

CENTRAL RAILWAY



E-Tender No: -BB.LG.W.THK.2026.01

(A) Electrification for upgradation of SM office, other utility offices, construction and improvement of toilet, beautification of FOBs and allied works at Thakurli station. (B) Rewiring for renovation and improvement of service buildings in between Kanjurmarg-Kopar Section. (C) Rewiring for renovation and improvement of service building at Thakurli, Dombivli and Kalyan Station. (D) Electrification for Provision of extension of platform at Vikhroli, Kalva, Mumbra & Diva of through lines for running of 15 car EMU services.

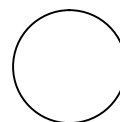
Tender issued by:

**Senior Divisional Electrical Engineer,
(General Service), Central Railway,
Mumbai CSMT.**

Tender issued to: -

M/s. _____

Book No.



INDEX**E-Tender No: - BB.LG.W.THK.2026.01**

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CHECK LIST

FOR DOCUMENT TO BE SUBMITTED BY THE TENDERER FOR TENDER ALONG WITH THE OFFER. OFFERS WITHOUT THESE DOCUMENTS WILL BE SUMMARILY REJECTED: -

SN	MANDATORY DOCUMENTS
1	BID SECURITY as per clause 1.10 of Chapter-I of this Tender Document. (As per Clause No 5 of uploaded GCC April 2022.)
2	Annexure-V (A) (As per Chapter VII of this Tender Document / As per ACS no.2 of GCC April 2022) Annexure-V (A) shall be submitted by the each member of a Partnership Firm / Joint Venture (JV) / Hindu Undivided Family (HUF) / Limited Liability Partnership (LLP) etc. as the case may be.
3	PAN CARD
4	GST Registration Certificate
5	The tenderer shall clearly specify whether the tender is submitted on his own (Proprietary Firm) or on behalf of a Partnership Firm / Company / Registered Society / Registered Trust / Hindu Undivided Family (HUF) / Limited Liability Partnership (LLP) etc. The tenderer(s) shall enclose the attested copies of the constitution of their concern as applicable mentioned below:
a	Sole Proprietor – An undertaking on suitable stamp paper to this effect clearly mentioning PAN number.
b	HUF: (i) A copy of notarized affidavit on Stamp Paper declaring that he who is submitting the tender on behalf of HUF is in the position of ‘Karta’ of Hindu Undivided Family (HUF) and he has the authority, power and consent given by other members to act on behalf of HUF.
c	Participation of Partnership Firms in works tenders: (i) A notarized copy of the Partnership Deed or a copy of the Partnership deed registered with the Registrar. (ii) A notarized or registered copy of Power of Attorney in favor of the individual to tender for the work, sign the agreement etc. and create liability against the firm. (iii) An undertaking by all partners of the partnership firm that they are not blacklisted or debarred by Railways or any other Ministry / Department of the Govt. of India from participation in tenders / contracts as on the date of submission of bids, either in their individual capacity or in any firm/LLP in which they were / are partners/members. Any Concealment / wrong information in regard to above shall make the bid ineligible or the contract shall be determined under Clause 62 of the Standard General Conditions of Contract.
d	Company registered under Companies Act 2013 (i) The copies of MOA (Memorandum of Association) / AOA (Articles of Association) of the company. (ii) A copy of Certificate of Incorporation (iii) A copy of Notarized Power of Attorney issued by the Company (backed by the resolution of Board of Directors) in favour of the individual to sign the tender on behalf of the company and create liability against the company.
e	LLP (Limited Liability Partnership): If the tender is submitted on behalf of a LLP registered under LLP Act-2008, the tenderer shall submit along with the tender: (i) A copy of LLP Agreement (ii) A copy of Certificate of Incorporation (iii) A copy of Power of Attorney/Authorization issued by the LLP in favour of the individual to sign the tender on behalf of the LLP and create liability against the LLP (iv) An undertaking by all partners of the LLP that they are not blacklisted or debarred by Railways or any other Ministry / Department of the Govt. of India from participation in tenders / contracts as on the date of submission of bids, either in their individual capacity or in any firm/LLP or JV in which they were / are partners/members. Concealment / wrong information in regard to above shall make the contract liable for determination under Clause 62 of the Standard General Conditions of Contract.
f	Registered Society & Registered Trust: (i) A copy of the Certificate of Registration (ii) A copy of Memorandum of Association of Society/Trust Deed (iii) A copy of Power of Attorney in favour of the individual to sign the tender documents and create liability against the Society/Trust. (iv) A copy of Rules & Regulations of the Society
6	Valid Electrical Contractor License as per Clause 2.28 of Chapter II of this tender document.
7	Supporting documents for Technical Eligibility Criteria as per clause 11.1 of this tender document. (As per Clause 10.1 of GCC April 2022)
8	Financial Eligibility Criteria: as per clause 11.2 of this tender document. The tenderers shall submit requisite information as per Annexure-VIB. The tenderer shall also submit copies of Audited Balance Sheets duly certified by the Chartered Accountant/ Certificate from Chartered Accountant duly supported by Audited Balance Sheet. (As per Clause 10.2 of GCC April 2022)
The above checklist for mandatory documents to be included in tender form. Tenders without these documents will be summarily rejected.	

CENTRAL RAILWAY
OFFICE OF THE SR. DEE (G) CSMT
OPEN E-TENDER NOTICE No. 15/2026 OF 18.06.2026

The Senior Divisional Electrical Engineer (General Services) Central Railway, Annex Building, First Floor, Mumbai CSMT-400 001 **for and on behalf of President of India invites open E-tender through website www.ireps.gov.in from reputed contractors. The time, date and submission are 13.00 hrs on 10.07.2026 and will be opened after 13.00 hours on same day.**

NAME OF WORK	Approximate Cost of the Work	Bid Security	Date of Opening	Validity	Completion Period
(A) Electrification for upgradation of SM office, other utility offices, construction and improvement of toilet, beautification of FOBs and allied works at Thakurli station. (B) Rewiring for renovation and improvement of service buildings in between Kanjurmarg-Kopar Section. (C) Rewiring for renovation and improvement of service building at Thakurli, Dombivli and Kalyan Station. (D) Electrification for Provision of extension of platform at Vikhroli, Kalva, Mumbra & Diva of through lines for running of 15 car EMU services. Tender No. BB.LG.W.THK.2026.01	Rs.2,92,42,358/-	Rs.5,84,900/-	10.07.2026	60 Day	12 Months (C)

Instruction:

1. Tender closing date & time of aforesaid tender: Upto 13.00 hours of **10.07.2026** and will be opened after 13.00 hrs and validity of offer is 60 days.
2. The prospective tenderers are requested to visit the website www.ireps.gov.in for complete details of tenders & corrigendum, if any.
3. Tenderer may participate in above e-tender electronically through website www.ireps.gov.in only & submission of manual offers against e-tender are not allowed. Manually, if submitted shall neither be opened nor considered.
4. For further enquiry, may contact: Senior Divisional Electrical Engineer (General Service), Annex Bldg., 1st floor, Central Railway, Mumbai CSMT.
5. This tender complies with Public Procurement Policy Order 2017 dated 15.06.2017.

(Shanti Lal)
**Sr. Divisional Electrical Engineer,
(General Service), Central Railway,
Mumbai CSMT.**

PREAMBLE AND SCOPE OF WORK

TENDER NO: BB.LG.W.THK.2026.01

- 1.0 **NAME OF WORK:** “(A) Electrification for upgradation of SM office, other utility offices, construction and improvement of toilet, beautification of FOBs and allied works at Thakurli station. (B) Rewiring for renovation and improvement of service buildings in between Kanjurmarg-Kopar Section. (C) Rewiring for renovation and improvement of service building at Thakurli, Dombivli and Kalyan Station. (D) Electrification for Provision of extension of platform at Vikhroli, Kalva, Mumbra & Diva of through lines for running of 15 car EMU services.”
- 2.0 **SCOPE OF WORK:** “(A) Electrification for upgradation of SM office, other utility offices, construction and improvement of toilet, beautification of FOBs and allied works at Thakurli station. (B) Rewiring for renovation and improvement of service buildings in between Kanjurmarg-Kopar Section. (C) Rewiring for renovation and improvement of service building at Thakurli, Dombivli and Kalyan Station. (D) Electrification for Provision of extension of platform at Vikhroli, Kalva, Mumbra & Diva of through lines for running of 15 car EMU services.”
- 3.0 **APPROXIMATE COST OF THE WORK:** - **Rs. 2,92,42,357.81**
- 4.0 **TIME AND DATE OF CLOSING** : - **Up to 13:00 Hrs on 10.07.2026**
- 5.0 **TIME AND DATE OF OPENING** : - **After 13:00 Hrs on 10.07.2026**
- 6.0 **COMPLETION PERIOD** : - **12 Months (C) including monsoon**
The work should be started within 15 days from issue of LOA.
- 7.0 **VALIDITY OF OFFER** : - **60 days**
- 8.0 **BID SECURITY** : - **Rs. 5,84,900/-**
- 9.0 **FOREIGN EXCHANGE:**
No foreign exchange and / or import license shall be released / provided to the Contractor in connection with this contract.
- 10.0 **GENERAL**
 1. All the works shall be carried out by the Contractor with tools and equipment arranged by the Contractor.
 2. Water / electricity / transport shall be arranged by the Contractor at his own cost. The Purchaser shall not provide the same under any circumstances. The site for depot / workshop can be provided to the Contractor on his request.
 3. The Contractor shall arrange at his own cost, all tools & plants, facilities required for erection, testing and commissioning of all the equipment in compliance with the respective specifications.
 4. The schedule of rates and quantities enclosed should be read in conjunction with the explanatory notes given in the tender papers.
 5. Conditional offer will not be considered.
- 11.0 **ELIGIBILITY CRITERIA: - MINIMUM ELIGIBILITY CRITERIA OF TENDERER (Applicable for works costing more than Rs. 50 Lakh): -**
- 11.1 **Technical Eligibility Criteria:**
 - (a) The tenderer must have successfully completed or substantially completed any of the following during last 07 (seven) years, ending last day of month previous to the one in which tender is invited.
 - (i) Three similar works each costing not less than the amount equal to 30% of advertised value of the tender, **OR**
 - (ii) Two similar works each costing not less than the amount equal to 40% of advertised value of the tender, **OR**

(iii) One similar work each costing not less than the amount equal to 60% of advertised value of the tender.

- (b) (1) In case of tenders for composite works (e.g. works involving more than one distinct component, such as Civil Engineering works, S&T works, Electrical works, OHE works etc. and in the case of major bridges – substructure, superstructure etc.), tenderer must have successfully completed or substantially completed any of the following during last 07 (seven) years, ending last day of month previous to the one in which tender is invited:

(i) Three similar works each costing not less than the amount equal to 30% of advertised value of each component of tender, **OR**

(ii) Two similar works each costing not less than the amount equal to 40% of advertised value of each component of tender, **OR**

(iii) One similar work each costing not less than the amount equal to 60% of advertised value of each component of tender.

Note for b (i): Separate completed works of minimum required values shall also be considered for fulfillment of technical eligibility criteria for different components.

- (b) (2) In such cases, what constitutes a component in a composite work shall be clearly predefined with estimated tender cost of it, as part of the tender documents without any ambiguity.

- (b) (3) To evaluate the technical eligibility of tenderer, only components of work as stipulated in tender documents for evaluation of technical eligibility, shall be considered. The scope of work covered in other remaining components shall be either executed by tenderer himself if he has work experience as mentioned in clause 7 of the Standard General Conditions of Contractor through subcontractor fulfilling the requirements as per clause 7 of the Standard General Conditions of Contract or jointly i.e., partly himself and remaining through subcontractor, with prior approval of Chief Engineer in writing.

However, if required in tender documents by way of Special Conditions, a formal agreement duly notarized, legally enforceable in the court of law, shall be executed by the main contractor with the subcontractor for the component(s) of work proposed to be executed by the subcontractor(s), and shall be submitted along with the offer for considering subletting of that scope of work towards fulfillment of technical eligibility. Such subcontractor must fulfil technical eligibility criteria as follows:

The subcontractor shall have successfully completed at least one work similar to work proposed for subcontract, costing not less than 35% value of work to be subletted, in last 5 years, ending last day of month previous to the one in which tender is invited through a works contract.

Note: for subletting of work costing up to Rs 50 lakh, no previous work experience of subcontractor shall be asked for by the Railway.

In case after award of contract or during execution of work it becomes necessary for contractor to change subcontractor, the same shall be done with subcontractor(s) fulfilling the requirements as per clause 7 of the Standard General Conditions of Contract, with prior approval of Chief Engineer in writing.

Similar nature of works

The contractor should have executed:

Electrification / Rewiring of Service or Residential building/Yard / HT/LT Substation work / HT/LT cable work / Street lighting / Platform or building lighting management / circulating area Lighting/ Electrical overhead power supply work / Electrical pump work etc.”

Note for Item 11.1

Work experience certificate from private individual shall not be considered. However, in addition to work experience certificates issued by any Govt. Organization, work experience certificate issued by Public listed company having average annual turnover of Rs 500 crore and above in last 3 financial years excluding the current financial year, listed on National Stock Exchange or Bombay Stock Exchange, incorporated/registered at least 5 years prior to the date of closing of tender, shall also be considered provided the work experience certificate has been issued by a person authorized by the Public listed company to issue such certificates.

In case tenderer submits work experience certificate issued by public listed company, the tenderer shall also submit along with work experience certificate, the relevant copy of work order, bill of quantities, bill wise details of payment received duly certified by Chartered Accountant, TDS

certificates for all payments received and copy of final/last bill paid by company in support of above work experience certificate.

11.2 Financial Eligibility Criteria:

The tenderer must have minimum average annual contractual turnover of V/N or 'V' whichever is less; where

V= Advertised value of the tender in crores of Rupees

N= Number of years prescribed for completion of work for which bids have been invited.

The average annual contractual turnover shall be calculated as an average of "total contractual payments" in the previous three financial years, as per the audited balance sheet. However, in case balance sheet of the previous year is yet to be prepared / audited, the audited balance sheet of the fourth previous year shall be considered for calculating average annual contractual turnover.

The tenderers shall submit requisite information as per Annexure-VIB, along with copies of Audited Balance Sheets duly certified by the Chartered Accountant/ Certificate from Chartered Accountant duly supported by Audited Balance Sheet.

11.3 Bid Capacity: (Only for tender costing more than Rs. 20 crore)

The tender/technical bid will be evaluated based on bid capacity formula detailed as Annexure-VI of GCC April 2022

11.4 No Technical and Financial credentials are required for tenders having advertised value up to Rs 50 lakh

11.5 Credentials if submitted in foreign currency shall be converted into Indian currency i.e., Indian Rupee as under:

The conversion rate of US Dollars into Rupees shall be the daily representative exchange rates published by the Reserve Bank of India or entity authorized by RBI to do so for the relevant date or immediately previous date for which rates have been published. Where, relevant date shall be as on the last day of month previous to the one in which tender is invited. In case of any other currency, the same shall first be converted to US Dollars as on the last day of month previous to the one in which tender is invited, and the amount so derived in US Dollars shall be converted into Rupees at the aforesaid rate. The conversion rate of such currencies shall be the daily representative exchange rates published by the International Monetary Fund for the relevant date or immediately previous date for which rates have been published.

Explanation for above clause 11 including clause 11.1 to 11.5 - Eligibility Criteria:

1. *Substantially Completed Work means an ongoing work in which payment equal to or more than 90% of the present contract value (excluding the payment made for adjustment of Price variation (PVC), if any) has been made to the contractor in that ongoing contract and no proceedings of termination of contract on Contractor's default has been initiated. The credential certificate in this regard should have been issued not prior to 60 days of date of invitation of present tender.*
2. *In case a work is started prior to 07 (seven) years, ending last day of month previous to the one in which tender is invited, but completed in last 07 (seven) years, ending last day of month previous to the one in which tender is invited, the completed work shall be considered for fulfillment of credentials.*
3. *If a work is physically completed and completion certificate to this extent is issued by the concerned organization but final bill is pending, such work shall be considered for fulfillment of credentials*
4. *In case of completed work, the value of final bill (gross amount) including the PVC amount (if paid) shall be considered as the completion cost of work. In case final bill is pending, only the total gross amount already paid including the PVC amount (if paid) shall be considered as the completion cost of work.*
In case of substantially completed work, the total gross amount already paid including the PVC amount (if paid), as mentioned in the certificate, shall be considered as the cost of substantially completed work.
5. *If a bidder has successfully completed a work as subcontractor and the work experience certificate has been issued for such work to the subcontractor by a Govt. Organization or public*

listed company as defined in Note for Item 10.1 Para 10 of the Tender Form (Second Sheet), the same shall be considered for the purpose of fulfillment of credentials.

