of PVC insulated copper earth wire of 1 Sq.mm. as site required.
NS 22	Supply and Fixing of 20 mm dia medium class PVC Pipe along with accessories as required in recess / surface on walls/roof properly including cutting of wall /roof and making good. PVC pipe shall be confirming to IS 9537 (part-III) 1987 or latest. The PVC conduit shall have minimum wall thickness of 1.5mm and shall have ISI marking. Saddles for fixing conduit shall be heavy gauge non-metallic type with base. Higher size of PVC conduit shall be used wherever required for accommodating more number of wires.as per railway requirement. The colour of the PVC conduit shall be cream/white colour or other colour as approved by the Engineer.  The surface PVC conduit shall be fixed with raw plugs saddles at equal distance of 50cm/60cm and should have necessary junction boxes, elbows as per requirement. Saddles shall be fixed at a closer distance on either sides of couplers or bends or similar fittings. After completion of Electrical work the contractor will undertake the Civil Engg Work to repatch the wall plaster and fill up the recesses etc. in the wall occurred during wiring and rewiring/fitting of the same.
NS 23	
NS 24	Supply of material and wiring of LP/TP/FP/Ex-Fan point wiring shall be done by 03 x 1.5 Sqmm multi stranded copper flexible PVC insulated ISI marked Copper wire 1100 volts grade wire, confirming to relevant IS specifications and make of reference list shall be used for point wiring wire /switches for phase, neutral and earth shall be laid / done in concealed with heavy duty ISI marked PVC Conduit pipe, minimum 19/20 mm dia and thickness 01.5 mm along with bend / junction, inside PVC duct/ conduit as per instruction of site Engineer. Oneway modular type modular switch type 5/6A and good quality ceiling rose. Switches shall be provided on phase wire. The entire M.S. box shall have modular plate for switches and 05 Amp modular plug with required modular design groove cutting for fixing of switches / sockets etc. The wiring shall be done in such fashion that minimum conduit pipes run inside the room as far as possible. Modular type switches, 05 amp. Modular Sockets, ceiling rose, batten holder etc. shall be of reference list. The contractor shall dismantle old wiring completely in case it is replaced with new wiring. Samples of all wiring items shall be got approved from Railway before installation.  The copper wire used for earthing purpose shall not be less than wire used for wiring. Wire shall be ISI marked confirming to relevant IS specifications and make of reference list shall be used. The sub wiring shall be done in such fashion that minimum conduit pipes run inside the room as far as possible. The contractor shall dismantle existing /old wiring completely in case it is replaced with new wiring. The circuit wiring in is to be done by 03 x1.5 sqmm insulated multi-strand copper wire for phase, neutral and earth inside PVC duct/ conduit 19/20 mm as per instruction of site Engineer. The PVC conduit shall be properly fixed with the help of MS clamps /rawal plugs as per the instructions of site Engineer. The contractor will be responsible for proper plastering and distempering / fixing of tiles to restore the original finish of wall such that it matches with original surface and colour of wall on which conduit pipe has been laid. There should be no loose connections and joints in the wiring circuit. Bends or flexible conduits should be used as per the site requirement. The wiring should be in well dressed up manner.  Any discrepancy occurred in engineering work during the wiring should be restored in the original condition by the contractor, at his own cost. All metallic parts, fittings etc. shall be connected to the earth wire.
NS 25	5/6A SOCKET: Supply & providing 5/6A plug 3/5/6-pin 230V or above modular type switch socket on board and connection with 2.5sqmm PVC CU cable
NS 26	POWER PLUG: Supply and fixing modular type 15/16A power plug 6-pin 230V or above and switch modular type with metal box concealed in wall and connection with 4sqmm PVC CU cable.
NS 27	FAN REGULATOR: Supply and providing modular type electronic fan regulator 5step type on existing board and connection as per Railway requirement.
NS 28	Module Plate MS/PVC: Supply and fixing 12,8,6,4 & 2 module modular plate for fixing of