6. In case a work is considered similar in nature for fulfillment of technical credentials, the overall cost including the PVC amount (if paid) of that completed work or substantially completed work, shall be considered and no separate evaluation for each component of that work shall be made to decide eligibility.
7. In case of newly formed partnership firm, the credentials of individual partners from previous propriety firm(s) or dissolved previous partnership firm(s) or split previous partnership firm(s), shall be considered only to the extent of their share in previous entity on the date of dissolution / split and their share in newly formed partnership firm. For example, a partner A had 30% share in previous entity and his share in present partnership firm is 20%. In the present tender under consideration, the credentials of partner A will be considered to the extent of $0.3 \times 0.2 \times \text{value of the work done in the previous entity}$. For this purpose, the tenderer shall submit along with his bid all the relevant documents which include copy of previous partnership deed(s), dissolution deed(s) and proof of surrender of PAN No.(s) in case of dissolution of partnership firm(s) etc.
8. In case of existing partnership firm, if any one or more partners quit the partnership firm, the credentials of remaining partnership firm shall be re-worked out i.e., the quitting partner(s) shall take away his credentials to the extent of his share on the date of quitting the partnership firm (e.g. in a partnership firm of partners A, B & C having share 30%, 30% & 40% respectively and credentials of Rs 10 crore; in case partner C quits the firm, the credentials of this partnership firm shall remain as Rs 6 crore). For this purpose, the tenderer shall submit along with his bid all the relevant documents which include copy of previous partnership deed(s), dissolution deed(s) and proof of surrender of PAN No.(s) in case of dissolution of partnership firm(s) etc.
9. In case of existing partnership firm if any new partner(s) joins the firm without any modification in the name and PAN/TAN no. of the firm, the credentials of partnership firm shall get enhanced to the extent of credentials of newly added partner(s) on the same principles as mentioned in item 6 above. For this purpose, the tenderer shall submit along with his bid all the relevant documents which include copy of previous partnership deeds, dissolution/splitting deeds and proof of surrender of PAN No.(s) in case of dissolution of partnership firm etc.
10. Any partner in a partnership firm cannot use or claim his credentials in any other firm without leaving the partnership firm i.e., In a partnership firm of A&B partners, A or B partner cannot use credentials of partnership firm of A&B partners in any other partnership firm or propriety firm without leaving partnership firm of A&B partners.
11. In case a partner in a partnership firm is replaced due to succession as per succession law, the proportion of credentials of the previous partner will be passed on to the successor.
12. If the percentage share among partners of a partnership firm is changed, but the partners remain the same, the credentials of the firm before such modification in the share will continue to be considered for the firm as it is without any change in their value. Further, in case a partner of partnership firm retires without taking away any credentials from the firm, the credentials of partnership firm shall remain the same as it is without any change in their value.
13. In a partnership firm "AB" of A&B partners, in case A also works as propriety firm "P" or partner in some other partnership firm "AX", credentials of A in propriety firm "P" or in other partnership firm "AX" earned after the date of becoming a partner of the firm AB shall not be added in partnership firm AB.
14. In case a tenderer is LLP, the credentials of tenderer shall be worked out on above lines similar to a partnership firm.
15. In case company A is merged with company B, then company B would get the credentials of company A also.]

12. **TENDERER CREDENTIALS:**

Documents testifying tenderer previous experience and financial status should be produced along with the tender.

Tenderer(s) who is / are not borne on the approved list of the Contractors of Central Railway shall submit along with his / their tender:

- (i) Certificates and testimonials regarding contracting experience for the type of job for which tender is invited with list of works carried out in the past.
- (ii) Certificates which may be an attested Certificate from the client, Audited Balance Sheet duly certified by the Chartered Accountant etc. regarding contractual payments received in the past.
- (iii) The list of personnel / organization on hand and proposed to be engaged for the tendered work. Similarly list of Plant & Machinery available on hand and proposed to be inducted and hired for the tendered work.
- (iv) Annexure-V:- “On IREPS Module, a facility has been already been created for online submission of Annexure-V. Same must be filled and submitted online on IREPS by firm at the time of submission of offer/Bid. In addition to Annexure-V (online on IREPS), in case of other than Company/Proprietary firm, Annexure - V(A) shall also be submitted by the each member of a Partnership Firm / Joint Venture (JV) / Hindu Undivided Family (HUF) / Limited Liability Partnership (LLP etc. as the case may be. Non submission of a copy of certificate by the bidder shall result in summarily rejection of his/their bid. It shall be mandatorily incumbent upon the tenderer to identify, state and submit the supporting documents duly self-attested / digitally signed by which they/he are/is qualifying the Qualifying Criteria mentioned in the Tender Document. (As per Railway Board letter No. 2022/CE-I/CT/GCC Correspondence New Delhi, dated 14.05.2024).
- (v) The Railway reserves the right to verify all statements, information and documents submitted by the bidder in his tender offer, and the bidder shall, when so required by the Railway, make available all such information, evidence and documents as may be necessary for such verification. Any such verification or lack of such verification, by the Railway shall not relieve the bidder of its obligations or liabilities hereunder nor will it affect any rights of the Railway thereunder.
- (vi) (a) In case of any information submitted by tenderer is found to be false forged or incorrect at any time during process for evaluation of tenders, it shall lead to forfeiture of the tender Bid Security besides banning of business for a period of upto two years.
(b) In case of any information submitted by tenderer is found to be false forged or incorrect after the award of contract, the contract shall be terminated. Bid Security, Performance Guarantee and Security Deposit available with the railway shall be forfeited. In addition, other dues of the contractor, if any, under this contract shall be forfeited and agency shall be banned for doing business for a period of upto two years.

13.0 Non-compliance with any of the conditions set forth therein above is liable to result in the tender being rejected.

14.0 DOCUMENTS TO BE SUBMITTED ALONG WITH TENDER:

14.1 The tenderer shall clearly specify whether the tender is submitted on his own (Proprietary Firm) or on behalf of a Partnership Firm / Company / Joint Venture (JV) / Registered Society / Registered Trust / Hindu Undivided Family (HUF) / Limited Liability Partnership (LLP) etc. The tenderer(s) shall enclose the attested copies of the constitution of their concern, and copy of PAN Card along with their tender. Tender Documents in such cases are to be signed by such persons as may be legally competent to sign them on behalf of the firm, company, association, trust or society, as the case may be.

14.2 FOLLOWING DOCUMENTS SHALL BE SUBMITTED BY THE TENDERER:

(a) SOLE PROPRIETORSHIP FIRM:

- (i) All documents in terms of Para 11 above.
- (ii) In case a tenderer is participating as Sole Proprietor in a tender, it should be made mandatory for him to submit an undertaking on suitable stamp paper to this effect clearly mentioning PAN number also along with tender document at the time of submission of tender.
(Vide SDGM/CR (Vig.) letter no. VIG/EL/2022.03.01 dated 13.05.2022)

(b) HUF:

- (i) A copy of notarized affidavit on Stamp Paper declaring that he who is submitting the tender on behalf of HUF is in the position of ‘Karta’ of Hindu Undivided Family (HUF)

and he has the authority, power and consent given by other members to act on behalf of HUF.

- (ii) All other documents in terms of para 11 above.
 - (c) **PARTNERSHIP FIRM:** All documents as mentioned in para 18 of the Tender Form (Second Sheet) of GCC April 2022.
 - (d) **JOINT VENTURE (JV):** All documents as mentioned in para 17 of the Tender Form (Second Sheet) of GCC April 2022.
 - (e) **COMPANY REGISTERED UNDER COMPANIES ACT 2013:**
 - (i) The copies of MOA (Memorandum of Association) / AOA (Articles of Association) of the company.
 - (ii) A copy of Certificate of Incorporation.
 - (iii) A copy of Authorization / Power of Attorney issued by the Company (backed by the resolution of Board of Directors) in favor of the individual to sign the tender on behalf of the company and create liability against the company.
 - (iv) All other documents in terms of para 11 above.
 - (f) **LLP (Limited Liability Partnership):**
 - (i) A copy of LLP Agreement.
 - (ii) A copy of Certificate of Incorporation.
 - (iii) A copy of Power of Attorney / Authorization issued by the LLP in favor of the individual to sign the tender on behalf of the LLP and create liability against the LLP.
 - (iv) An undertaking by all partners of the LLP that they are not blacklisted or debarred by Railways or any other Ministry / Department of the Govt. of India from participation in tenders / contracts as on the date of submission of bids, either in their individual capacity or in any firm/LLP or JV in which they were / are partners/members. Concealment / wrong information in regard to above shall make the contract liable for determination under Clause 62 of the Standard General Conditions of Contract.
 - (v) All other documents in terms of para 11 above
 - (g) **Registered Society & Registered Trust:**
 - (i) A copy of the Certificate of Registration.
 - (ii) A copy of Memorandum of Association of Society/Trust Deed.
 - (iii) A copy of Power of Attorney in favor of the individual to sign the tender documents and create liability against the Society/Trust.
 - (iv) A copy of Rules & Regulations of the Society
 - (v) All other documents in terms of para 11 above
- 14.3** If it is NOT mentioned in the submitted tender that tender is being submitted on behalf of a Sole Proprietorship firm / Partnership firm / Joint Venture / Registered Company etc., then the tender shall be treated as having been submitted by the individual who has signed the tender.
- 14.4** After opening of the tender, any document pertaining to the constitution of Sole Proprietorship Firm / Partnership Firm / Registered Company/ Registered Trust / Registered Society / HUF/LLP etc. shall be neither asked nor considered, if submitted. Further, no suo moto cognizance of any document available in public domain (i.e., on internet etc.) or in Railway's record/office files etc. will be taken for consideration of the tender, if no such mention is available in tender offer submitted.
- 14.5** A tender from JV / Partnership firm etc. shall be considered only where permissible as per the tender conditions.
- 14.6** The Railway will not be bound by any change of power of attorney or in the composition of the firm made subsequent to the submission of tender. Railway may, however, recognize such power of attorney and changes after obtaining proper legal advice, the cost of which will be chargeable to the Contractor.
- 14.7** The tenderer whether sole proprietor / a company or a partnership firm / registered society / registered trust / HUF / LLP etc if they want to act through agent or individual partner(s), should submit along with the tender, a copy of power of attorney duly stamped and authenticated by a Notary Public or by Magistrate in favor of the specific person whether he/they be partner(s) of the firm or any other person, specifically authorizing him/them to sign the tender, submit the tender and further to deal with the Tender/ Contract up to the stage of signing the agreement except in

case where such specific person is authorized for above purposes through a provision made in the partnership deed / Memorandum of Understanding / Article of Association / Board resolution, failing which tender shall be summarily rejected.

A separate power of attorney duly stamped and authenticated by a Notary Public or by Magistrate in favor of the specific person whether he/they be partner(s) of the firm or any other person, shall be submitted after award of work, specifically authorizing him/them to deal with all other contractual activities subsequent to signing of agreement, if required.

Note: A Power of Attorney executed and issued overseas, the document will also have to be legalized by the Indian Embassy and notarized in the jurisdiction where the Power of Attorney is being issued. However, the Power of Attorney provided by Bidders from countries that have signed the Hague Legislation Convention 1961 are not required to be legalized by the Indian Embassy if it carries a conforming Apostille certificate.

14.8 The following documents are required to be submitted along with tender with offer:

- (i) Certificate (Annexure-V(A) of GCC) (if applicable)
- (ii) Copy of GST registration number
- (iii) A copy of PAN Card
- (iv) BID SECURITY (as per clause 1.10.1 of Chapter-I of this Tender Document) / Bank Guarantee Bond
- (v) List of personnel along with their qualifications, trade certification / licenses, designation, available in organization and proposed to be engaged for the subject work.
- (vi) List of Plants & Machineries available on hand (own) and proposed to be inducted (own and hired to be given separately) for the subject work.
- (vii) Annexure VI B along with audited balance sheet.
- (viii) Work Completion Certificate from the controlling authorities of Govt./ Semi Govt. organization indicating value of work of similar nature carried out by the firm during qualifying period in support of para 11.0)
- (ix) List of works completed in the qualifying period giving description of work, organization for whom executed approximate value of contract at the time of award, payment received in the qualifying period date of award and date of scheduled completion of work. Date of actual start, actual completion and final value of contract should also be given as per Proforma –A attached in Chapter-VII. The certificate submitted by the tenderer should not be signed by an Officer below the rank of Executive Engineer of the concerned department.
- (x) List of ALL works on hand indicating description of work, contract value, and approximate value balance work yet to be done and date of award as per Proforma –B attached in Chapter-VII.
- (xi) The contractor shall fulfill valid Electrical Contractor License requirement as per IE Rule 1956 clause no-45. **Electrical Contractors license** shall be submitted along with the offer, failing which the offer will summarily be rejected.
- (xii) Any other documents the tenderer/s may like to submit in support of his / scheme.

Note: (1) In case of items (x) & (xi) above, supporting documents / certificates from the organizations with whom they worked / are working should be enclosed as per proforma A & B mentioned above.

(2) Tenderer should not quote any conditional offer, giving rebate for early finalization of their offer. Such conditional offer will be summarily rejected and no correspondence in this matter will be entertained.

(3) Tenderer may carefully note that their contract agreement for this work is liable to be terminated at any time later. In case any of the information furnished by them is found to be untrue / misleading or any adverse point comes to light subsequently. The decision of Railway in this regard shall be final and binding.

(4) For any additional information / clarification office of the Sr. DEE (G) CSMT may be contacted on any working day between 09.30 hrs to 17.30 hrs.

- 15. Make in India Policy:** Provisions of Make in India Policy 2017 issued by Govt. of India, as amended from time to time, shall be followed for consideration of tenders.
 “This tender complies with Public Procurement Policy (Make in India) Order, 2017 – Revision dated 16/09/2020, issued by Department of Industrial Promotion and Policy, Ministry of Commerce, circulated vide Railway Board letter no. 2020/RS(G)/779/2/Pt.1 dated 25/09/2020 and amendments / revisions thereof.” The full details of the order can be seen at <http://dipp.nic.in/whats-new/publicprocurement-preference-make-india-order-2017>.
 (Authority Railway Boards L. No. 2020/RS(G)/779/2/Pt.1 dated 25-09-2020)
Reciprocity Clause (d) of revised ‘Make in India’ policy (vide vide Railway Board letter no. 2015/RS(G)/779/5 dated 01.06.2021)
- (i) “When a Nodal Ministry/Department identifies Indian suppliers of an item are not allowed to participate and/ or compete in procurement by any foreign government, due to restrictive tender conditions which have direct or indirect effect of barring Indian companies such as registration in the procuring country, execution of projects of specific value in the procuring country etc. it shall provide such details to all its procuring entities including CMDs/CEOs of PSEs/PSUs, State Governments and other procurement agencies under their administrative control and GeM for appropriate reciprocal action.”
 - (ii) Entities of countries which have been identified by the nodal Ministry/Department as not allowing Indian companies to participate in their Government procurement for any item related to that nodal Ministry shall not be allowed to participate in Government procurement in India for all items related to that nodal Ministry / Department, except for the list of items published by the Ministry / Department permitting their participation.
 - (iii) The stipulation in (ii) above shall be part of all tenders invited by the Central Government procuring entities stated in (i) above. All purchases on GeM shall also necessarily have the above provisions for items identified by nodal Ministry / Department.
 - (iv) State Govt. should be encouraged to incorporate similar provisions in their respective tenders.
 - (v) The term 'entity' of a country shall have the same meaning as under the FDI Policy of DPIIT as amended from time to time.
- 16. Permission to Bid for a bidder from a country which shares Land boundary with India:** Any bidder from the countries sharing a land border with India will be eligible to bid in any procurement of works (including turnkey projects) only if the bidder is registered with the Competent Authority. The Competent Authority for registration will be the Registration Committee constituted by the Department for Promotion of Industry and Internal Trade (DPIIT), Government of India. For interpretation of this para, Department of Expenditure, Ministry of Finance, Government of India letter F.No.6/18/2019-PPD dated 23/07/2020 shall be referred.
- 17. Clarification of Bids:** To assist in the examination, evaluation & comparison and pre-qualification of the Tender, the Railway may, at its discretion, ask any Bidder for a clarification of its Bid. Any clarification submitted by a Bidder that is not in response to a request by the Railway shall not be entertained or considered. The Railway request for clarification and the response of the bidder in this regard shall be in writing.
 However, if a Bidder does not provide clarification of its bid by the date and time communicated in the Railway request for clarification, the bid shall be evaluated as per the documents submitted along with the bid.
- 18. GENERAL CONDITION OF CONTRACT:**
 Unless otherwise stated in the tender papers, contract shall be governed by the **Indian Railways Standard General Conditions of Contract (G.C.C.) April 2022** issued by Railway Board / Central Railway & applicable for Central Railway, copy of which is available, for reference in the office of the **Senior Divisional Electrical Engineer, (General Service) Mumbai CSMT** and soft copy can be accessed at https://indianrailways.gov.in/railwayboard/uploads/directorate/civil_engg/pdf/2022/GCC_April-2022_2022_CE-I_CT_GCC-2022_POLICY_27_04_22.pdf. For block working in Mumbai division, rules/procedure stipulated in PDSR (Power Distribution & Subsidiary Rules) and G&SR (General & Subsidiary Rules) as applicable for Mumbai division shall be followed. Successful tenderer shall ensure himself & his staff for getting acquaintance of these rules and their compliance.