NS 29	switches and sheet metal box of good quality with suitable size cover base frame as per satisfaction of site engineer and concealed fixing of MS/PVC as per site requirement.
NS 30	
NS 31	
NS 32	
NS 33	Supply and fixing modular type exhaust fan 225/250mm including air curtain and making hole in wall if not exist including repairing the same properly with cement-sand or concrete and connection complete in all respect.
NS 34	Supply and fixing pedestal fan 400mm sweep with three speed fan regulator as per site requirement.
NS 35	<p>The contractor shall have to supply &amp; fixing of Three phase electronic KWH energy meter surface mounting type with bottom connection and terminal cover similar to HPL Long Range meter or similar of any repute make viz- L&amp;T/Secure/Genius etc.</p> <p>Technical specification-Three-phase, 4-wire static type (Electronic)</p> <p>Accuracy -Class 1.0 as per ISI 13779:99</p> <p>Voltage rating-3X240V(415V) (25%to+20%)</p> <p>Current rating- 40-200amps. Frequency-50Hz+/-5%</p> <p>Insulation Class-4kV Registering mechanism-Six digit impulse center with one decimal</p> <p>Enclosure-Double insulated glass filled Poly carbonate</p> <p>Operating temperature--10<sup>0</sup>Cto55<sup>0</sup>C</p> <p>Relevant Standard-IS-13779/1999 or latest</p> <p>Communication- Optical port, RS 232.</p> <p>The energy meter should have terminal cover plate with sealing arrangements for meter body cover and terminal board. Anti-temper features. The complete demo should be given by OEM representative to substation staff for measurement of reading and other associating data.</p>
NS 36	<p>The contractor shall have to supply, install &amp; commission of ISI marked, PVC casing &amp; capping size 25mm x12mm (WXH) with accessories confirming to IS:14927 Part-2 or latest.</p> <p>The color of the PVC casing capping shall be cream/white color or other color as approved by the Engineer. The PVC casing capping shall be fixed with rawl plugs at equal distance of 50cm/60cm (approximate) and should have necessary junction boxes, elbows as per requirement. The fixing of the casing capping at a closer distance on either sides of couplers or bends or similar fittings as per site requirement.</p>
NS 37	Supply, testing, fixing & commissioning of Exhaust fan 300 mm sweep, 1000 to 1440 RPM Make- Crompton, GEC, Usha, Philips, Bajaj, Polar, Orient or Similar.
NS 38	Supply, Testing & Fixing of wall mounted cabin fan with regulator three speed, suitable for 220- 230 volt ,50HZ AC supply .Make- Bajaj, Usha/ Crompton Greaves /Philips or similar.
NS 39	<p><b>General - Governing Specification - IS: 3043</b></p> <p><b>Earth Pipe:</b> 50-mm dia, "B" class, Medium, ISI marked, Approximate single piece of 03 meter length, Galvanized coating, relevant IS, perforated holes of 12mm dia.</p> <p><b>Protection Pipe for GI wire:</b> 12mm dia, "A" class, Light, ISI marked, Galvanized coating, relevant IS.</p> <p><b>Nuts &amp; Bolts:</b> with Galvanized coating.</p> <p><b>Inspection Chamber:</b> Square earth station C.C. Block, C.C. Ratio: 1:4:8, chamber with RCC cover &amp; handle.</p> <p>The measurement of the earth resistance shall be carried out as per relevant IS. The contractors at his own cost shall bring Instrument/ meters required for testing. Each earth pit shall give a minimum resistance as specified in IE rules. Earth conductors 4 mm GI wire crossing the pucca floor shall be buried at a depth of 6inch inside GI pipe of 12mm dia and then cemented. Earth conductors should be laid underground at a depth of 0.6 meter inside GI pipe of 12mm dia in all other cases. Earth conductors running vertically along the wall also shall be embedded inside protection pipe along with suitable cleats. Provision of watering the earth pits periodically shall be provided as per IS. The earth pit shall have to be covered in a cement concrete cover and top cover of G.I. or RCC slab as per standard practice. The value of earth resistance should be written on the earth pit with date of reading as per direction of site engineer. The contractor and Railway representatives shall measure Earth resistance at each electrode jointly. No Earth electrode shall have ohmic resistance more than 8 ohms. If the above stated earth resistance is not achieved, necessary improvement shall be made by the contractor by provision of additional electrode or by artificial treatment of soil etc. as may</p>
NS 40	



TECH. SALT BR.C.C COVER WITH HANDLE

GROUND LEVEL

500mm MIN.

12mm G.I PIPE

UP TO INSTALLATION

APPROX 300mm of EXTRA LENGTH OF WIRE LOOPE IN NOT MORE THAN ONE TURN. (WIRE SIZE 8 SWG-6)

50mm DIA. G.I. PIPE MEDIUM GRADE IS:1239

20 NOS. C.P. INCORPORATED HOLES OF 12mm DIA.

PUNCHED WASHER M6 IS 2018 STEEL FOR HEX-BOLT

HEX-BOLT M6 X 50N 70 IS 1368

DETAILS AT 'y'

300

125

75

25

15

300

125

700

CHARCOLE LAYER

3000mm

2500MM

350 mm.

100

ALTERNATE LAYER OF CHARCOLE & SALT

SQUARE EARTH-STATION C.C. BLOCK.

NOTE-

1. AT PLACES WIRE MORE THAN ONE INDEPENDENT EARTH ARE TO BE PROVIDED IN NEAR VICINITY. THE SPACING BETWEEN ANY TWO EARTH SHOULD NOT BE LESS THAN 2.5 METRES
2. EARTHING SHALL BE DONE AS PER IS-3043
3. ALL DIMENSIONS ARE IN MILLIMETRE.
4. EARTH WIRE FROM EARTH PIT TO INSTALLATION SHALL BE RUN IN 12 mm Ø G.I. PIPE IN THE GROUND AND 150mm. m. ABOVE GROUND LEVEL ON WALL. POLE WITH PROPER CLAMPS.
5. FOR ROCKY AREA REFER DRG. No. DRM/ELECT./10029/3

WESTERN RAILWAY		
DETAILS OF PIPE EARTHING		
NOT TO SCALE		
MOD. 1	10-12-98	NOTE NO. 4 ADDED FOR R.C.C. PIPE PIT.
DEF. 8/89		DRG. NO.
NO. DRM (ELECT.) 10029/1/1		

NS 41	Contractor must supply & laying of earth connection from earth electrode with 4 mm GI wire properly fixed on wall with wooden gutties etc as per the satisfaction of site supervisor.
NS 42	Supply of 3 Core 2.5 sq. mm PVC Copper Circular Sheathed Cable with Rigid Conductor, Category of Cable FR-LSH, material annealed tinned copper, as per IS 694.
NS 43	<p>Supply, erection, testing and commissioning of 5 mtrs Height double arm hot dip galvanized steel octagonal "Smart Poles" with galvanized base plate of 220 x 220 x 12 mm. Foundation PCD 200 mm &amp; bolt size 4x20 mm/4x16 mm dia x 600 mm/450 mm length in position, projected bolt length 100 mm/ 80 mm including excavation of pit and filling the same with concrete 50 cm ground level from base plate mounting including supply of material as required. Sheet thickness 3 mm, top dia 70 mm and bottom dia 130 mm. The pole shall be galvanized internally &amp; externally by single dipping method as per BS EN ISO 1461. The allied accessories such as single/ double cross arms, Bakelite sheet with MCB and stud terminals, clamping, etc. are included. The poles should be suitable for wind speed up to 169 Kmph (47 m/s).</p> <p>Double arms of 1000 mm to 1500 mm length are to be provided as per the site requirement and the instructions of railway site engineer. The Bakelite sheet with MCB &amp; stud terminals shall be provided in the base compartment of the poles. All the connecting terminals shall be properly tightened and crimped in order to avoid any loose connection. This also including connection of pole lights by MCB &amp; wiring &amp; complete charging of poles as per direction of site engineer. Make BAJAJ Model BOP -7030, GE, Crompton Greaves, Philips or similar.</p>
NS 44	Supply, fixing, testing and commissioning of fabricated Feeder Pillar distribution box made of MS sheet 1.6mmthick size 600x300x600mmwith suitable MS stand Copper bus bar of 200Acapacity and 2x63A MCB 4pole as per site requirement and satisfaction of site engineer.
NS 45	The contractor shall have to fix surface pendent mounted box type LED tube light fitting/street light /flood light fitting, batten lights or any other type light fittings as per requirement. The fitting shall be connected with the ceiling rose with PVC insulated flexible pvc pipe cord having multi strand copper conductor size 48/0.2mm (three core) or as per site requirement. Any damage to building or railway property should be made good to the satisfaction of railway by contractor else it will be recovered from contractor.
NS 46	Supplying, fixing ,testing & commissioning Automatic operation street light timing switch box

	having lighting control (on-off) through astronomical calculation and pre-wired with suitable size of contactors, copper conductor etc. at specified locations as per specification attached and Similar to model no 04764 of LEGRAND make or similar of Siemens/ABB.
NS 47	Contractor shall supply Submersible pump set ISI marked minimum 224 mtr head with maximum OD 142mm submersible cable size length 3 mtr 2900 RPM , capacity 15 HP suitable for operation on 415 volt +/- 5%, 3 phase, 50 hz conforming to IS 8034-2002 or latest, 2 inch (50mm) outlet, Make- KSB model UQDs 182 or similar.
NS 48	Contractor shall Supply of ISI mark, energy efficient submersible pump motor set 10 HP 20 Stage ,415 volt AC , three phase , H/Range 100-186 mtrs , discharge 233-83 LPM , del.size 50 mm,SD ,suitable for 150 mm borewell water lubricated type, confirming To IS no.8034/2002 or latest . Accepted make:- KSB,CG,CRI, or similar.
NS 49	Design, manufacture, Supply, fixing, testing & commissioning of Fully automatic type Star Delta Starter panel for Submersible pumps Of Model No.MUG-20 Relay Range 20-32 of L&T or Similar model of BCH,C&S. The starter box shall be front door type, dust & vermin proof with neoprene EDPM/rubber gasket and made out of powder coated/ coats of primer and finished by enamel paint - grey shade sheet metal enclosure of 2mm thick sheet. The sheet steel should be given special treatment such as degreasing and pickling for rust removal. The final finishing shall be smooth with attractive GRAY colour. The complete wiring should be done with suitable size of FRLS copper wire.
NS 50	Design, manufacture, Supply, fixing, testing & commissioning of Fully automatic type Starter panel for Submersible pumps Of Model No.MU G10 DOL Relay range 13-21of L&T or Similar model of BCH,C&S. The starter box shall be front door type, dust & vermin proof with neoprene EDPM/rubber gasket and made out of powder coated/ coats of primer and finished by enamel paint - grey shade sheet metal enclosure of 2mm thick sheet. The sheet steel should be given special treatment such as degreasing and pickling for rust removal. The final finishing shall be smooth with attractive GRAY colour. The complete wiring should be done with suitable size of FRLS copper wire.
NS 51	Supply and drawing of PVC insulated 3 core sheathed Flat copper submersible cable 1100 volt grade conf. to IS: 694/1990 with latest amendments, size 6 sq mm. Approved make list is attached.
NS 52	Contractor shall supply of 5 HP/ 3.7 kW Submersible energy Efficient pump set (3 star or Above) 3- Phase , 415 V AC, Discharge Head: 100 mtrs, Number of stage : 11 , ISI Marked Submersible cable 4 core flat with copper conductor to IS 694 :- Yes, Control Panel with starter, ISI marked MCB /main switch , ammeter, voltmeter and water level indicator, single phase preventer, Bore size:- 150mm, Delivery size: 40 mm as per spec
NS 53	Supplying, connecting, fixing and lowering of GI pipe 2" Dia ISI marked medium density within the tube well / UG tank including supply & fixing of suitable size accessories like flange ,safety clamp , cable clamp, pipe fittings, bends, socket etc. as required and excluding flat copper cable. This work is to be replaced with existing work and released GI pipe shall be deposit in the store of site supervisor. Approved make list is attached
NS 54	<p><b>SCOPE:</b> • This specification covers the supply of battery charging rectifiers set comprising of transformers, silicon rectifier controlling devices etc. for charging train lighting batteries. The set shall be complete with all parts and accessories for efficient operation whether mentioned or not.</p> <p><b>SERVICE CONDITION:-</b> Temperature should not increase max. 50 deg. C ambient temperatures. Maximum ambient temperature-50 deg C Maximum humidity - 100% Minimum humidity- 65% Atmosphere condition - Dusty The equipment is to be installed in open area to withstand heavy rain splashing of water and hot in summer.</p> <p><b>COVERING SPECIFICATION:-</b> The main component of the battery charging rectifier shall generally conform to the following IS specification (Latest editions) which shall be applied in the manner altered amended by this specification. The latest Indian electricity rules shall also be applicable wherever necessary.</p> <p>a. Rectifier transformer to ISS: 2026 with class B.</p> <p>b. Silicon rectifier to ISS 3895.</p> <p>c. Electrical indicating instrument to ISS 1248.</p> <p>d. Rotary switches ISS 1568.</p> <p><b>RATING AND OTHER PARTICULARS</b></p> <p>a. Rectifier set shall be designed for the following rating and other particulars.</p> <p>b. Type indoor under shed (Portable, fully Wave Bridge connected).</p>