19.0 ADDRESSES:

Relevant addresses for specified purposes in connection with the tender are given below:

- 19.1 For Contract execution –
Senior Divisional Electrical Engineer,
(General Service) Mumbai CSMT,
Annex Building, 1st floor,
Central Railway,
Mumbai-400 001**
- 19.2 For Security Deposit / BID SECURITY.
Senior Divisional Finance Manager,
Mumbai CSMT,
Annex Building, 4th floor,
Central Railway,
Mumbai-400 001**

OFFER LETTER

Tender No.: BB.LG.W.THK.2026.01

Name of Work: “(A) Electrification for upgradation of SM office, other utility offices, construction and improvement of toilet, beautification of FOBs and allied works at Thakurli station. (B) Rewiring for renovation and improvement of service buildings in between Kanjurmarg-Kopar Section. (C) Rewiring for renovation and improvement of service building at Thakurli, Dombivli and Kalyan Station. (D) Electrification for Provision of extension of platform at Vikhroli, Kalva, Mumbra & Diva of through lines for running of 15 car EMU services.”

To,

**The President of India,
Acting through the
Sr. Divisional Electrical Engineer (General Service)
Central Railway, Mumbai CSMT**

1. I/We _____ have read the various conditions to tender attached hereto and agree to abide by the said conditions. I/We also agree to keep this offer open for acceptance for a period of **60 days** from the date fixed for closing of the tender and in default thereof, I / We will be liable for forfeiture of my/our “Bid Security”. I/We offer to do the work for Central Railway, at the rates quoted in the attached bill(s) of quantities and hereby bind myself/ourselves to complete the work in all respects within **12 Months** from the date of issue of letter of acceptance of the tender.
2. I/We also hereby agree to abide by the Indian Railways Standard General Conditions of Contract, with all correction slips up-to-date and to carry out the work according to the Special Conditions of Contract and Specifications of materials and works as laid down by Railway in the annexed Special Conditions / Specifications, Standard Schedule of Rates (SSOR) with all correction slips up-to-date for the present contract.
3. A Bid Security of ₹ _____ has already been deposited online/ submitted as Bank Guarantee bond. Full value of the Bid Security shall stand forfeited without prejudice to any other right or remedies in case my/our Tender is accepted and if:
 - a) I/We do not submit the Performance Guarantee within the time specified in the Tender document;
 - b) I/We do not execute the contract documents within seven days after receipt of notice issued by the Railway that such documents are ready; and
 - c) I/We do not commence the work within fifteen days after receipt of order to that effect.
4. I/We am/are a Startup firm registered by Department of Industrial Policy and Promotion (DIPP) and my registration number is valid upto (Copy enclosed) and hence exempted from submission of BID SECURITY.
5. We are a Labour Cooperative Society and our Registration No. iswith and hence required to deposit only 50% of Bid Security
6. Until a formal agreement is prepared and executed, acceptance of this tender shall constitute a binding contract between us subject to modifications, as may be mutually agreed to between us and indicated in the letter of acceptance of my/our offer for this work.

.....

Signature of Tenderer(s)

Date

Address of the Tenderer(s)

.....

CHAPTER-I

INSTRUCTIONS TO

TENDERERS

&

CONDITIONS OF TENDERING

CHAPTER-I

INSTRUCTIONS TO TENDERERS AND CONDITIONS OF TENDERING

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CHAPTER-I

REGULATION FOR TENDERS AND CONTRACTS FOR THE GUIDANCE OF ENGINEERS & CONTRACTORS FOR WORKS CONTRACTS MEANING OF TERMS

1.1.0 TENDER PAPERS:

The instructions to Tenderers and conditions of Tendering, conditions of contract, prices and payment and explanatory notes, specifications, forms of tender, preamble shall hereafter be collectively referred to as the “Tender Papers”.

The intending tenderers are advised to study the tender papers carefully. The tenderer shall also acquaint himself with the local conditions, means of access to the site of work, nature of work and all other matters pertaining thereto.

The submission of tender shall be deemed to have been done after careful study and examination of the tender papers with a full understanding of the implications thereof.

1.2.0 INTERPRETATIONS:

These Instructions to Tenderers shall be read in conjunction with the Standard General Conditions of Contract which are referred to herein and shall be subject to modifications additions or suppression by special conditions of contract and/or special specifications, if any, annexed to the Tender Forms.

1.2.1 In these Instructions to Tenderers, the following terms shall have the meanings assigned hereunder except where the context otherwise requires.

- (a) **“Railway”** shall mean the President of the Republic of India or the Administrative Officers of the Railway or Successor Railway authorized to deal with any matters, which these presents are concerned on his behalf.
- (b) **“General Manager”** shall mean the Officer-in-Charge of the general superintendence and control of the Zonal Railway/Production Units and shall also include Addl. General Manager, General Manager (Construction) and shall mean and include their successors, of the Successor Railway.
- (c) **“Chief Engineer”** shall mean the Officer in charge of the Engineering Department of Railway and shall also include the Chief Engineer (Construction), Chief Electrical Engineer, Chief Electrical Engineer (Construction), Chief Signal & Telecom Engineer, Chief Signal & Telecom Engineer (Construction), Chief Mechanical Engineer and shall mean and include their successors of the Successor Railway.
- (d) **“Divisional Railway Manager”** shall mean the Officer in charge of a Division of the Zonal Railway and shall mean and include the Divisional Railway Manager of the Successor Railway.
- (e) **“Engineer”** shall mean the Divisional Engineer or the Executive Engineer, Divisional Signal & Telecom Engineer, Divisional Electrical Engineer, Divisional Mechanical Engineer in executive charge of the works and shall include the superior officers, both Open Line and Construction organizations, of Engineering, Signal & Telecom, Mechanical and Electrical Departments, i.e. the Senior Divisional Engineer/Deputy Chief Engineer, Senior Divisional Signal & Telecom Engineer / Dy. Chief Signal & Telecom Engineer, Senior Divisional Electrical Engineer / Deputy Chief Electrical Engineer, Senior Divisional Mechanical Engineer and shall mean & include the Engineers of the Successors Railway.
- (f) **“Tenderer”** shall mean the person / the firm / co-operative or company whether incorporated or not who tenders for the works with a view to execute the works on contract with the Railway and shall include their representatives, successors and permitted assigns.
- (g) **“Limited Tenders”** shall mean tenders invited from all or some Contractors on the approved or select list of Contractors with the Railway.
- (h) **“Open Tenders”** shall mean the tenders invited in open and public manner and with adequate notice.
- (i) **“Works”** shall mean the works contemplated in the drawings and Bill(s) of Quantities set forth in the tender forms and required to be executed according to the specifications.

- (j) **"Specifications"** shall mean the Specifications for Materials and Works of the Railway as specified under the authority of the Ministry of Railways or Chief Engineer or as amplified, added to or superseded by special specifications if any, appended to the Tender Forms.
- (k) **Standard Schedule of Rates (SSOR)** shall mean the schedule of Rates adopted by the Railway, which includes-
 1. "Unified Standard Schedule of Rates of the Railway (USSOR)" i.e. the Standard Schedule of Rates of the Railway issued under the authority of the Chief Engineer from time to time, updated with correction slips issued up to date of inviting tender or as otherwise specified in the tender documents;
 2. "Delhi Schedule of Rates (DSR)" i.e. the Standard Schedule of Rates published by Director General/ Central Public Works Department, Government of India, New Delhi, as adopted and modified by the Railway under the authority of the Chief Engineer from time to time, updated with correction slips issued up to date of inviting tender or as otherwise specified in the tender documents.
- (l) **"Drawing"** shall mean the maps, drawings, plans and tracings or prints there of annexed to the contract and shall include any modifications of such drawings and further drawings as may be issued by the Engineer from time to time.
- (m) **'Contractor's authorized Engineer'** shall mean a graduate Engineer or equivalent, having more than 3 years experience in the relevant field of construction work involved in the contract, duly approved by Engineer.
- (n) **Date of inviting tender** shall be the date of publishing tender notice on IREPS website if tender is published on website or the date of publication in newspaper in case tender is not published on website.
- (o) **"Bill of Quantities"** shall mean Schedule of Item(s) included in the tender document along with respective quantities.
- (p) **"Engineer's Representative"** shall mean the Assistant Engineer, Assistant Signal & Telecommunication Engineer and Assistant Electrical Engineer, Assistant Mechanical Engineer in direct charge of the works and shall include any Sr. Section/Junior Engineer of Civil Engineering/ Signal and Telecommunication Engineering/Mechanical Engineering/Electrical Engineering Departments appointed by the Railway and shall mean and include the Engineer's Representative of the Successor Railway.
- (q) **"Contractor"** shall mean the Person/Firm/LLP/Trust/Co-operative Society or Company whether incorporated or not who enters into the contract with the Railway and shall include their executors, administrators, successors and permitted assigns.
- (r) **"Contract"** shall mean and include the Agreement, the Work Order, the accepted Bill(s) of Quantities or Chapter(s) of Standard Schedule of Rates (SSOR) of the Railway modified by the tender percentage for items of works quantified, or not quantified, the Standard General Conditions of Contract, the Special Conditions of Contracts, if any; the Drawing, the Specifications, the Special Specifications, if any and Tender Forms, if any.
- (s) **"Constructional Plant"** shall mean all appliances or things of whatsoever nature required for the execution, completion or maintenance of the works or temporary works (as hereinafter defined) but does not include materials or other things intended to form or forming part of the permanent work.
- (t) **"Temporary Works"** shall mean all temporary works of every kind required for the execution completion and/or maintenance of the works.
- (u) **"Site"** shall mean the lands and other places on, under, in or through which the works are to be carried out and any other lands or places provided by the Railway for the purpose of the contract.
- (v) **"Period of Maintenance"** shall mean the specified period of maintenance from the date of completion of the works, as certified by the Engineer.
- (w) **'Contractor's authorized Engineer'** shall mean a graduate Engineer or equivalent, having more than 3 years experience in the relevant field of construction work involved in the contract, duly approved by Engineer.

1.3.0 SINGULAR / PLURAL:

Words importing the singular number shall also include the plural and vice versa where the context requires.

1.4.0 REGULATIONS FOR TENDER:

These Instructions to Tenderers shall be read in conjunction with the Standard General Conditions of Contract as amended at the time of acceptance of the tender and at the time of execution of the agreement mentioned in GCC clause 8 under Regulations for Tender and Contracts which are referred to herein and shall be subject to modifications additions or suppression by Special Conditions of Contract and/or Special Specifications, if any, annexed to the Tender Forms

1.5.0 OMISSIONS & DISCREPANCIES:

The tenderers shall not take any advantage of any misinterpretation of the conditions due to typing or any other error/omission and if any doubt, shall bring it to the notice of the Engineer without delay in case any contradictions, only the printed rules and books should be followed and no claim for the misinterpretation shall be entertained.

Should a tenderer find discrepancies in or omissions from the drawings or any of the Tender Forms or should he be in doubt as to their meaning, he should at once notify the authority inviting tenders. The tender inviting authority may, if deemed necessary, clarify the same to all tenderers. It shall be understood that every endeavour has been made to avoid any error which can materially affect the basis of tender and successful tenderer shall take upon himself and provide for the risk of any error which may subsequently be discovered and shall make no subsequent claim on account thereof.

1.6.0 CONTRACTOR'S SUPPORTING DOCUMENTATION**1.6.1 SUBMISSION OF DOCUMENTS: As para 14.0 of Preamble****1.6.2 TENDERER SPECIAL CONDITIONS:**

The tenderer should normally not stipulate any special conditions while submitting his tender. In such an eventuality, Central Railway reserves the right to summarily reject such tenders without assigning any reasons whatsoever. The tenderer should normally submit his tender in full conformity with the tender conditions of Central Railway, Mumbai. If any particulars are furnished by the tenderer in response to specific tender conditions, by which such particulars are required to be furnished at the tender stage, this shall not be treated as special conditions for the purpose of this para.

1.6.3 TENDER FORM:

The following documents form part of contract: -

- (a) Tender offers letter
- (b) Instructions to tenderers and conditions of tendering
- (c) Special Conditions of contracts
- (d) Prices and Payments
- (e) Explanatory Notes
- (f) Technical Specifications
- (g) Indian Railway's General Conditions of Contract (G.C.C.) April 2022 as amended at the time of acceptance of the tender and at the time of execution of the agreement mentioned in **clause 8** under Regulations for Tender and Contracts. (not attached to this tender documents, however, it can be referred as and when it is required in this office)
- (h) Schedule of Quantities and Rates
- (i) Forms of the Tender
- (j) List of approved suppliers

1.7.0 INSTRUCTIONS FOR TENDER SUBMISSION:

- (a) Subject to exemptions provided under para 5(1) (a) of Part-1 (ITT) of GCC, the tender must be accompanied by a Bid Security as mentioned in tender documents, failing which the tender shall be summarily rejected. The Bid Security shall be deposited either in cash through e-payment gateway or submitted as Bank Guarantee bond from a scheduled commercial bank of India or as mentioned in tender documents. The Bank Guarantee bond shall be as per **Annexure-VIA** and shall be valid for a period of 90 days beyond the bid validity period.

(b) The Tenderer (s) shall keep the offer open for a minimum period of 60 days (in case of two packet system of tendering 90 days) from the date of closing of the Tender. It is understood that the tender documents have been issued to the Tenderer(s) and the Tenderer(s), is / are permitted to tender in consideration of the stipulation on his / their part that after submitting his / their tender subject to the period being extended further, if required by mutual agreement from time to time, he will not resile from his offer or modify the terms and conditions thereof in a manner not acceptable to Central Railway. Should the tenderer fail to observe or comply with the foregoing stipulation, the amount deposited or Bank guarantee bond submitted as Bid Security for the due performance of the above stipulation, shall be forfeited to the Railway.

(c) If his tender is accepted,

(i) the Bid Security mentioned in sub para (a) above deposited in cash through e-payment gateway will be retained as part security for the due and faithful fulfillment of the contract in terms of Clause 16 of the Standard General Conditions of Contract;

(ii) the Bid Security mentioned in sub para(a) above submitted as Bank guarantee bond, will be encashed as part security for the due and faithful fulfillment of the contract in terms of Clause 16 of the Standard General Conditions of Contract.

The Bid Security of other Tenderers shall, save as herein before provided, be returned to them, but the Railway shall not be responsible for any loss or depreciation to the Bid Security that may happen thereto while in their possession, nor be liable to pay interest thereon.

(d) In case Contractor submits the Term Deposit Receipt/Bank Guarantee Bond towards either the Full Security Depositor the Part Security Deposit equal to or more than Bid Security, the Railway shall return the Bid Security so retained as per sub para(c) above, to the Contractor.

1.8.0 INSPECTION OF SITE BEFORE TENDERING:

Before submitting a tender, the tenderer will be deemed to have satisfied himself by actual inspection of the site and locality of the works, that all conditions liable to be encountered during the execution of the works.

1.9.0 SIGNING OF TENDER:

When work is tendered for by a firm or company of contractors, the tender shall be signed by the individual legally authorized to enter into commitments on their behalf.

The Railways will not be bound by any Power of Attorney granted by the tenderer or by changes in the composition of the firm made subsequent to the execution of the contract. Railway may, however recognize such Power of Attorney and changes after obtaining proper legal advice, the cost of which will be charged to the Contractor.

1.10.0 BID SECURITY:

1. a) The tenderer shall be required to submit the Bid Security with the tender for the due performance with the stipulation to keep the offer open till such date as specified in the tender, under the conditions of tender. The Bid Security shall be as under:

Value of the Work	Bid Security
For all works	2% of the estimated cost of the work

Note: (i) The Bid Security shall be rounded off to the nearest Rs.100/-. This Bid Security shall be applicable for all modes of tendering.

(ii) Any firm recognized by Department of Industrial Policy and Promotion (DIPP) as 'Startups' shall be exempted from payment of Bid Security detailed above.

(iii) Labour Cooperative Societies shall submit only 50% of above Bid Security detailed above.

b) It shall be understood that the tender documents have been issued to the tenderer and the tenderer is permitted to tender in consideration of stipulation on his part, that after submitting his tender he will not resile from his offer or modify the terms and conditions thereof in a manner not acceptable to the Engineer. Should the tenderer fail to observe or comply with the said stipulation, the aforesaid amount shall be liable to be forfeited to the Railway.

- c) If his tender is accepted this Bid Security mentioned in sub clause (a) above will be retained as part security for the due and faithful fulfillment of the contract in terms of Clause 16 of the Standard General Conditions of Contract. The Bid Security of other Tenderers shall, save as herein before provided, be returned to them, but the Railway shall not be responsible for any loss or depreciation that may happen thereto while in their possession, nor be liable to pay interest thereon.
- 2. The Bid Security shall be deposited either in cash through e-payment gateway or submitted as Bank Guarantee bond from a scheduled commercial bank of India or as mentioned in tender documents. **The Bank Guarantee bond shall be as per Annexure-VIA and shall be valid for a period of 90 days beyond the bid validity period.**
- 3. In case, submission of Bid Security in the form of Bank Guarantee, following shall be ensured:
 - i. A scanned copy of the Bank Guarantee shall be uploaded on e-Procurement Portal (IREPS) while applying to the tender.
 - ii. **The original Bank Guarantee should be delivered in person to the official nominated as indicated in the tender document before closing date for submission of bids. (i.e. excluding the last date of submission of bids.)**
 - iii. Non submission of scanned copy of Bank Guarantee with the bid on e-tendering portal (IREPS) and/or non submission of original Bank Guarantee within the specified period shall lead to summary rejection of bid.
 - iv. The Tender Security shall remain valid for a period of 90 days beyond the validity period for the Tender.
 - v. The details of the BG, physically submitted should match with the details available in the scanned copy and the data entered during bid submission time, failing which the bid will be rejected
 - vi. The Bank Guarantee shall be placed in an envelope, which shall be sealed. The envelope shall clearly bear the identification **“Bid for the ***** Project”** and shall clearly indicate the name and address of the Bidder. In addition, the Bid Due Date should be indicated on the right hand top corner of the envelope.
 - vii. The envelope shall be addressed to the officer and address as mentioned in the tender document.
 - viii. If the envelope is not sealed and marked as instructed above, the Authority assumes no responsibility for the misplacement or premature opening of the contents of the Bid submitted and consequent losses, if any, suffered by the Bidder.

1.10.2 INTEREST ON BID SECURITY:

No interest on Bid Security will be paid by Senior Divisional Finance Manager, Central Railway, Mumbai CSMT. Further, Senior Divisional Finance Manager, Central Railway, Mumbai CSMT are not responsible for loss of any interest in case of the Fixed Deposit Receipt for any reasons.

1.10.3 SECURITY DEPOSIT: -

The Security Deposit shall be 5% of the contract value. The Bid Security submitted by the Contractor with his tender will be retained/encashed by the Railways as part of security for the due and faithful fulfillment of the contract by the Contractor. Provided further that, if Contractor submits the Cash or Term Deposit Receipt issued from a Scheduled commercial bank of India or irrevocable Bank Guarantee Bond from a Scheduled commercial bank of India, either towards the Full Security Depositor the Part Security Deposit equal to or more than Bid Security, the Railway shall return the Bid Security, to the Contractor.

Balance of Security Deposit may be deposited by the Contractor in cash or Term Deposit Receipt issued from Scheduled commercial bank of India or irrevocable Bank Guarantee bond issued from Scheduled commercial bank of India, or may be recovered at the rate of 6% of the bill amount till the full Security Deposit is recovered. Provided also that in case of defaulting Contractor, the Railway may retain any amount due for payment to the Contractor on the pending "on account bills" so that the amounts so retained (including amount guaranteed through Performance Guarantee) may not exceed 10% of the total value of the contract.

The Irrevocable Bank Guarantee submitted towards Security deposit shall be initially valid up to the stipulated date of Maintenance period plus 60 days and shall be extended from time to time, depending upon extension of contract granted in terms of Clause 17A and 17B of the Standard General Conditions of Contract.

Note: Security Deposit deposited in cash by the Contractor or recovered from the running bills of a Contractor or submitted by contractor as Term Deposit Receipt(s) can be refunded/returned to the contractor, in lieu of irrevocable Bank Guarantee bond issued from scheduled commercial bank of India, to be submitted by him, for an amount equal to or more than the already available Security Deposit, provided however that, in a contract of value less than Rs. 50 Crore, such refund/ return of the already available Security Deposit is permitted up to two times and in a contract of value equal to or more than Rs. 50 Crore, such refund / return of the already available Security Deposit is permitted up to three times.

1.10.4 REFUND OF SECURITY DEPOSIT:

Security Deposit mentioned in above clause shall be returned to the Contractor along with or after, the following:

- (a) Final Payment of the Contract as per clause 51. (1) of GCC and
- (b) Execution of Final Supplementary Agreement or Certification by Engineer that Railway has No Claim on Contractor and
- (c) Maintenance Certificate issued, on expiry of the maintenance period as per clause 50. (1) of GCC, in case applicable.

1.10.5 Forfeiture of Security Deposit: Whenever the contract is rescinded as a whole under clause 62 (1) of these conditions, the Security Deposit already with railways under the contract shall be forfeited. However, in case the contract is rescinded in part or parts under clause 62 (1) of these conditions, the Security Deposit shall not be forfeited.

1.10.6 No interest shall be payable upon the Bid Security and Security Deposit or amounts payable to the Contractor under the Contract, but Government Securities deposited in terms of Sub-Clause 16.4)(b) of this clause will be payable with interest accrued thereon.

1.11.0 PERFORMANCE GUARANTEE (P.G.)

The procedure for obtaining Performance Guarantee is outlined below:

- a. The successful bidder shall have to submit a Performance Guarantee (PG) within 21 (Twenty one) days from the date of issue of Letter of Acceptance (LOA). Extension of time for submission of PG beyond 21 (Twenty one) days and upto 60 days from the date of issue of LOA may be given by the Authority who is competent to sign the contract agreement. However, a penal interest of 12% per annum shall be charged for the delay beyond 21(Twenty one) days, i.e. from 22nd day after the date of issue of LOA. Further, if the 60th day happens to be a declared holiday in the concerned office of the Railway, submission of PG can be accepted on the next working day. In all other cases, if the Contractor fails to submit the requisite PG even after 60 days from the date of issue of LOA, the contract is liable to be terminated. In case contract is terminated railway shall be entitled to forfeit Bid Security and other dues payable to the contractor against that particular contract, subject to maximum of PG amount. In case a tenderer has not submitted Bid Security on the strength of their registration as a Startup recognized by Department of Industrial Policy and Promotion (DIPP) under Ministry of Commerce and Industry, DIPP shall be informed to this effect.

The failed Contractor shall be debarred from participating in re-tender for that work.

- b. The successful bidder shall submit the Performance Guarantee (PG) amounting to 5% of the original contract value **and Additional Performance Guarantee as per clause 16(4)(h)** in any of the following forms
 - (i) A deposit of Cash;
 - (ii) Irrevocable Bank Guarantee;
 - (iii) Insurance Surety Bond as per Annexure-XVII.

Note: **In case of extension of Date of Completion, selected bidder needs to submit extended Insurance Surety Bond/Fresh Insurance Surety Bond/fresh Performance Security, in any form as given above, before expiry of existing Insurance Surety Bond.**

- (iv) Government Securities including State Loan Bonds at 5% below the market value;
- (v) Pay Orders and Demand Drafts tendered by any Scheduled Commercial Bank of India;

- (vi) Guarantee Bonds executed or Deposits Receipts tendered by any Scheduled Commercial Bank of India;
 - (vii) Deposit in the Post Office Saving Bank;
 - (viii) Deposit in the National Savings Certificates;
 - (ix) Twelve years National Defence Certificates;
 - (x) Ten years Defence Deposits;
 - (xi) National Defence Bonds and
 - (xii) Unit Trust Certificates at 5% below market value or at the face value whichever is less. Also, FDR in favour of **Senior Divisional Finance Manager, Central Railway Mumbai CSMT** (free from any encumbrance) may be accepted.
- c. The Performance Guarantee shall be submitted by the successful bidder after the Letter of Acceptance (LOA) has been issued, but before signing of the contract agreement. This P.G. shall be initially valid upto the stipulated date of completion plus 60 days beyond that. In case, the time for completion of work gets extended, the Contractor shall get the validity of P.G. extended to cover such extended time for completion of work plus 60 days.
- d. The value of PG to be submitted by the Contractor is based on original contract value and shall not change due to subsequent variation(s) in the original contract value.
- e. The Performance Guarantee (PG) shall be released after physical completion of the work based on 'Completion Certificate' issued by the competent authority stating that the Contractor has completed the work in all respects satisfactorily.
- f. Whenever the contract is rescinded, the Performance Guarantee already submitted for the contract shall be encashed.
- g. The Engineer shall not make a claim under the Performance Guarantee except for amounts to which the President of India is entitled under the contract (not withstanding and/or without prejudice to any other provisions in the contract agreement) in the event of:
- i) Failure by the Contractor to extend the validity of the Performance Guarantee as described herein above, in which event the Engineer may claim the full amount of the Performance Guarantee.
 - ii) Failure by the Contractor to pay President of India any amount due, either as agreed by the Contractor or determined under any of the Clauses/Conditions of the Agreement, within 30 days of the service of notice to this effect by Engineer.
 - iii) The Contract being determined or rescinded under clause 62 of the GCC.
- h. **If a tender is accepted on the quoted rates of bidder which is below the advertised tender value, an additional performance security shall be submitted by the bidder as below:**

Bid quoted in % of advertised cost	Additional Performance Guarantee (%)
Below 0 - 5% (inclusive)	Nil
Below 5%	5%

1.12.0 PRICE VARIATION CLAUSE (PVC): - Not applicable in this tender.

1.13.0 FORCE MAJEURE CLAUSE (GCC Clause 17): -

If at any time, during the continuance of this contract, the performance in whole or in part by either party of any obligation under this contract shall be prevented or delayed by reason of any war, hostility, acts of public enemy, civil commotion, sabotage, serious loss or damage by fire, explosions, epidemics / pandemics, strikes, lockouts or acts of God (hereinafter, referred to events) provided, notice of the happening of any such event is given by either party to the other within 30 days from the date of occurrence thereof, neither party shall by reason of such event, be entitled to terminate this contract nor shall either party have any claim for damages against the other in respect of such non-performance or delay in performance, and works under the contract shall be resumed as soon as practicable after such event has come to an end or ceased to exist, and the decision of the Engineer as to whether the works have been so resumed or not shall be final and conclusive, PROVIDED FURTHER that if the performance in whole or in part of any obligation under this contract is prevented or delayed by reason of any such event for a period exceeding 120 days, either party may at its option terminate the contract by giving notice to the other party.

1.13.1 Extension of Time in Contracts (GCC Clause 17-A):

Subject to any requirement in the contract as to completion of any portion or portions of the works before completion of the whole, the Contractor shall fully and finally complete the whole of the works comprised in the contract (with such modifications as may be directed under conditions of this contract) by the date entered in the contract or extended date in terms of the following clauses:

(i) **Extension Due to Modification:**

If any modifications have been ordered which in the opinion of the Engineer have materially increased the magnitude of the work, then such extension of the contracted date of completion may be granted as shall appear to the Engineer to be reasonable in the circumstances, provided moreover that the Contractor shall be responsible for requesting such extension of the date as may be considered necessary as soon as the cause thereof shall arise.

(ii) **Extension for Delay Not Due to Railway or Contractor:**

If in the opinion of the Engineer, the progress of work has any time been delayed by any act or neglect of Railway's employees or by other Contractor employed by the Railway under **Sub-Clause (4) of Clause 20** of these Conditions or in executing the work not forming part of the contract but on which Contractor's performance necessarily depends or by reason of proceeding taken or threatened by or dispute with adjoining or to neighbouring owners or public authority arising otherwise through the Contractor's own default etc. or by the delay authorized by the Engineer pending arbitration or in consequences of the Contractor not having received in due time necessary instructions from the Railway for which he shall have specially applied in writing to the Engineer or his authorized representative then upon happening of any such event causing delay, the Contractor shall immediately give notice thereof in writing to the Engineer within 15 days of such happening, but shall nevertheless make constantly his best endeavours to bring down or make good the delay and shall do all that may be reasonably required of him to the satisfaction of the Engineer to proceed with the works. The Contractor may also indicate the period for which the work is likely to be delayed and shall be bound to ask for necessary extension of time.

(iii) **Extension For Delay Due To Railways:**

In the event of any failure or delay by the Railway to hand over the Contractor possession of the lands necessary for the execution of the works or to give the necessary notice to commence the works or to provide the necessary drawings or instructions or any other delay caused by the Railway due to any other cause whatsoever, then such failure or delay shall in no way affect or vitiate the contract or alter the character thereof or entitle the Contractor to damages or compensation therefore, but in any such case, the Railway may grant such extension or extensions of the completion date as may be considered reasonable.

The Contractor shall indicate the period for which the work is likely to be delayed and shall seek extension of time as may be considered necessary under clause 17A(i) or/and 17A(ii) or/ and 17A(iii) above, as soon as the cause thereof shall arise and, in any case, not less than 15 days before the expiry of the date fixed for completion of the works. The Engineer shall consider the same and shall grant and communicate such extension of time as in his opinion is reasonable having regard to the nature and period of delay and the type and quantum of work affected thereby. No other compensation shall be payable for works so carried forward to the extended period of time; the same rates, terms and conditions of contract being applicable, as if such extended period of time was originally provided in the original contract itself.

The non-submission of request for extension or submission of request within less than 15 days before the expiry of the date fixed for completion of the works, shall make him ineligible for extension under these sub clauses, subject to final decision of Engineer.

1.13.2 Extension of Time with Liquidated Damages (LD) for Delay Due To Contractor (GCC Clause 17-B):

The time for the execution of the work or part of the works specified in the contract documents shall be deemed to be the essence of the contract and the works must be completed not later than the date(s) as specified in the contract. If the Contractor fails to complete the works within the time as specified in the contract for the reasons other than the reasons specified in Clause 17 and 17A, the Railway may, if satisfied that the works can be completed by the Contractor within

reasonable short time thereafter, allow the Contractor for further extension of time (Proforma at Annexure-VII) as the Engineer may decide. On such extension the Railway will be entitled without prejudice to any other right and remedy available on that behalf, to recover from the Contractor as agreed damages and not by way of penalty for each week or part of the week, a sum calculated at the rate of liquidated Damages as decided by Engineer, between 0.05% to 0.30 % of the contract value of the works for each week or part of the week.

For the purpose of this Clause, the contract value of the works shall be taken as value of work as per contract agreement including any supplementary work order/contract agreement issued. Provided also, that the total amount of liquidated damages under this condition shall not exceed 5% of the contract value or of the total value of the item or groups of items of work for which a separate distinct completion period is specified in the contract.

Provided further, that if the Railway is not satisfied that the works can be completed by the Contractor and in the event of failure on the part of the contractor to complete the work within further extension of time allowed as aforesaid, the Railway shall be entitled without prejudice to any other right or remedy available in that behalf, to appropriate the contractor's Security Deposit and rescind the contract under Clause 62 of these Conditions, whether or not actual damage is caused by such default.

NOTE:

In a contract, where extension(s) of time have been allowed once under clause 17B, further request(s) for extension of time under clause 17A can also be considered under exceptional circumstances. Such extension(s) of time under clause 17A shall be without any Liquidated damages, but the Liquidated damages already recovered during extension(s) of time granted previously under clause 17B shall not be waived. However, Price variation during such extension(s) shall be dealt as applicable for extension(s) of time under clause 17B.

1.13.3 Bonus for Early Completion of Work (GCC Clause 17-C):

In open tenders having advertised value more than Rs.50 crore and original period of completion 12 months or more, when there is no reduction in original scope of work by more than 10%, and no extension granted on either railway or Contractor's account, Contractor shall be entitled for a bonus of 1% for each 30 days early completion of work. The period of less than 30 days shall be ignored while working out bonus. The maximum bonus shall be limited to 5% of original contract value. The completion date shall be reckoned as the date of issuance of completion certificate by Engineer.