- c. Rated voltage AC-3 phase 380-420 V 50 Hz cycle AC supply.
- d. Rated output DC 110V to 150 V. which can be selected by means of rotary switches. The charger should give 200 A DC output at 125 Volt DC.
- e. No. of DC circuits and cut-outs 2x100 amp. Each for 100 amp.

**TYPE OF CONSTRUCTION MOUNTING** The unit shall be suitable for indoor/outdoor duly weather proof. Where there is heavy and rainfall and the surrounds area wet due to water splashing. The unit shall be openable from 4 sides. The meters shall be water tight suitable protected by acrylic sheet and metallic foils for mechanical protection. The rectifier set shall be crested in a cubical made of MS sheet of not less than 1.5 mm thick. The cubical shall be robust in construction to prevent damage due to vibrations encountered during handling and transit in service. The angle iron of the frame work shall be liberally size and transformer shall be strongly supported and bolted so that its supports do not crack or bend during transit. The bottom shall have strong channel to with stand handling.

**VENTILATION:** Adequate natural ventilation shall be ensured to enable quick transfer to heat and keep temperature of all components well within permitted limits. Sufficient clearance shall be available at the bottom of the rectifier cubicle for entry of atmospheric air cooling purpose. Hot air circulation shall be such that the sensitive silicon diodes are not other equipments like transformer etc. shall be so arranged that heat shall not affect the diodes.

**FINISH OF ENCLOSURE** The select sheet steel panels and frame work shall under special treatment such as degreasing and pickling for rust removal. It shall be given a phosphate coating and primer coating to with stand the industrial environments, the final finishing shall be smooth with attractive standard two-tone yellow-green enamel paint or hammer tone finish. The rectifier set shall be mounted on four cast iron sheets. All the internal connection shall be with crimped sockets and multi strand copper cable shall be neatly anchored and number of identification spring washers only shall be provided.

**COMPOSITION OF RECTIFIERS SET MAIN TRANSFORMER** The transformer shall be of three phase, double wound, continuously rated vacuum impregnated, air cooled type. It shall be class B insulation grade. It shall have winding with class B insulation and all electrical test done be conformed class of this insulation. Primary winding of the transformer shall be provided with OFF load tap changing links to compensate for supply voltage variation at +5% nominal voltages of 400 V in steps of 10 volts.

**RECTIFIER** The rectifier shall be suitable for indoor/ outdoor duty. The rectifier shall consist of high power silicon diodes with liberal cooling fans, connecting hole storage switching voltage surges up to 440 V. Overload capacity shall also be catered to with stand short circuits in the DC conductors, suitable surge suppressor with capacitors/ Resistance net work provided for diodes for long life the diode shall be rated for taking 50% over load for period of 4 to 5 hours. The temperature rise of diode and its junction at full load shall be well in its rated value under maximum ambient condition. Rectifier diode of the reputed make shall be accepted.

**CHOKE** A ballast choke of adequate capacity shall be provided on AC side to minimize variations in charging conductors to be within 300% with class B insulation. The choke shall be wound with copper conductors the choke shall be vacuum impregnated and shall comply with ISS 2026 (latest) to the extent possible.

**BUS BAR** All DC bus bar shall be made of Alm. for 200 Amp. Minimum capacity and shall be insulate with PVC sleeve.

#### **CONTROL OF VOLTAGE AND CURRENT**

a) The unit shall be provided with necessary transformer tapping switch for current control on the primary side to the transformer tapping in each phase 4 position for coarse control and four position transformer tapping switch in each phase for fine control shall be provided for current allowing the output to be varied up to 200 Amp. at the DC voltage 110 V to 150 V for 110 V rectifier. Indications lamp shall be provided in different color R.Y.B.

b) Rotary switches used shall be of robust in construction and compact with current breaking capacity conforming to ISS- 1567/60 or latest edition.