1.14.0 (As per Advance Correction Slip No. 11 of GCC, April 2022, dated 13.03.2026)

1.14.1 ILLEGAL GRATIFICATION:

Procuring authorities as well as bidders, contractors and consultants should observe the highest standard of ethics and should not indulge in the following prohibited practices, either directly or indirectly, at any stage during the procurement process or during execution of resultant contracts:

(i) **“Corrupt practice”**: making offers, solicitation or acceptance of bribe, rewards or gifts or any material benefit, in exchange for an unfair advantage in the procurement process or to otherwise influence the procurement process or contract execution;

(ii) **“Fraudulent practice”**: any omission or misrepresentation that may mislead or attempt to mislead so that financial or other benefits may be obtained or an obligation avoided. This includes making false declaration or providing false information for participation in a tender process or to secure a contract or in execution of the contract;

(iii) **“Anti-competitive practice”**: any collusion, bid rigging or anti-competitive arrangement, or any other practice under the purview of The Competition Act, 2002, between two or more bidders, with or without the knowledge of the procuring entity, that may impair the transparency, fairness and the progress of the procurement process or to establish bid prices at artificial, non-competitive levels;

(iv) **“Coercive practice”** : any coercion or any threat to impair or harm, directly or indirectly, any party or its property to influence the procurement process or affect the execution of a contract;

(v) **“Conflict of interest” (COI)**: any personal, financial, or business relationship between the bidder and any personnel of the procuring entity who are directly or indirectly related to the procurement or execution process of the contract, which can affect the decision of the procuring entity directly or indirectly;

(vi) “Undue Advantage”: improper use of information obtained by the bidder from the procuring entity with an intent to gain an unfair advantage in the procurement process or for personal gain. This also includes if the bidder (or his allied firm) provides services for the need assessment/ procurement planning of the tender process in which he is participating;

(vii) “Obstructive practice”: materially impede the procuring entity’s investigation of a procurement process either by deliberately destroying, falsifying, altering, or by concealing of evidence material to the investigation; or by making false statements or by threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation; or by impeding the procuring entity’s rights of audit or access to information;

1.14.2 PUNITIVE PROVISIONS:

Without prejudice to and in addition to the rights of the procuring entity to other penal provisions as per the bid documents or contract, if the procuring entity comes to a conclusion that a (prospective) bidder / contractor directly or through an agent, has violated this code of integrity in competing for the contract or in executing a contract, the procuring entity may take appropriate measures including one or more of the following:

- (i)** If his bids are under consideration in any procurement
 - a)** Forfeiture or encashment of bid security;
 - b)** calling off of any pre-contract negotiations; and
 - c)** rejection and exclusion of the bidder from the procurement process
- (ii)** If a contract has already been awarded
 - a)** Cancellation of the relevant contract and recovery of compensation for loss incurred by the procuring entity;
 - b)** Forfeiture or encashment of any other security or bond relating to the procurement;
 - c)** Recovery of payments including advance payments, if any, made by the procuring entity along with interest thereon at the prevailing rate;
- iii)** Provisions in addition to above:
 - a)** Removal from the list of enlisted contractors and banning/ debarment of the bidder from participation in future procurements of the procuring entity for a period not less than one year;
 - b)** In case of anti-competitive practices, information for further processing may be filed under a signature of the Joint Secretary level officer, with the Competition Commission of India;
 - c)** Initiation of suitable disciplinary or criminal proceedings against any individual or staff found responsible.

Any question or dispute as to the commission of any such offence or compensation payable to the Railway under this clause shall be settled by the General Manager of the Railway, in such a manner as he shall consider fit & sufficient and his decision shall be final & conclusive.

1.15.0 QUOTING OF RATES:

The Tenderer(s) shall quote his / their rates as a percentage above or below or at par with respect to estimated cost given in the tender and fill up the form given in the tender’s schedule of quantities and rates. Any revision of rates / rebates submitted (quoted) through a separate letter whether enclosed with the bid (Tender Form) or submitted separately or mentioned elsewhere in the document other than specified place shall be summarily ignored and will not be considered.

1.16.0 ERASURE AND ALTERATIONS

Tenders containing erasures and / or alterations of tender documents are liable to be rejected. Any correction made by tender(s) in his/their entries must be attested by him / them.

1.17.0 OBLIGATION TO ACCEPT / REJECT

It shall not be obligatory on the said authority to accept the lowest tender or any other tender, and tenderer(s) shall neither demand any explanation for the cause of rejection of his/ their tender nor the Railway to assign reasons for declining to consider or reject any particular tender or tenders.

1.18.0 DELIBERATION: -If the tenderer(s) deliberately gives / give wrong information in his / their tender or creates / create circumstances for the acceptance of his / their tender, the Railway reserves the right to reject such tender at any stage.

1.19.0 RETAINING OF CHARACTER OF FIRM

If the tenderer(s) expire(s) after the submission of his / their tender or after the acceptance of his / their offer, the Railway shall deem such tender cancelled. If a partner of a firm expires after the submission of their tender or after the acceptance of their tender, the Railway shall deem such tender as cancelled, unless the firm retains its character.

1.20.0 NON COMPLIANCE:

Non-compliance with any of the conditions set forth therein above is liable to result in the tender being rejected.

1.21.0 AUTHORITY TO ACCEPT TENDER:

The authority for the acceptance of the tender will rest with the ADRM (Infra.) / Senior Divisional Electrical Engineer (General Services) Mumbai CSMT who does not bind himself to accept the lowest or any other tender nor does he undertake to assign reasons for declining to consider any particular tender or tenders.

1.22.0 EXECUTION OF CONTRACT AGREEMENT:

- (a) The successful Tenderer(s) shall be required to execute an Agreement with the President of India acting through the Senior Divisional Electrical Engineer (General Services) Mumbai CSMT for carrying out the work according to the Preamble, Conditions of contract, Instructions to the tenderers, Standard General Conditions of Contract, Specifications given in the tender papers and as laid by RDSO/ Central Railway for Works and Materials within 30 days on receipt of letter of acceptance based on accepted rates and conditions mentioned in Tender Document.
- (b) The Railway reserves the right of not to invite tenders for any of Railway work or works or to invite open or limited tenders and when tenders are called to accept a tender in whole or in part or reject any tender or all tenders without assigning reasons for any such action. In case if tender is accepted in part by Railway administration, Letter of Acceptance shall be issued as counter offer to the Tenderer, which shall be subject to acceptance by the Tenderer.
- (c) The Tenderer whose tender is accepted shall be required to appear in person at the office of Senior Divisional Electrical Engineer (General Services), Central Railway, Mumbai CSMT, as the case may be, or if tenderer is a firm or corporation, a duly authorized representative shall appear (there would be no need for appear in person if agreement is signed digitally) and execute the contract agreement within seven days of notice from Railways that the Contract Agreement is ready. Failure to do so shall constitute a breach of the agreement affected by the acceptance of the tender. The Contract Agreement shall be entered into by Railway only after submission of valid Performance Guarantee by the Contractor. In such cases the Railway may determine that such tenderer has abandoned the contract and there upon his tender and acceptance thereof shall be treated as cancelled and the Railway shall be entitled to forfeit the full amount of the Bid Security and other dues payable to the Contractor under this contract. The failed Contractor shall be debarred from participating in the re-tender for that work.
- (d) Every contract shall be complete in respect of the document it shall so constitute. Not less than 2 copies of the contract document shall be signed by the competent authority and the Contractor and one copy given to the Contractor (there would be no need of signing two copies if agreement is signed digitally).
- (f) The bid security deposited by the successful tenderer shall be forfeited if the contractor fails to execute the Agreement or fails to start the work within a reasonable time (to be determined by the Engineer after notification of the acceptance of his tender).

1.23.0 COMPLETION:

The works are required to be completed within a period as mentioned in preamble from the date of issue of acceptance letter.

1.24.0 EMPLOYMENT/PARTNERSHIP ETC. OF RETIRED RAILWAY EMPLOYEES:

- (a) Should a tenderer
 - (i) be a retired Engineer of the gazetted rank or any other gazetted officer working before his retirement, whether in the executive or administrative capacity or whether holding a pensionable

post or not, in the Engineering or any other department of any of the railways owned and administered by the President of India for the time being, OR

(ii) being partnership firm / joint venture (JV) / registered society / registered trust etc have as one of its partners/members a retired Engineer of the gazetted rank or any other gazetted officer working before his retirement, OR

(iii) being an incorporated company have any such retired Engineer of the gazetted rank or any other gazetted officer working before his retirement as one of its directors

AND

in case where such Engineer or officer had not retired from government service at least 1 year prior to the date of submission of the tender

THEN

the tenderer will give full information as to the date of retirement of such Engineer or gazetted officer from the said service and as to whether permission for taking such contract, or if the Contractor be a partnership firm or an incorporated company, to become a partner or director as the case may be, has been obtained by the tenderer or the Engineer or officer, as the case may be from the President of India or any officer, duly authorized by him in this behalf, shall be clearly stated in writing at the time of submitting the tender.

- (b) In case, upon successful award of contract, should a tenderer depute for execution of the works under or to deal matters related with this contract, any retired Engineer of gazette rank or retired gazetted officer working before his retirement in the Engineering or any other department of any of the railways owned and administered by the President of India for the time being, and now in his employment, then the tenderer will ensure that retired Engineer or retired gazetted officer had retired from government service at least 1 year prior to the date of his employment with tenderer and in case he had retired from service within a year then he possesses the requisite permission from the President of India or any officer, duly authorized by him in this behalf, to get associated with the tenderer.
- (c) Should a tenderer or Contractor being an individual, have member(s) of his family or in the case of partnership firm/ company / joint venture (JV) / registered society / registered trust etc. one or more of his partner(s)/shareholder(s) or member(s) of the family of partner(s)/shareholder(s) having share of more than 1% in the tendering entity employed in gazetted capacity in the Engineering or any other department of the railway, then the tenderer at the time of submission of tender, will inform the authority inviting tenders the details of such persons.

Note:-If information as required as per a), b), c) above has not been furnished, contract is liable to be dealt in accordance with provision of clause 62 of GCC.

1.25.0 PARTICIPATION OF PARTNERSHIP FIRMS IN WORKS TENDERS:

- 1.25.1** The Partnership Firms participating in the tender should be legally valid under the provisions of the Indian Partnership Act.
- 1.25.2** The partnership firm should have been in existence or should have been formed prior to submission of tender. Partnership firm should have either been registered with the Registrar or the partnership deed should have been notarized as per the Indian Partnership Act, prior to submission of tender.
- 1.25.3** Separate identity / name should be given to the partnership firm. The partnership firm should have PAN / TAN number in its own name and PAN / TAN number in the name of any of the constituent partners shall not be considered. The valid constituents of the firm shall be called partners.
- 1.25.4** Once the tender has been submitted, the constitution of the firm shall not normally be allowed to be modified / altered / terminated during the validity of the tender as well as the currency of the contract except when modification becomes inevitable due to succession laws etc., in which case prior permission should be taken from Railway and in any case the minimum eligibility criteria should not get vitiated. The re-constitution of firm in such cases should be followed by a notary certified Supplementary Deed. The approval for change of constitution of the firm, in any case, shall be at the sole discretion of the Railways and the tenderer shall have no claims what-so-ever. Any change in the constitution of Partnership firm after submission of tender shall be with the consent of all partners and with the signatures of all partners as that in the Partnership Deed.

Failure to observe this requirement shall render the offer invalid and full Bid Security shall be forfeited.

If any Partner/s withdraws from the firm after submission of the tender and before the award of the contract, the offer shall be rejected and Bid Security of the tenderer will be forfeited. If any new partner joins the firm after submission of tender but prior to award of contract, his / her credentials shall not qualify for consideration towards eligibility criteria either individually or in proportion to his share in the previous firm. In case the tenderer fails to inform Railway beforehand about any such changes / modification in the constitution which is inevitable due to succession laws etc. and the contract is awarded to such firm, then it will be considered a breach of the contract conditions liable for determination of the contract under Clause 62 of the Standard General Conditions of Contract.

- 1.25.5** A partner of the firm shall not be permitted to participate either in his individual capacity or as a partner of any other firm in the same tender.
- 1.25.6** The tender form shall be submitted only in the name of partnership firm. The Bid Security shall be submitted by partnership firm. The Bid Security submitted in the name of any individual partner or in the name of authorized partner (s) shall not be considered.
- 1.25.7** One or more of the partners of the firm or any other person (s) shall be designated as the authorized person (s) on behalf of the firm, who will be authorized by all the partners to act on behalf of the firm through a “Power of Attorney”, specially authorizing him / them to submit & sign the tender, sign the agreement, receive payment, witness measurements, sign measurement books, make correspondences, compromise / settle / relinquish any claim (s) preferred by the firm, sign “No Claim Certificate”, refer all or any dispute to arbitration and to take similar such action in respect of the said tender / contract. Such “Power of Attorney” shall be notarized / registered and submitted along with the tender.
- 1.25.8** On issue of Letter of Acceptance (LOA) to the partnership firm, all the guarantees like Performance Guarantee, Guarantee for various Advances to the Contractor shall be submitted only in the name of the partnership firm and no splitting of guarantees among the partners shall be acceptable.
- 1.25.9** On issue of Letter of Acceptance (LOA), contract agreement with partnership firm shall be executed in the name of the firm only and not in the name of any individual partner.
- 1.25.10** In case the Letter of Acceptance (LOA) is issued to a partnership firm, the following undertakings shall be furnished by all the partners through a notarized affidavit, before signing of contract agreement.

(a) Joint and several liabilities:

The partners of the firm to which the Letter of Acceptance (LOA) is issued, shall be jointly and severally liable to the Railway for execution of the contract in accordance with General and Special Conditions of the Contract. The partners shall also be liable jointly and severally for the loss, damages caused to the Railway during the course of execution of the contract or due to non-execution of the contract or part thereof.

(b) Duration of the partnership deed and partnership firm agreement:

The partnership deed/partnership firm agreement shall normally not be modified/altered/terminated during the currency of contract and the maintenance period after the work is completed as contemplated in the conditions of the contract. Any change carried out by partners in the constitution of the firm without permission of Railway, shall constitute a breach of the contract, liable for determination of the contract under Clause 62 of the Standard General Conditions of Contract.

(c) Governing laws: The partnership firm agreement shall in all respect be governed by and interpreted in accordance with the Indian laws.

(d) No partner of the firm shall have the right to assign or transfer the interest right or liability in the contract without the written consent of the other partner/s and that of the Railway.

- 1.25.11** The tenderer shall clearly specify that the tender is submitted on behalf of a partnership firm. The following documents shall be submitted by the partnership firm, with the tender:

- (i) A notarized copy of the Partnership Deed or a copy of the Partnership deed registered with the Registrar.
- (ii) A notarized or registered copy of Power of Attorney in favour of the individual to tender for the work, sign the agreement etc. and create liability against the firm.
- (iii) An undertaking by all partners of the partnership firm that they are not blacklisted or debarred by Railways or any other Ministry / Department of the Govt. of India from participation in tenders / contracts as on the date of submission of bids, either in their individual capacity or in any firm/LLP in which they were / are partners/members. Any Concealment / wrong information in regard to above shall make the bid ineligible or the contract shall be determined under Clause 62 of the Standard General Conditions of Contract.
- (iv) All other documents in terms of Para 11 of Preamble.

1.25.12 Evaluation of eligibility of a partnership firm:

Technical and financial eligibility of the firm shall be adjudged based on satisfactory fulfillment of the eligibility criteria laid down in Para 11 of Preamble.

1.26.0 BINDING OF ORIGINAL OFFER IN CASE OF NEGOTIATIONS:

Should the Railway decide to negotiate with a view to bring down the rates, the original offer will still be binding in case nothing materializes out of the negotiations.

1.27.0 SUBMISSION OF TENDER:

“Tenderer should participate electronically in E- tender through website www.ireps.gov.in & submission of manual offers against e-tender are not allowed & if any manual offers submitted shall neither be opened nor considered.”

1.27.1 CARE IN SUBMISSION OF TENDERS:

- a(i) Before submitting a tender, the tenderer will be deemed to have satisfied himself by actual inspection of the site and locality of the works, that all conditions liable to be encountered during the execution of the works are taken into account and that the rates he enters in the tender forms are adequate and all inclusive to accord with the provisions in Clause-37 of the Standard General Conditions of Contract for the completion of works to the entire satisfaction of the Engineer.
- a(ii) Tenderers will examine the various provisions of The Central Goods and Services Tax Act, 2017(CGST)/ Integrated Goods and Services Tax Act, 2017(IGST)/ Union Territory Goods and Services Tax Act, 2017(UTGST)/ respective state’s State Goods and Services Tax Act (SGST) also, as notified by Central/State Govt. & as amended from time to time and applicable taxes before bidding. Tenderers will ensure that full benefit of Input Tax Credit (ITC) likely to be availed by them is duly considered while quoting rates.
- a(iii) The successful tenderer who is liable to be registered under CGST/IGST/UTGST/SGST Act shall submit GSTIN along with other details required under CGST/IGST/UTGST/SGST Act to railway immediately after the award of contract, without which no payment shall be released to the Contractor. The Contractor shall be responsible for deposition of applicable GST to the concerned authority.
- a(iv) In case the successful tenderer is not liable to be registered under CGST/IGST/UTGST/ SGST Act, the railway shall deduct the applicable GST from his/their bills under reverse charge mechanism (RCM) and deposit the same to the concerned authority.
- a(v) Contractor shall be liable to pay/refund the amount collected as GST to the Indian Railways along with interest and penalties, if any imposed by the authorities, in case GST input tax credit of Indian Railways is denied/rejected by the tax authorities due to reasons mentioned below but not limited to:
 - Wrong/incorrect invoices issued by Contractor,
 - No-filing of GST returns;
 - Non-payment of GST collected from Indian Railways to the authorities;
 - Any other non-compliance done by Contractor:

General Indemnity: Contractor hereby agrees to indemnify and hold harmless the Indian Railways from and against any and all losses, including loss on account of Input Tax Credit and all losses incurred by the Indian Railways relating to or arising out of or in connection with any actual or threatened claim, legal action, proceedings, prosecution or inquiry by or against the Indian Railways arising out, directly or indirectly, of failure by the contractor to comply with the provisions of GST and related laws, or based upon or arising from any failure by the Contractor.

Retention Money: Any payment liable to be paid by Indian Railways to contractor against the goods or services or both supplied by such contractor to Indian Railways shall be kept on hold in case supplier makes any non-compliance of any of the GST law provisions including non-reporting of invoices in GST returns. Such payment shall be released after proper verification of records and availability of ITC to Indian Railways as per provisions of GST Law.

- (b) When work is tendered for by a firm or company, the tender shall be signed by the individual legally authorized to enter into commitments on their behalf.
- (c) The Railway will not be bound by any power of attorney granted by the tenderer or by changes in the composition of the firm made subsequent to the execution of the contract. It may, however, recognize such power of attorney and changes after obtaining proper legal advice, the cost of which will be chargeable to the Contractor.

CHAPTER - II

SPECIAL CONDITIONS OF

CONTRACTS

CHAPTER – II

SPECIAL CONDITIONS OF CONTRACT

Para No.	Subject
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CHAPTER - II

SPECIAL CONDITIONS OF CONTRACT

2.1.0 SCOPE:

This chapter deals with the conditions of Contract under which the various works coming under the purview of this contract are to be executed by the Contractor.

2.2.0 CONDITIONS OF CONTRACT:

If the Tender submitted by a Tenderer is accepted and the contract awarded to the Tenderer, the various works coming under the purview of the contract shall be governed by the terms and conditions included in the Tender papers covering the following:

- i) System of tendering
- ii) Preamble and scope of work to the Tender Papers.
- iii) Instructions to Tenderers and conditions of Tendering, as included in Chapter-I of this tender document.
- iv) Conditions of contract, as included in this chapter.
- v) General conditions of contract April 2022 of Engineering department as amended from time to time (Not attached to this tender document).
- vi) Prices and Payments, as included in Chapter III of this tender document.
- vii) Explanatory notes of Schedule and Schedule of prices and quantities as included in **Chapter IV & Chapter VI** of this tender document.

2.3.0 PURCHASER'S REPRESENTATIVE:

Subject as otherwise provided in this contract, all notices to be given on behalf of the Purchaser and all other action to be taken on his behalf may be given or taken, as the case may be, on his behalf by the General Manager or his successor.

2.4.0 CONTRACTOR'S REPRESENTATIVE:

The Contractor's Representative shall be a person as defined in Chapter-I.

2.5.0 CONTRACTOR'S OFFICE & ADDRESS:

The Contractor shall within a month of issue of letter of acceptance of Tender, establish an office at a convenient place for progressing designs and drawings and field works, expeditiously, in consultation and with approval of the Purchaser. He shall intimate the Purchaser the address thereof in which all correspondence shall be sent. Any communication sent to the Contractor by post at his said address shall be deemed to have reached the Contractor duly and in time. Important documents shall be sent by Registered post.

2.6.0 PURCHASER'S ADDRESS:

The list of addresses to which correspondence and documents relating to the contracts to be made are as under:

1. A. For tender, policy matter, design, drawings and contract execution.

**Senior Divisional Electrical Engineer,
(General Service) Mumbai CSMT,
Annex Bldg., 1st floor,
Central Railway,
Mumbai-400 001**

1. B. For Execution of the work

**Senior Divisional Electrical Engineer,
(General Service) Mumbai CSMT,
Annex Bldg., 1st floor,
Central Railway,
Mumbai-400 001**

- 2 For Security Deposit / Bid Security.**
Senior Divisional Finance Manager, Mumbai CSMT,
 Annex Bldg., 1st floor,
 Central Railway,
 Mumbai-400 001

2.7.0 INCOME TAXES:

- (a) The Contractor and all personnel employed by him shall pay such taxes like income tax as are payable under statutory laws of India and the Purchaser will not accept any liability for the same.
- (b) Deduction of income tax at source as per provision of finance act and income tax act in force may be made from the Contractor/sub-Contractor and the amount so deducted may be credited to the Central Government.

2.8.0 LAWS OF INDIA:

The contract shall be governed by the law for the time being in force in the Republic of India.

2.9.0 AGREEMENT

- a) The successful Tenderer shall, within 30 days on receipt of Letter of Acceptance, be bound to execute an agreement based on accepted rates and conditions, in such forms as the Purchaser may prescribe and lodge the same with the Purchaser together with the conditions of contract, specifications and Schedule of prices referred to therein duly completed.
- b) If a work is transferred from the jurisdiction of one Railway to another Railway or to a project authority or vice versa while the contract is in subsistence, the contract shall be binding on the Contractor and successor Railway/Project in the same manner and take effect in all respects as if the Contractor and the successor Railway/Project were parties thereto from the inspection and the corresponding officers or the competent authority in the successor Railway will exercise the same powers and enjoy the same authority as conferred to the Predecessor Railway/Project under the original contract/agreement entered into.
- d) If for administrative or other reasons the Contract is transferred to the successor Railway the contract shall, notwithstanding anything contained herein contrary there to, be binding on the Contractor and the successor Railway in the same manner and take effect in all respects as if the Contractor and the successor Railway had been parties thereto from the date of this contract.
- d) Until a formal agreement is prepared and executed, acceptance of this letter shall constitute a binding Contract between us for this work.

2.10 SCHEME OF WORK:

The work should be done as per technical specification, explanatory notes and other conditions of contract and use of approved materials, equipment. The contractor should submit fortnightly to executive engineer a progress report of material received at site and progress of work.

2.11 ASSIGNMENT OR SUBLETTING OF CONTRACT:

The Contractor shall not assign or sublet the contract or any part thereof or allow any person to become interested therein any manner whatsoever without the special permission in writing of the Chief Engineer, save as provided as below. Any breach of this condition shall entitle the Railway to rescind the contract under Clause 62 of GCC and also render the Contractor liable for payment to the Railway in respect of any loss or damage arising or ensuing from such cancellation; provided always that execution of the details of the work by petty Contractor under the direct and personal supervision of the Contractor or his agent shall not be deemed to be sub-letting under this clause.

In case Contractor intends to subcontract part of work, he shall submit a proposal in writing seeking permission of Chief Engineer for the same. While submitting the proposal to railway, Contractor shall ensure the following:

- a) (i) The Contractor shall not sub-contract the Works comprising more than 40% (forty per cent) of the Contract Price and shall carry out Works for at least 60% (sixty per cent) of the total Contract Price directly under its own supervision and through its own personnel. The Parties expressly agree that for the purposes of computing the value of sub-contracts under this Clause 3.2.1, the Contract Price shall exclude any sub-contract for the procurement of goods and equipment like [rails, sleepers and track fittings, signaling and telecommunication & Power supply equipment]. The Parties agree that all obligations and liabilities under this Agreement for the entire Railway Project shall at all time remain with the Contractor. {The Parties agree that works equal to at least 30% (thirty per cent) of the Contract Price shall be discharged solely by the Lead Member.}\$ Procurement of material, hire of equipment or engagement of labour by prime contractor or procuring entity will not mean sub-contracting.

\$ May be deleted if the Contractor is not a Consortium/Joint Venture.

(ii) The subcontractor shall have successfully completed at least one work similar to work proposed for subcontract in last 5 years, ending date of submission of proposal by Contractor to Railway, costing not less than 35% value of work to be subletted, through a works contract. For fulfillment of above, Work Experience Certificate issued by a Govt. Department/Organisation shall be considered. Further, Work Experience Certificate issued by a Public listed company shall be considered provided the company is having average annual turnover of Rs 500 crore and above in last 3 financial years excluding the current financial year, listed on National Stock Exchange or Bombay Stock Exchange, registered at least 5 years back from the date of submission of proposal by Contractor to Railway and work experience certificate issued by a person authorised by the Public Listed Company to issue such certificates.

Note: for subletting of work costing up to Rs 50 lakh no previous work experience shall be asked for by the Railway.

In case contractor submits subcontractor's work experience certificate issued by public listed company, the contractor shall also submit along with work experience certificate, the relevant copy of work order, bill of quantities, bill wise details of payment received duly certified by Chartered Accountant, TDS certificates for all payments received and copy of final/last bill paid by company in support of above work experience certificate.

(iii) There is no banning of business with the sub-contractor in force over IR.

- b) The Contractor shall provide to the Engineer a copy of the agreement to be entered into by Contractor with subcontractor. No subcontractor shall be permitted without a formal agreement between Contractor and subcontractor. This agreement shall clearly define the scope of work to be carried out by subcontractor and the terms of payment in clear & unambiguous manner.
- c) On receipt of approval from Chief Engineer, Contractor shall enter into a formal agreement legally enforceable in Court of Law with subcontractor and submit a copy of the same to the Engineer.
- d) The Contractor shall intimate to the Engineer not less than 7 days in advance, the intended date of commencement of subcontractor's work.
- e) Once having entered into above arrangement, Contractor shall discontinue such arrangement, if he intends to do so at his own or on the instructions of Railway, with prior intimation to Chief Engineer.
- f) The Contractor shall indemnify railway against any claim of subcontractor.
- g) The Contractor shall release payment to the Sub-contractor(s) promptly and shall endeavour to resolve all issues amicably and speedily with the Sub-contractor(s), so that the execution of work is not affected in any manner whatsoever.
- h) In addition to issuance of work experience certificate to Contractor, the Engineer, when, based on documents, is satisfied that subcontracted work has been carried out by subcontractor, shall issue work experience certificate to the subcontractor also for the portion of work subcontracted and successfully completed by the sub-contractor.

*Note: Work Experience Certificate to the subcontractor shall be issued only when the contractor's work is complete and contractor is entitled for the issuance of Work Experience Certificate. However, in the same contract, when the Chief Engineer, based on documents, is satisfied that the subcontractor has successfully carried out subletted work; without issuance of work experience certificate to subcontractor at this stage, the Chief Engineer can, **only once**, consider the successfully completed subletted work for the fulfillment of eligibility for further subletting of work to the subcontractor in the same contract. When the contractor's work is complete and contractor is entitled for the issuance of work experience certificate, the subcontractor shall be issued one Work Experience Certificate for the total scope of work executed by the subcontractor in the contract.*

- i) The responsibility of successful completion of work by subcontractor shall lie with Contractor. Subcontracting will in no way relieve the Contractor to execute the work as per terms of the Contract.
- j) Further, in case Engineer is of the view that subcontractor's performance is not satisfactory, he may instruct the Contractor to remove the subcontractor from the work and Contractor has to comply with the above instructions with due promptness. Contractor shall intimate the actual date of discontinuation of subcontract to Engineer. No claim of Contractor whatsoever on this account shall be entertained by the Railway and this shall be deemed as 'excepted matter' (matter not arbitrable).
- k) The permitted subcontracting of work by the Contractor shall not establish any contractual relationship between the sub-contractor and the Railway and shall not relieve the Contractor of any responsibility under the Contract.

2.12 VARIATION IN QUANTITIES DURING EXECUTION OF WORK CONTRACTS:

The procedure as detailed below shall be adopted for dealing with variations in quantities during execution of works contracts: -

1. The accepted variation in quantity of each individual item of the contract would be upto 25% of the quantity originally contracted, except in case of foundation work (in which no variation limit shall apply). However, the rates for the increased quantities shall be as per sub- para (iii) below.
2. The Contractor shall be bound to carry out the work at the agreed rates and shall not be entitled to any claim or any compensation whatsoever upto the limit of 25% variation in quantity of individual item of works.
3. In case an increase in quantity of an individual item by more than 25% of the agreement quantity is considered unavoidable, then same shall be executed at following rates:
 - a) Quantities operated in excess of 125% but upto 140% of the agreement quantity of the concerned item, shall be paid at 98% of the rate awarded for that item in that particular tender;
 - b) Quantities operated in excess of 140% but upto 150% of the agreement quantity of the concerned item shall be paid at 96% of the rate awarded for that item in that particular tender;
 - c) Variation in quantities of individual items beyond 150% will be avoided and would be permitted only in exceptional unavoidable circumstances and shall be paid at 96% of the rate awarded for that item in that particular tender;
 - d) **Variation to quantities of Minor Value Item:** The limit for varying quantities for minor value items shall be 100% (as against 25% prescribed for other items). A minor value item for this purpose is defined as an item whose original agreement value is less than 1 % of the total original contract value.
 - d(i) Quantities operated upto and including 100% of the agreement quantity of the concerned minor value item, shall be paid at the rate awarded for that item in that particular tender;
 - d(ii) Quantities operated in excess of 100% but upto 200% of the agreement quantity of the concerned minor value item, shall be paid at 98% of the rate awarded for that item in that particular tender;
 - d(iii) Variation in quantities of individual minor value item beyond 200% will be avoided and would be permitted only in exceptional unavoidable circumstances and shall be paid at 96% of the rate awarded for that item in that particular tender;

4. In case of earthwork items, the variation limit of 25% shall apply to the gross quantity of earthwork items and variation in the quantities of individual classifications of soil shall not be subject to this limit.
5. As far as Standard Schedule of Rates (SSOR) items are concerned, the variation limit of 25% would apply to the value of SSOR schedule(s) as a whole and not on individual SSOR items. However, in case of Non Standard Schedule of Rates (SSOR) items, the limit of 25% would apply on the individual items irrespective of the manner of quoting the rate (single percentage rate or individual item rate).

2.13 ACCESS TO WORK SITE:

- (a) Access to the site for the purpose of this contract shall be accorded to the contractor by the purchaser at all times. In the execution of the work no person other than the contractor or his duly appointed representative or approved sub-contractor and bonafide workmen shall have access to the site. Access to the site of work at all times shall be allowed by the contractor to Officials or approved representatives of the purchaser or to Railway staff for purpose of maintenance.
- (b) The Purchaser or his authorized representative shall have the right to refuse admission to the work site of any person employed by the contractor whom the purchaser or his engineer may consider undesirable.
- (c) The purchaser or his Engineer shall be at liberty to object to the employment of any person as Contractor's Agent/Representative, approved sub-contractor's supervisors, workmen or labourer for execution of this contract on the ground of misconduct, incompetence or negligence. The contractor on receipt of notice of such objection in writing from the purchaser or his engineer shall forthwith remove the person so objected to and provide in his place any other competent person and shall not allow the persons so objected to, to enter the site of work subsequently or remain in the execution of the contract. The purchaser will not be liable to pay any cost or damage on this account.

2.14 ACCIDENTS:

- (a) The Contractor shall, in respect of all staff engaged by him or by his sub-contractor, indemnify and keep the purchaser at all times indemnified and protected against all claims made and liabilities incurred under Workmen's Compensations Act, the Factories Act and the Payment of Wages Act and rules made there under from time to time or under any other labour and Industrial legislation made from time to time.
- (b) The Contractor shall indemnify and keep the Purchaser indemnified and harmless against all actions, suits, claims, demands, costs, charges or expenses arising in connection with any death or injury sustained by any person or persons within the Railway premises and any loss or damage to Railway property sustained due to the acts or omission of the Contractor, his sub-contractors, his agents or his staff during the execution of this contract irrespective of whether such liability arises under the Workmen's.
- (c) Compensation Act, or Fatal Accident Act or any other statute in force for the time being.

2.15 SAFETY MEASURES:

The contractor shall take all precautionary measures in order to ensure the protection of his own personnel moving or working on the Railway premises, but shall then confirm to the rules and regulations of the Railway. The contractor shall be responsible for safe custody of all equipments till provisional acceptance. Moreover, if any time the works to be carried out directly concern the safety of trains, the contractor's staff must comply fully with Railway regulations given to him by the authorized Railway staff. The contractor's employees and workers may for no reason operate an installation concerning train safety or train movement. They shall notify the authorized representative of the purchaser who will take all necessary steps in this regard.

2.16 PROVISIONAL ACCEPTANCE:

After completion of entire work contractor has to obtain a certificate from the field supervisor confirming that they have successfully completed the work. Based on that Senior Divisional Electrical Engineer (General Service), Central Railway, Mumbai CSMT will issue a provisional acceptance certificate which is mandatory before submission of the FINAL BILL.