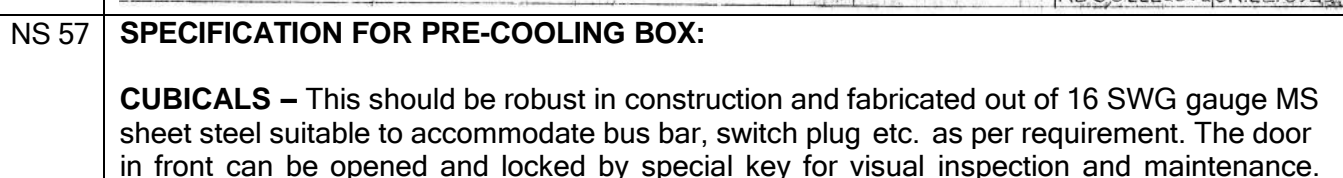
**DC SIDE CONTROLS AND PROTECTIONS:-** 2 sets of outgoing DC terminals complete with HRC fuses 100A capacity outside the rectifier set on DC output, circuit complete with nut. Check nuts, spring washers including socket suitable for 1 core 120 sq mm PVC heavy duty cable armored.

**METERS** The following meters shall be provided.

**VOLTMETERS AND AMMETERS:-** Voltmeter and ammeter, moving coil type, industrial

**INSTRUCTION MANUALS:-** 06 copies of instruction manuals for maintenance of the rectifier set shall be supplied after completion of work.

NS 56	It includes supply, fixing and commissioning of battery charging board/box emergency feed terminal box, two way outdoor type as per RDSO Drg. No. SKEL-3929. The sample of EFT can be seen in office. The sample of the EFT shall be got approved from Sr. DEE/JU or his representative before supply.
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However the door shall be two parts to occupy less space while opening/working of suitable size to accommodate all the items.

**BUS BAR CHAMBERS-** Three aluminum bus bar of 200 amp capacity for each phase and one aluminum bus bar of 200 amps for neutral. Capacity for neutral shall be provided inside the cubical on proper insulator. The bus bar shall be taped with red, yellow, blue & black (neutral) colors. The bus bar chambers shall be complete with arrangements, for cable entry at both ends of the bus bar suitable for 240 sq. mm 4 cores LT cable (armoured). The cable entry at the both ends is to be protected by cable glands of suitable size. The switch plug cubical shall be connected with T connection from the bus-bar with 63 amp. MCCB and connection shall be made with PVC insulated and PVC sheath aluminum cable properly thimble. The incoming and outgoing cables shall be taken through suitable size of GI pipe medium class (suitable for 4 x 240sq. mm cable) rate of GI pipe inclusive. The bus bar chambers should be covered with Bakelite of thickness 1/8" for protection which can be opened for inspection purposes.

**SWITCH PLUG SET COMPLETES:-**

Provision of four pole MCCB 63 Amps/25 KA cat. nos 420053 of Legrand suitable for 440V, 3 phase AC power supply, plug 63 amp capacity, 5 pin with 63 amps. Socket make of BCH. The switch plug unit shall be damp, dust, vermin proof quick make and break, operation with position ON/OFF indication with protection against flash over. The switch plug unit is to be housed inside the cubical duly connected with PVC cables. The outlet of the plug socket is to be placed at the bottom of the cubical in such a way that cable connection for the outgoing lead can be done and the cubical can be closed. It should be also to be ensured that the cover of plug & socket (male) is earthed when it is OFF. Providing of double earthing on the cubical shall be made by hot dip galvanized MS nut & bolts & washers of 38 mm x 16 mm (Dia.) on the either side of the cubical at two distinct place for efficient Earthing.

The pre-cooling points along with bus bar chamber etc. are to be fixed/erected & commissioned at different places at platform line with on rail poles, where it shall be fixed/tightened on MS channel of size 50 x 50 x 100 mm of thickness 6 mm of suitable length with MS clamps of size not less than 50 x 6 mm of as side requirement. A danger plate of 440/415V shall be affixed on the front and back door of each cubical. The cubical shall be painted with gray paint over red oxide primer after anti-corrosion treatment The proto type fabricated cubical complete with all respect shall be got approved by Sr. DEE/JU before manufacturing. The sample of the pre-cooling box may be seen in the existing pit line. Providing of double Earthing on the cubical shall be made by hot dipped galvanized MS nut & bolts & washers of 38 x 16 mm (dia.) on the either size of cubical at two distinct places and cubical shall be earthed as per IE rules and site condition/requirement.

**Note:-** Drawing of LT Switch Board for pre-cooling points to be got approved before manufacturing.

NS 58

**TECHNICAL PARTICULARS FOR VPI TRANSFORMER**

S.No.	Description	Particulars
1.	Type and make of Transformer	Three Phase, 50 Hz, Core type, two winding, VPI Dry type Indoor Transformer
2.	Normal continuous rating	15 KVA
3.	Winding material	COPPER
4.	No load voltage ratio	415/83 V $\pm$ 5%
5.	Output Voltage Phase to neutral	48 Volt $\pm$ 5%
6.	Connection a) Primary b) Secondary	Star/ Star
7.	Hv current-- LV current--	20 to 25 amp 100 to 120 amp
8.	Temperature rise winding over ambient temperature of 50 °C	15 °C
9.	Class of Insulation	Class <u>F</u>
10.	Impedance at rated current and at 75°C	4.5.0% (IS Tolerance)

		and at Normal tap																			
	11.	Enclosure	IP 43 (Suitable For Indoor Installation)																		
	12.	Method of Cooling	AN (Air Natural)																		
	13.	Fittings for Dry type	a) Lifting Lugs b) 02 Nos. Earthing Terminals																		
	14.	Paint	Epoxy- RAL 7032																		
	<p><b>Note:</b> Surge arrestors to protect High voltage winding against the spikes / voltage variation coming from the grid</p> <p><b>Warranty-</b> 2 Years from the date of installation.</p> <p><b>List of Routine Test to be done:-</b></p> <table><tr><th>S.No.</th><th>Name of Routine Test</th></tr><tr><td>1.</td><td>Measurement of Winding Resistance</td></tr><tr><td>2.</td><td>Measurement of voltage ratio &amp; check of vector relationship</td></tr><tr><td>3.</td><td>Measurement of Impedance Voltage</td></tr><tr><td>4.</td><td>Measurement of Load Loss &amp; Current</td></tr><tr><td>5.</td><td>Measurement of No Load Loss &amp; Current</td></tr><tr><td>6.</td><td>Measurement of Insulation resistance</td></tr><tr><td>7.</td><td>Induced Over Voltage Withstand Test</td></tr><tr><td>8.</td><td>Separate Source Voltage Withstand Test</td></tr></table> <p><b>Note:- Above all routine tests as described in IS: 2026 / IS: 11171 shall be carried out.</b></p>			S.No.	Name of Routine Test	1.	Measurement of Winding Resistance	2.	Measurement of voltage ratio & check of vector relationship	3.	Measurement of Impedance Voltage	4.	Measurement of Load Loss & Current	5.	Measurement of No Load Loss & Current	6.	Measurement of Insulation resistance	7.	Induced Over Voltage Withstand Test	8.	Separate Source Voltage Withstand Test
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NS 59	Supply installation testing commissioning of LED based pit lights as under - Wattage- 16/20W, suitable for 48V-72V +/-10% Single phase AC supply, PF>.90, temp- ( -20deg to 60 deg), life expectancy min.-50000hrs (along with submission of reports of LM80 and TM 21 of OEM) , luminous efficacy >100lm/w, lumens>1400, color temp- 2700K-6500K, CRI> 70, Beam angle>120, source -PWM constant current, lamp housing- pressure die cast aluminium housing toughened glass cover, protection -reverse polarity, short circuit, open circuit, ingress protection IP-67, impact resistance IK 10, bracket mounting, thermal management - external heat sink of aluminium housing, aluminium metal core, printed circuit board thermal conductivity more than 2.0W/mk and thermal pad with thermal conductivity more than 1.5W/mk, test reports to be provided by NABL accredited lab, warranty – 5 years, LM79 & LM 80 reports of LEDs shall be provided with supply, test shall be conducted by NABL accredited LAB, connecting lead wires shall be 3 core pvc insulated. Make- M/s Goldwyn or similar. These are to be Inspected by RITES Ltd and inspection reports should be submitted. The fitting shall be install in such a way that covers entire length of the washing lines in equal distance. Fitting shall be install in existing pocket of the washing line by required minor civil work.																				
NS 60	The price shall cover fabrication and supply of feeder pillar made of MS sheet for accommodating the equipments including copper bus bar of 200 Amps, (size 25X5mm) for phases and neutral and indication lamp in incoming side for RYB duly wired with 1.5 Sq.mm, 1100 volts PVC insulated copper wire. The panel board shall be made of 1.6mm thick MS sheet on angle iron of size 50X50X6mm & MS channel of size 75X40mm frame with properly cleaned with acid bath and painted with two coats of synthetic Grey Enamel paint over a coat of anti-corrosive AII class Red oxide primer. The panel board shall have the provision of two doors on both front and rear for inspection and maintenance from both sides. The internal connection between the bus bar and the switch gears should be made with copper bus bar (20X3mm for 100 Amps/ 63 amps MCCB). The earthing clamp, joint less GI strip/flat of size 25x4mm should be provided on both sides. The size of the panel board is 800mmx 600mmx 375mm approx. Incoming: i) 1X100A MCCB 4P Ics 35 KA ii) LED type indication lamp Outgoing: i) 2X63A MCB TPN, 10KA C series. ii) 4x32A MCB TPN 10KA C series (For all MCCB's Ics=100% Icu) The price shall cover the cost of all materials required for the above work.																				
NS 61	The contractor shall Supply & erection suitable enclosure duly painted for protection of Pit light fitting made of MS angle iron size25mmX25mmX3mm & MS wire mesh 25 mm 25mm x																				