2.17 DEFECTIVE EQUIPMENTS TO BE CHANGED:

Notwithstanding completion of work in partial or full use of any equipment, if the completed equipment or any portion thereof before it finally taken over at the end of the guarantee period be found to be or to have become defective in course of usage by the Railway due to faulty material, design or workmanship, or otherwise fails to fulfill the requirement of the contract and/or its purpose, the purchaser shall normally give the contractor prompt notice setting forth the particulars of each defects or failure and the contractor shall forthwith make the defects good or modify or replace the equipment, as may be directed by the purchaser's Engineer, at his own cost in all respects to make comply satisfactorily with the said requirements. Should the contractor fail to do within a reasonable time the service of the said notice upon him or should time not permit of service of such notice, the purchaser may repair or reject and replace the whole or part of such defective equipment as the case may be, at the cost of the contractor. The contractor's full liability under this clause shall be satisfied by the payment to the purchaser of the extra total cost, if any, of such replacement delivered and erected as provided for in the original contract, such extra cost being the ascertained difference between the price paid by the purchaser under the provisions above mentioned for such replacement and the contractor's price for the plant so replaced, plus the sum, if any, paid by the purchaser to the contractor in respect of such defective equipment. Should the purchaser not so replace the rejected equipment within a reasonable time, the contractor's liability under this clause shall be satisfied by the repayment by the contractor of all money paid by the purchaser to him in respect of such rejected equipment. Rejected/defective materials shall be returned to the contractor to the extent possible.

2.18 FINAL ACCEPTANCE:

- (a) The final acceptance of the entire equipment installed on the site shall take effect from the date of expiry of the period of guarantee.
- (b) After expiry of the period of guarantee for each section, a certificate of final acceptance shall issued by the Purchaser and the last of such certificate will be called the last and final acceptance certificate. The contract shall not be considered as completed until the issue of final acceptance certificate by the Purchaser.
- (c) The Purchaser shall not be liable to the Contractor for any matter arising out of or in connection with the contract or execution of the work unless the Contractor shall have made a claim in writing in respect thereof before the issue of final acceptance certificate under this clause.

Notwithstanding the issue of final acceptance certificate, the Contractor and the Purchaser (subject to sub-clause as above) shall remain liable for fulfillment of any obligation incurred under the provision of the contract prior to the issue of final acceptance certificate which remains unperformed at the time such certificate is issued and for determining the nature and extent of such obligation the contract shall be deemed to remain in force between the parties hereto.

2.19 ISSUE OF IDENTITY CARDS TO CONTRACTOR'S LABOURS:

Following certificates/documents should be issued to each contract labourers nominated to work in the railway premises by the contractor, indicating Contract No, Name of the person, place of work etc.

1. Identity Card **2.** Character certificate issued by Police Department **3.** Certificate for technical competency.

If these are not issued to contract labourers, he / they will not be permitted to work in the Railway premises. The list of the labour should be submitted to this office for records.

2.20 DISASTER MANAGEMENT:

Vehicles and equipments of contractors working with railways can be provided/ asked to be deployed by Railway administration at its discretion in case of accidents/natural calamities involving human lives. In case it is seen that the contractors have shunned their responsibilities in case of disaster involving human lives, they may be levied penalties as decided by Railway administration or their contract can be rescinded as the requirement of Railway administration in such cases are for larger public interest.

2.21 INSURANCE

- a) The contractor shall take out and keep in force a policy or policies of insurance against all liabilities of the contractor or the purchaser at common law or under any statute in respect of accidents to persons who shall be employed by the contractor in or about the site and the contractor's office for the purpose of carrying out the works on the site. The contractor shall also take out and any keep in force a policy or policies of insurance against all recognized risk to their offices and depots. Such insurance shall in all respects be to the approval of the purchaser and if he so requires, in his name.
- b) Insurance of materials and installations.
The contractor shall take out and keep in force a policy or policies of insurance for all materials/equipments in shortage and installations under erection and/or erected, until such materials and installations are provisionally handed over to the purchaser. For this purpose, the installations shall be deemed to have been provisionally handed over when a provisional acceptance certificate is issued for the installation. The contractor shall not be liable for losses or damages to equipment erected, in the course of erection or in similar courses over which the contractor has not control and which cannot be insured. Such losses or damages shall be the liability of the purchaser and, if required by the purchaser be made good by the contractor, at the cost of the purchaser.
- c) The contractor should, however, insure the stores brought to site, against risks in consequence of war and invasion, as required under the emergency risks (goods) insurance act in force from time to time.
- d) The contractor shall take out all insurance covers in connection with this contract with General Insurance Corporation of India only.
- e) The purchaser will advise the contractor in his letter of acceptance of tender, the price and quantity of the entire Railway stores (if supplied by the purchaser) to enable the contractor to declare the value to his underwriters.

2.22 ISSUE OF MATERIALS TO THE CONTRACTOR:

Contractors have to submit a Bank Guarantee for an amount equal to the cost of material paid to them and to be handed over to them for erection. The cost of material paid to them and handed over to them and under their possession at any time shall not exceed the value of the B.G. already submitted.

2.23 STANDING INDEMNITY BOND:

Cost of all the materials for which 'On Account' payments have been made to the contractor against the Contract and materials handed over to the contractor by the purchaser for the purpose of execution of the said Contract, until such time the materials are duly erected or otherwise handed over to the purchaser shall be covered by the standing indemnity bond (see Form No. 16).

2.24 INSPECTION:

All the material, erection and installation work shall be subject to inspection to ensure that the work is done in accordance with specification, drawings and is of the best quality suitable for the purpose. Following inspection schedule shall be followed.

(a) Inspection of material: -

- i) **At Firm's premises:** - Inspection of **Item no. 1, 13, 19, 26(e) & 35 of Schedule-A, Item no. 2, 3 & 6 of Schedule-B, Item no. 10 of Schedule-C and Item no. 4(b) of Schedule-D-4, shall be done by RITES. All charges for RITES inspection shall be borne by the contractor.** Inspection of other materials shall be done by Railway's representative. Firm will submit manufactures original test certificate also.
- ii) **After Receipt of material:** - Inspection of items shall be done at depot / site by Railway Engineer's representative. Contractor shall produce all the test reports, material documents in original etc. during inspection.
- iii) All the defects / discrepancies, if any, pointed out during inspection should be attended by the contractor immediately.

- (b) **Stage Inspections:** - Stage inspections shall be carried out by Railway Engineer's representative from time to time during execution of the work at site. All the shortcomings noticed during stage inspection shall be attended by the contractor.
- (c) **Final Inspections:** - After completion of work, contractor shall offer it for final inspection and testing. All the shortcomings noticed during final inspection shall be attended by the contractor, immediately and a joint inspection shall be carried out by Railway Engineer's Representative and by Contractor Representative after completion of the entire work and a joint inspection report shall be made. The joint inspection report shall be signed by the contractor's representative, Railway's authorized Engineer for that work and shall be enclosed along with the final bill. Any defect / shortcomings noticed shall be attended by the contractor immediately.

2.25 MATERIALS/EQUIPMENTS:

All materials used in the work shall be of the best quality and of the class most suited for the purpose specified. All the materials, standard fittings, equipments, control panel, cables etc. and other accessories required for this work shall be made of as specified in explanatory note and should be of reputed make as per approval of Sr. DEE (G) CSMT or as appearing in the approved sources of RDSO / ICF / RCF / CLW. Performance of items, which are not on approved list of RDSO / ICF / RCF / CLW, can be judged based on their past performance. If not available it shall be conforming to relevant latest IS-Specification against each schedule item.

All the equipments, materials, fittings and components will be subject to quality control programme of being part of the quality assurance programme of the contractor. All the major equipments / material shall be inspected as per Inspection clause.

2.26 GUARANTEE / WARRANTY: -

- (a) All LED Light fittings and its driver should be warranted for a period of 60 months from its commissioning or 72 months from the date of supply whichever is earlier and shall submit guarantee certificate from manufacturer.
- (b) The warranty of Maintenance free earthing and BLDC Ceiling fan shall be 60 months from date of commissioning. During this period, any defect or failure due to improper materials & bad workmanship shall be attended free of cost by the Contractor.
- (c) The contractor shall guarantee satisfactory working of the installations (other than above a & b) erected by him for a period of 12 [TWELVE] months from the date of completion of work or as specified otherwise.
- (d) During the period of guarantee the contractor shall maintain the equipments and contractor shall keep available experienced Engineer and necessary equipment to attend to any defects.
- (e) During the guarantee period, the contractor shall be fully responsible for the replacement of any part(s) found to be defective due to faulty design, substandard materials, poor workmanship, or negligence on the part of the contractor. This shall include the supply, loading, transportation, unloading, erection, testing, and commissioning of the replacement parts at site, completely at the contractor's cost. Further, such defective parts which are not repairable at site shall be taken back by the contractor, if so required by him, at his own expense.
- (f) The repaired or renewed parts shall be delivered and erected on site free of charge to the purchaser.

2.27 RELEASED MATERIAL: -

All the released materials should be returned by the contractor to Railways and acknowledged. The released materials should be transported to respective depot/Scrap depots with the tenderer's men & vehicle as per instruction of Rly's Engineer.

2.28 ELECTRICAL CONTRACTORS LICENSE

The contractor shall fulfill valid Electrical Contractor License requirement as per IE Rule 1956 clause no - 45. Electrical Contractors license shall be submitted along with the offer, failing which the offer will summarily be rejected.

2.29.0 OTHER SPECIAL CONDITIONS: -

- 2.29.1 Firm should submit their offer with full credentials regarding working capacity, testing facilities and other financial capabilities. Offers from firms not having required infrastructure to carry out the work and testing facilities will be summarily rejected.

- 2.29.2** Contractors found using sub-standard un-approved materials shall be, on the spot, stopped from executing further work and suitable action taken to terminate the contract. Particular note of this should be taken and it shall be strictly ensured that only quality work is done.
- 2.29.3** All completed work shall be jointly recorded by contractors with Railways in 'Measurement Books' which will be available with Railway's supervisor. No work, other than those recorded in M.B., will be recognized.
- 2.29.4** All the bidders / tenders should ensure that they are GST compliant and their quoted tax structure / rates are as per GST Law.
- 2.29.5** Bills shall be submitted in Railway's bill form only. All released materials shall be handed over to Railways at the depot of Senior Section Engineer (M)'s. Contractors should keep a proper account of the released materials handed over, with proper acknowledgement from Railway's supervisor and submit the same along with the bills.
- 2.29.6** **Error omission and discrepancies-** The tenderer shall not take advantage of any error due to typing or otherwise, if there is any doubt, that shall be brought to notice of Sr. DEE (G) CSMT without delay and same shall be dealt as per Railway's requirement only and to Railway's advantage only.
- 2.30.0 SPECIAL CONDITION OF THE WORK**
The Contractor shall maintain a register showing names and addresses of the person so engaged along with photographs of each person and shall produce the same for inspection on demand by Welfare Officer or such other person so authorized by the owner. The Contractor shall not use or allow to be authorized to be used train or any part thereof for dwelling purpose and shall not allow, any outsiders to loiter in or around the train without valid authority.
- 2.30.1** With regard to the nature of employment of the employees working in the stipulation at clause no. 2.30.2 reads thus.
- 2.30.2** The contractor shall be required to employ/engage only that number of employees/workers as may be specifically authorized by Railway Administration from time to time and shall maintain complete records of such employees/workers with regard to their names, address, qualifications, experience and other required details. The Railway shall have absolute right to test, interview or otherwise assess or determine skills, knowledge, proficiency, capability, etc. so as to ensure that such employees/workers are competent, qualified or otherwise suitable for efficiently /worker rejected, not authorized by the Railway shall not be employed/engaged by the contractor on the work covered by this contract.
- 2.30.3** The contractor is liable to pay provident fund contribution. Leave salary, medical benefits to his employees and to observe statutory working hours. The contractor is responsible for the proper maintenance of registers, records and accounts so far as compliance with any statutory provisions/obligations is concerned. The contractor to keep proper records pertaining to payment of wages etc. and also for depositing the provident fund contributions with the authorities concerned. The contractor is liable to defend, indemnify and hold harmless to the Railway from any liability or penalty which may be imposed by the Central, State or local authorities by reason of any violation by the contractor or such laws, regulations and also from all claims, suits or proceedings that may be brought against the management arising under or incidental to or by reason of the work provided/assigned under the contract brought by the employees of the contractor, third party or by the Central or State Government authorities.
- 2.30.4** The contractor will make aware his employees that the contract employee are employee of contractor and the employee are not entitled for any regularization in Railway Service. If such situation arises in future contractor is liable to defend, indemnify & hold harmless to the Railway Administration from any such liability.
- 2.30.5** **SETTLEMENT OF DISPUTES:** The provisions of clause 63 and 64 of GCC will be applicable only for settlement of claims of disputes between the Railway and Contractor of a value less than or equal to 20% of the original contract value, so as to bring the claim within the scope of Arbitrability.
- 2.30.6** The contractor shall not be entitled to ask for reference to arbitration before COMPLETION of the work assigned to him under this contract. The contractor shall seek reference to arbitration to settle disputes only ONCE within the ambit of condition 2.30.5 above.

- 2.30.7** Taxes wherever applicable should be shown separately and not all inclusive rates in the price schedule.
- 2.30.8** If service tax is leviable, the section under which it is levied is to be mentioned by the tenderer. If abatement of service tax, the notification under which abatement taken should be submitted by the tenderer.
- 2.30.9** The service tax registration number of the tenderer and copy of the same should be submitted. The category of service for which the firm registered with CBEC should be submitted.

2.30.10 Employment of staff

- a. The contract is liable for cancellation if either the contractor himself or any of his employee is found to be a person of Gazetted rank of Engineering Department which includes Civil, Mechanical, Electrical, Signal and Telecommunication Department of Railways whether pensionable or non- pensionable who after retirement has sought engagement as contractor for or in connection with the execution of public works whether on Railway, P.W.D. or Defence Forces or as an employee of such Contractor within 2 years of his retirement without obtaining the permission of the President of India before taking up such engagement or employment.
- b. The contractor shall employ the following technical staff during the execution of the work-
 - i. At least one Graduate Electrical / Electronic Engineer when the cost of the work to be executed is Rs. 50 Lakh and above.
 - ii. At least one qualified Electrical / Electronic diploma holder when the cost of the work to be executed is more than Rs. 10 Lakh, but less than Rs. 50 Lakh.
- c. Technical staff should be available at site whenever required by the Engineer-in-charge to take instructions. In case the desired level of technical staff fails to take instruction of the Engineer-in-charge, contractor shall be liable to pay a reasonable amount of the Railways not exceeding a sum of Rs. 5,000/- (Rupees Five Thousand only) for each calendar month or part thereof for default in case of Graduate Engineer and Rs.2,500/- (Rupees Two Thousand Five Hundred only) for each calendar month or part thereof for default in case of Diploma holder.
- d. The decision of the Engineer-in-charge as to the period for which required. Technical staff was not employed by the contractor and as to the reasonableness of the amount to be deducted from the contractor shall be final and binding on the contractor.
- e. The contract is liable to be terminated in case of persistent failure to engage suitable technical staff by the contractor.

2.30.11 MINIMUM WAGES ACT, LABOUR LAWS:

- (a) The Contractor shall comply with all the LEGAL PROVISIONS pertaining to Industrial Labour Law and Hours of Employment Regulations in force. The wages to be paid to the contractor's staff shall necessarily be in accordance with the provisions of the MINIMUM WAGES ACT as amended from time to time. The risk to the life and limb of the staff shall be covered by the contractor by way of an insurance policy. Compensation to the contractor's staff in case of accidents or otherwise shall be made by the contractor.
 - i) Apprentice Act
 - ii) Provisions of Payments of Wages Act:
 - iii) Provisions of Contract Labour (Regulation and Abolition) Act, 1970:
 - iv) Provisions of Employees Provident Fund and Miscellaneous Provisions Act, 1952
 - v) Provision of Workmen's Compensation Act:
 - vi) Payment of Bonus Act, 1965:
- (b) Contractor is to abide by the provisions of various labour laws in terms of clause 54, 55, 55-A and 55-B of Indian Railways General Condition of Contract. In order to ensure the same, an application has been developed and hosted on website www.shramikkalyan.indianrailways.gov.in. Contractor shall register his firm / company etc. and upload requisite details of labour and their payment in this portal. These details shall be available in public domain. The Registration / updation in Portal shall be done as under:
 - (i) Contractor shall apply for onetime registration of his company / firm etc. in the Shramikkalyan portal with requisite details subsequent to issue of Letter of Acceptance. Engineer shall approve the contractor's registration on the portal within 7 days of receipt of such request.