	dia. 2 mm.
NS 62	Supply installation testing commissioning of 22 Watt catwalk LED light fittings as per the following description/specification/dimensions. i) Dimension of the fitting (in mm approx.): L-290 X B-210 X H-75 ii) Housing: High pressure aluminium die cast extruded aluminium iii) Mounting: Surface/recessed iv) Voltage: 48volt -72v AC +/-10% v) Wattage:22 watt+/-10% vi)IP-67 vii) IK-10 viii) LED type: SMD ix) Protection: Reverse polarity protection, Short circuit protection, Open circuit protection, driver -constant current, toughened glass prismatic diffuser, driver efficiency>85%, life expectancy min.-50000hrs(along with submission of reports of LM80 and TM 21 of OEM), test reports to be provided by NABL accredited lab, warranty - 5 years, connecting lead wires shall be 3 core pvc insulated. Make-M/s GOLDWYN or similar. These are to be Inspected by RITES Ltd and inspection reports should be submitted with lights. The fitting shall be install in such a way that covers entire length of the washing line in equal distance. Fitting shall be install in existing pocket of the washing line by required minor civil work.
NS 63	Supply, install, test & commissioning of load change over switch in steel sheet enclosure 630/250 Amp. (as per specification) The contractor shall have to supply, install, test & commissioning of front operated, AC-22A, 4P, 415V, 50Hz, 630/250Amps LT heavy duty On load changeover switch with steel sheet enclosure complete in all respect with all associate accessories confirming to IS13947-3 Make- Havells/L&T/HPL or similar equivalent make.
NS 64	
NS 65	Supply of Phenolic top sheet wooden board size 7" x 4" with one no. 5x15 amp switch socket combined & one nos. 5 amp switch ISI mark make- Anchor/Vinay/ABB/Cona/Legrand or similar. A sample must be approved by site engineer/ADEE before bulk supply.
NS 66	Supply of Phenolic top mobile charging wooden board size 6"x15" fitted with 4 nos. switch & 4 nos. socket of 6 amps with internal wiring of 1.5 sq. mm with base plate of both side particle board for mobile with hanging clip. A sample must be approved by site engineer/ADEE before bulk supply.
NS 67	Supply, installation, testing & commissioning of cable junction boxes IP65 of various cable sizes with metric knockouts for cable entry Box dimensions approx. (LxBxH) (mm): 200x160x98 with 100Amp copper bus bar including other required materials for fixing, mounting & masonry work if required.
NS 68	Junction Box: (for cable passing & fitting connection) The contractor shall have to design, fabrication, supply, installation, testing and commissioning of junction box of approximate size 200x200x150 mm made by 18 SWG GI sheet with water tightening material, required Glands, Painting, insulating material and locking arrangement. The following arrangement shall be made in the junction box : (1) Insulating Material: 20mm thick Tuffnol or Hylem sheet. (2) Bus bar: 25x3mm size GI flat of suitable length. (3) Other Material: nut, bolt & washer (Spring & Flat). (4) Bus bar shall have 03 hole i.e. 02 for terminating & extend the main cable & 01 for connection of Pit light fitting
NS 69	Junction Box: (for distribution of supply) The contractor shall have to supply, wiring, installation, testing and commissioning of 04 Way SPN, double door distribution board with following material: RCCB: 01 no, 25amps, 2Pole, 30mA, 50Hz, AC, as per relevant IS. MCB: 02 no. 25amps, SP, B  series, 10kA
NS 70	The contractor shall have to supply and fixing of PVC cable duct 40 x 60 (W x H) 1M STD slot greenish gray in shed shall be properly clamped on structure with the help of MS flat 35 x 5 mm & suitable size GI nut-bolt-washer in well-dressed manner as per satisfaction of site engineer.
NS 71	Supply, installation, testing & commissioning of (150 mm width x 50 mm depth x 1.6 mm thickness) perforated Hot Dipped Galvanized Iron Cable Tray with cover(Galvanization thickness not less than 50 microns) with perforation not more than 17.5%, in convenient sections fixed with MS Angle frame duly painted of 35 mm x 5 mm thick and all hardware complete in all respect. This will also include the routing the cables in cable tray using necessary hardware.
NS 72	Supply, installation, testing & commissioning of (100 mm width x 50 mm depth x 1.6 mm thickness) perforated Hot Dipped Galvanized Iron Cable Tray with cover (Galvanization thickness not less than 50 microns) with perforation not more than 17.5%, in convenient sections fixed with MS Angle frame duly painted of 35 mm x 5 mm thick and all hardware complete in all respect. This will also include the routing the cables in cable tray using necessary hardware.
NS 73	The contractor shall Supply of Three Phase FRP Telescopic Earth / Discharge Rod Length

	15/18 Feet in three Steps ,Discharge Range 11 KV to 132 KV , Manufactured from high Quality Epoxy Resin in automatic Pultrusion Plant ,Strong and Sturdy, Super Smooth Glossy Finish Prevent Moisture, Excellent Dielectric Strength, Equipped with FRP/Rubber insulator to increase Creepage distance, bottom provided with slip resistance rubber grip, canvas cover bag for protection of equipment, Tested as per IS & IEC Standard, HT /LT Discharge Rod Short Circuiting Rod for 11to 33 KV, Voltage: 11 KV, 22 KV, 33 KV, 132KV, Weight 05 Kg. Makes/Brands: ESAFE/National/Kusum-Meco or similar																
NS 74	Supply, fixing, testing and connecting of wall mounted heavy duty Air Circulator of 24"(600mm) size with built in 3 speed regulator, delivers Air 280Cu.m/min, similar to M/s Almonard make with all accessories complete confirming to IS specification with latest amendments. The Air Circulator is to be fixed by suitable MS clamps of size 50x50x6mm / flats of size 40x6mm with bolts and nuts etc., complete as desired by site engineer. Make Crompton, Bajaj or similar.																
NS 75	<p>Design, manufacture, supply, fixing, testing and connecting of LED back lit single sided signage boards with IP-65 CRCA housing, vinyl print on acrylic sheet which is back lit with high grade, high brightness LED modules inbuilt SMPS driver, without battery backup. Operating voltage 80-270VAC. LED with L70 life of minimum 50,000 hours, LPM technology, including fabrication and supply of clamping arrangements as desired by site engineer. The Railway will decide the size, colour &amp; content to be printed on the signage Board. Signage board shall be pre wired with flexible copper wire and terminated in a connector from where 3- core flexible wire shall be brought out for connecting the board to ceiling rose, as per site requirement. The body of Glow sign board to be connected with earth. The pictogram and letter of desired color and size made by translucent vinyl sheet cut through computerized machine shall be pasted on acrylic sheet. Acrylic sheet with pictogram shall be fixed on CRCA/GI sheet powder coated box with suitable arrangement. Subject matter and pictogram can be seen in the standard look of signage available in office. Depth of box shall be approximately 3.5 inches (for single sided), 5.5 inches (for double sided) and made by 0.8 mm thick CRCA/GI sheet with powder coated having louvers for ventilation on two sides having suitable gaskets for protection against water and vermin ingress. Louvers should be covered with wire mesh to avoid entry of insects/lizards of suitable size as per requirement. LED light shall be provided inside the box in such way that intensity of light on both side of box (no dark spot) remains same. Size, quantity and place can be changed as per site requirement and Final decision of Sr.DEE/G/JU shall be acceptable and binding to the contractor.</p> <p>LED-Clear cool white colour 5.00 mm LEDs of uniform intensity and luminosity shall be used for excellent Visibility. The intensity of the illumination is such that it shall be possible to read the information clearly from a distance of 20meters or higher. NICHIA /PHILIPS/LUMILIDE / AVAGO/Seol semiconductor/OSRAM make LED with L70 life of minimum 50,000 hours and with specified parameters as per latest data sheet of Original Equipment manufacturer shall be used. The contractor shall installed these as per site engineer instructions or as per requirement.</p> <p>SMPS-All power supply units supplied are Switch Mode Power Supply type (SMPS) operated from AC source ranging from 80V to 270 Volts, 50 Hz AC, single phase. All the power units are tested at 50% load of maximum working capacity. Protection against transient coming in the power supply source originated by some other source is provided. Protection against voltage fluctuations of short durations is also provided.</p> <p>Over voltage and short circuit protection is incorporated within the power supply. Power factor should be &gt; 0.95. Signage board has following specifications</p> <table border="1"> <tr> <td>No. of Lines per Board</td><td>As per requirement</td></tr> <tr> <td>Case Material</td><td>CRCA sheet of 0.8mm thickness</td></tr> <tr> <td>Front Acrylic sheet thickness</td><td>3 mm</td></tr> <tr> <td>Protection</td><td>IP 65</td></tr> <tr> <td>Mounting Provision</td><td>Wall Mounting / Hanging With Clamps</td></tr> <tr> <td>Dimensions of LED module (approx)</td><td>295 mm x 295 mm</td></tr> <tr> <td>Nominal Voltage:</td><td>230 V AC</td></tr> <tr> <td>Operating Voltage Range with SMPS power supply</td><td>150 V -260 V A.C</td></tr> </table>	No. of Lines per Board	As per requirement	Case Material	CRCA sheet of 0.8mm thickness	Front Acrylic sheet thickness	3 mm	Protection	IP 65	Mounting Provision	Wall Mounting / Hanging With Clamps	Dimensions of LED module (approx)	295 mm x 295 mm	Nominal Voltage:	230 V AC	Operating Voltage Range with SMPS power supply	150 V -260 V A.C
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	LED type	5mm
	LED System Wattage	6 W max per square feet
	LED Wattage	0.06 W per LED
	LED control	Current regulator
	Luminosity	700mcd
	LED Color	Cool White
	Viewing angle	70 deg
	Solid angle	40 Deg
	Distance between LEDs	1.5" diagonally
	No of LEDs in each module	72
	LUX level inside the surface	1700 LUX @ 2" +/- 10%
	Color temperature	5500K/6500K
NS 76	Contractor shall supply Bosch Fibre Body Handheld Electric Blower with operating voltage 230V, 50 Hz, 800W with air flow of min 4.1 m <sup>3</sup> /min.	
NS 77	Contractor shall supply PVC insulated armoured Cable 3x10sqmm, 1100V as per site requirement.	
NS 78	The contractor shall supply Digital Electrician Tool Kit Tool kit for Generator set as per site requirement to the satisfaction of Railways. The make and brand of tool kit to be approved from Railways before supplying.	

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**Senior Divisional Electrical Engineer /General  
North Western Railway, Jodhpur**