- (ii) Contractor once approved by any Engineer, can create password with login ID (PAN No.) for subsequent use of portal for all Letter of Acceptance (LOAs) issued in his favour.
- (iii) The contractor once registered on the portal, shall provide details of his Letter of Acceptances (LOA) / Contract Agreements on Shramikkalyan portal within 15 days of issue of any LOA for approval of concerned engineer. Engineer shall update (if required) and approve the details of LOA filled by contractor within 7 days of receipt of such request.
- (iv) After approval of LOA by Engineer, contractor shall fill the salient details of contract labours engaged in the contract and ensure updating of each wage payment to them on Shramikkalyan portal on monthly basis.
- (v) It shall be mandatory upon the contractor to ensure correct and prompt uploading of all salient details of engaged contractual labour & payments made thereof after each wage period.
- (c) **While processing payment of any 'On Account bill' or 'Final bill' or release of 'Advances' or 'Performance Guarantee / Security deposit', contractor shall submit a certificate to the Engineer or Engineer's representatives that "I have uploaded the correct details of contract labours engaged in connection with this contract and payments made to them during the wage period in Railway's Shramikkalyan portal at 'www.shramikkalyan.indianrailways.gov.in' till _____ Month, _____ Year."**

2.31.0 SETTLEMENT OF DISPUTES – INDIAN RAILWAY ARBITRATION AND CONCILIATION RULES

63. Conciliation of Disputes:

- (i) This clause is applicable in the tender having advertised value less than or equal to Rs.50 Crore.
- (ii) All disputes and differences of any kind whatsoever arising out of or in connection with the contract, whether during the progress of the work or after its completion and whether before or after the determination of the contract, shall be referred by the Contractor to the "Chief Engineer" or "Divisional Railway Manager" through "Notice of Dispute" provided that no such notice shall be served later than 30 days after the date of issue of Completion Certificate by the Engineer. Chief Engineer or Divisional Railway Manager shall, within 30 days after receipt of the Contractor's "Notice of Dispute", notify the name of conciliator(s) to the Contractor.
- (iii) The Conciliator(s) shall assist the parties to reach an amicable settlement in an independent and impartial manner within the terms of contract.
- (iv) If the parties reach agreement on a settlement of the dispute, they shall draw up and sign a written settlement agreement duly signed by Engineer In-charge, Contractor and conciliator(s). When the parties sign the settlement agreement, it shall be final and binding on the parties.
- (v) The parties shall not initiate, during the conciliation proceedings, any arbitral or judicial proceedings in respect of a dispute that is the subject matter of the conciliation proceedings.
- (vi) The conciliation proceedings shall be terminated as per Section 76 of "The Arbitration and Conciliation Act, 1996.

63.1 Matters Finally Determined by the Railway: All disputes and differences of any kind whatsoever arising out of or in connection with the contract, whether during the progress of the work or after its completion and whether before or after the determination of the contract, shall be referred by the Contractor to the GM and the GM shall, within 120 days after receipt of the Contractor's representation, make and notify decisions on all matters referred to by the Contractor in writing provided that matters for which provision has been made in Clauses 7(j), 8, 18, 22(5), 39.1, 39.2, 40A, 43(2), 45(i)(a), 55, 55-A(5), 57, 57A, 61(1), 61(2), 62(1), 63(iv) and 63.2.11 of the standard General Conditions of Contract or in any Clause (stated as excepted matter) of the Special Conditions of the Contract, shall be deemed as 'excepted matters' (matters not arbitrable) and decisions of the Railway authority, thereon shall be final and binding on the Contractor; provided further that 'excepted matters' shall stand specifically excluded from the purview of the Dispute Adjudication Board (DAB) and Arbitration.

63.2 Dispute Adjudication Board (DAB): This clause is applicable in the tender having advertised value more than Rs 50 Crore.

64. (1): Demand for Arbitration:

64. (1) (i) (a) : In the event of any dispute or difference between the parties hereto as to the construction or operation of this contract, or the respective rights and liabilities of the parties on any matter in question, dispute or difference on any account or as to the withholding by the Railway of any certificate to which the Contractor may claim to be entitled to, or if the Railway fails to make a decision within 120 days, then and in any such case, but except in any of the “excepted matters” referred to in Clause 63.1 of these Conditions, the Contractor, after 120 days but within 180 days of his presenting his final claim on disputed matters shall demand in writing that the dispute or difference be referred to arbitration.

64. (1) (i) (b) : Arbitration as a method of dispute resolution should not be routinely or automatically included in procurement contacts/tenders, especially in large contracts.

64. (1) (i) (c) : As a norm, arbitration as a method of dispute resolution may be restricted to disputes with a value less than Rs. 10 crore. This figure is with reference to the value of the dispute (not the value of the contract, which may be much higher).

64. (1) (i) (d) : Inclusion of arbitration clauses covering disputes with a value exceeding Rs. 10 crore, should be based on careful application of mind and recording of reasons and with the approval of an officer not below the rank of Senior Administrative Grade (SAG) or the Accepting Authority of the tender whichever is higher.

64.(1)(ii)(a): The demand for arbitration shall specify the matters which are in question, or subject of the dispute or difference as also the amount of claim item-wise. Only such dispute or difference, in respect of which the demand has been made, together with counter claims or set off, given by the Railway, shall be referred to arbitration and other matters shall not be included in the reference.

64.(1)(ii)(b): The parties may waive off the applicability of Sub-Section 12(5) of Arbitration and Conciliation (Amendment) Act 2015, if they agree for such waiver in writing, after dispute having arisen between them, in the format given under Annexure XV of these conditions.

64.(1)(iii)(a): The Arbitration proceedings shall be assumed to have commenced from the day, a written and valid demand for arbitration is received by the Railway.

64.(1)(iii)(b): The claimant shall submit his claims stating the facts supporting the claims alongwith all the relevant documents and the relief or remedy sought against each claim within a period of 30 days from the date of appointment of the Arbitral Tribunal.

64.(1)(iii)(c): The Railway shall submit its defence statement and counter claim(s), if any, within a period of 60 days of receipt of copy of claims from Tribunal, unless otherwise extension has been granted by Tribunal.

64.(1)(iii)(d): Place of Arbitration: The place of arbitration would be within the geographical limits of the Division of the Railway where the cause of action arose or the Headquarters of the concerned Railway or any other place with the written consent of both the parties.

64.(1)(iv): No new claim shall be added during proceedings by either party. However, a party may amend or supplement the original claim or defense thereof during the course of arbitration proceedings subject to acceptance by Tribunal having due regard to the delay in making it.

64.(1)(v): If the Contractor(s) does/do not prefer his/their specific and final claims in writing, within a period of 90 days of receiving the intimation from the Railways that the final bill is ready for payment, he/they will be deemed to have waived his/their claim(s) and the Railway shall be discharged and released of all liabilities under the contract in respect of these claims.

64.(2): Obligation During Pendency of Arbitration: Work under the contract shall, unless otherwise directed by the Engineer, continue during the arbitration proceedings, and no payment due or payable by the Railway shall be withheld on account of such proceedings, provided, however, it shall be open for Arbitral Tribunal to consider and decide whether or not such work should continue during arbitration proceedings.

64.(3) : Appointment of Arbitrator:

64.(3)(a) : The Arbitral Tribunal shall consist of a panel of three arbitrators. General Manager /Additional General Manager will appoint two arbitrators, one Railway nominee and other from among the contractor's nominee. Contractor can recommend his nominee either from approved panel of Railways or from approved panel of Indian Council of Arbitration (ICA) within 30 days from the date of dispatch of approval of written and valid acceptance of demand for arbitration by the General Manager /Additional General Manager.

64.(3)(a)(i): If contractor wants to choose his nominee from Railway panel, the Railway will send a panel of at least four (4) names of retired Railway Officers empanelled to work as Arbitrator within 30 days from the day when a written and valid demand for arbitration is received by the General Manager /Additional General Manager. Contractor will be asked to suggest to General Manager /Additional General Manager at least 2 names out of the panel for appointment as Contractor's nominee within 30 days from the date of dispatch of the request by Railway. The General Manager/Additional General Manager shall appoint at least one out of them as the Contractor's nominee within 30 days from the receipt of the names of Contractor's nominees. The Railway panel shall be provided free of cost to the contractor.

64.(3)(a)(ii): If contractor wants to choose his nominee from Indian Council of Arbitration panel, Contractor will send at least 2 names of Arbitrators from the ICA panel for appointment as Contractor's nominee within 30 days from the date of dispatch of the request by Railway. The General Manager /Additional General Manager shall appoint at least one out of them as the Contractor's nominee within 30 days from the receipt of the names of Contractor's nominees. Nomination and appointment of arbitrators from ICA panel shall be as per the ICA Rules for Domestic Commercial Arbitration and amended from time to time.

Some general guidelines of ICA Rules for Domestic Commercial Arbitration are as under:-

- i. Contractor may access the ICA's panel of arbitration through ICA's official webpage:
<https://icaindia.co.in/pdf/Engineers.pdf>
- ii. A formal request for nomination shall be submitted to ICA, accompanied by:-
 - a. A brief Statement of Claim outlining the nature and quantum of the disputes.
 - b. A copy of the relevant contract and any supporting documents.
 - c. A copy of the notice intimating the other party of the initiation of arbitration proceedings, with proof of delivery (if any).
- iii. Ad-hoc appointment fees for the nomination and appointment of arbitrators shall be as per the ICA Rules for Domestic Commercial Arbitration and revised from time to time and shall be submitted along with the request.

64.(3)(b): Two selected arbitrators are free to select presiding arbitrator (3d arbitrator) within thirty (30) days from the date of their appointment. The presiding arbitrator may be selected from approved panel of Railways or approved panel of Indian Council of Arbitration (as per mutual agreement), which will be approved by General Manager/Additional General Manager. General Manager /Additional General Manager shall complete this exercise of appointing the Arbitral Tribunal within 30 days from the receipt of the names of all the three arbitrators.

64.(3)(c)(i): If one or more of the arbitrators appointed as above refuses to act as arbitrator, withdraws from his office as arbitrator, or vacates his/their office/offices or is/are unable or unwilling to perform his functions as arbitrator for any reason whatsoever or dies or in the opinion of the General Manager /Additional General Manager fails to act without undue delay, the General Manager /Additional General Manager shall appoint new arbitrator/arbitrators to act in his/their place in the same manner in which the earlier arbitrator/arbitrators had been appointed. Such re-constituted Tribunal may, at its discretion, proceed with the reference from the stage at which it was left by the previous arbitrator (s).

64.(3) (c) (ii): (a) The Arbitral Tribunal shall have power to call for such evidence by way of affidavits or otherwise as the Arbitral Tribunal shall think proper, and it shall be the duty of the parties hereto to do or cause to be done all such things as may be necessary to enable the Arbitral Tribunal to make the award without any delay. The proceedings shall normally be conducted on the basis of documents and written statements.

(b) Before proceeding into the merits of any dispute, the Arbitral Tribunal shall first decide and pass its orders over any plea submitted/objections raised by any party, if any, regarding appointment of Arbitral Tribunal, validity of arbitration agreement, jurisdiction and scope of the Tribunal to deal with the dispute (s) submitted to arbitration, applicability of time 'limitation' to any dispute, any violation of agreed procedure regarding conduct of the arbitral proceedings or plea for interim measures of protection and record its orders in day to day proceedings. A copy of the proceedings duly signed by all the members of tribunal should be provided to both the parties.

64.3(c)(iii):

(i) Qualification of Railway Empanelled Arbitrator (s):

- (a) Retired Railway Officers not below SA Grade level, one year after his date of retirement.
 - (b) Age of arbitrator at the time of appointment shall be below 70 years.
 - (c) Persons not involved in any current vigilance/CBI cases or against whom disciplinary or prosecution proceedings are not in process.
 - (d) Persons who had not been imposed a major penalty or two or more minor penalties or against whom administrative action has not been taken three times or more or
 - (e) Persons who have not been imposed one minor Penalty and against whom two administrative actions have not been taken as a result of vigilance/CBI action while in service on Railways.
- (ii) An arbitrator may be appointed notwithstanding the total number of arbitration cases in which he has been appointed in the past.
- (iii) While appointing arbitrator(s) under Sub-Clause 64.(3)(a), 64.(3)(a)(i), 64.(3)(a)(ii) & 64.(3)(b) above, due care shall be taken that he/they is/are not the one/those who had an opportunity to deal with the matters to which the contract relates or who in the course of his/their duties as Railway servant(s) expressed views on all or any of the matters under dispute or differences. A certification to this effect as per annexure- XVI shall be taken from Arbitrators also. The proceedings of the Arbitral tribunal or the award made by such Tribunal will, however, not be invalid merely for the reason that one or more arbitrator had, in the course of his service, opportunity to deal with the matters to which the contract relates or who in the course of his/their duties expressed views on all or any of the matters under dispute.
- 64.(3)(d)(i):** The arbitral award shall state item wise, the sum and reasons upon which it is based. The analysis and reasons shall be detailed enough so that the award could be inferred there from.
- 64.(3)(d)(ii):** A party may apply for corrections of any computational errors, any typographical or clerical errors or any other error of similar nature occurring in the award of a Tribunal and interpretation of a specific point of award to Tribunal within 60 days of receipt of the award.
- 64.(3)(d)(iii):** A party may apply to Tribunal within 60 days of receipt of award to make an additional award as to claims presented in the arbitral proceedings but omitted from the arbitral award.
- 64.(4):** Any ruling on award shall be made by a majority of members of Tribunal. In the absence of such a majority, the views of the Presiding Arbitrator shall prevail.
- 64.(5):** Where the arbitral award is for the payment of money, no interest shall be payable on whole or any part of the money for any period till the date on which the award is made.
- 64. (6):** The cost of arbitration shall be borne by the respective parties. If all the three arbitrators are selected from the Railway Panel, the fee of the arbitrators shall be determined as per the rates fixed/revised by Railway Board from time to time and the fee shall be borne equally by both the parties, provided parties sign an agreement in the format given at Annexure XV to these conditions after/ while referring these disputes to Arbitration. However, if any of the three arbitrators is selected from the Panel of Indian Council of Arbitration (ICA), the fee of the arbitrators shall be determined as per the rates fixed/revised by the Indian Council of Arbitration from time to time and the fee shall be borne equally by both the parties, provided parties sign an agreement in the format given at Annexure XV to these conditions after/ while referring these disputes to Arbitration.
- 64.(7)** Subject to the provisions of the aforesaid Arbitration and Conciliation Act 1996 and the rules thereunder and relevant para of General Conditions of Contract (GCC) and any statutory modifications thereof shall apply to the appointment of arbitrators and arbitration proceedings under this Clause.
- 64.(8)** In case arbitration award is challenged by a party in the Court of Law, 75% of award amount, pending adjudication by Court of Law, shall be made by party to other party. In case payment is to be made by Railway to Contractor, the terms & conditions as incorporated in the Ministry of Railways letter No. 2016/CE(I)/CT/ARB/3(NITI Aayog)/Pt. dated 08th Mar,2017 as amended from time to time, shall be followed. In case Contractor has to pay to the Railway, then 75% of the award amount shall be deducted by the Railway from the Contractor's bills,

Performance Guarantee/ Security Deposit or any other dues of Contractor with the Government of India.

2.32.0 INCLUSION OF “LETTER OF CREDIT” AS MODE OF PAYMENT IN WORKS TENDER OR SERVICE TENDER

- (i) For all the tenders having advertised cost of Rs 10 lakh or above, the contractor shall have the option to take payment from Railways through a letter of credit (LC) arrangement.
- (ii) This option of taking payment through LC arrangement has to be exercised in IREPS (Indian Railway Electronic Procurement System - the e-application on which tenders are called by Railways) by the tenderer at the time of bidding itself, and the tenderer shall affirm having read over and agreed to the terms and conditions of the LC option.
- (iii) The option so exercised, shall be an integral part of the bidder's offer.
- (iv) The above option of taking payment through LC arrangement, once exercised by tenderer at the time of bidding, shall be final and no change shall be permitted, thereafter, during execution of contract.
- (v) In case tenderer opts for payment through LC, following shall be the procedure to deal release of payment through LC:
 - (a) The LC shall be a sight LC
 - (b) The contractor shall select his Advising/Negotiating bank for LC. The incidental cost towards issue of LC and its operation thereof shall be borne by the contractor.
 - (c) SBI, New Delhi, Main Branch will be the nodal branch for issue of LCs based on online requests received from Railway Accounts Units for tenders opened in financial year 2018-19. SBI branches where the respective Railway Accounts Office has its Account (local SBI branch) will be the issuance/reimbursing branch for LC issued under this arrangement. The Bank shall remain same for this tender till completion of contract. The incidental cost @0.15% per annum of LC value, towards issue of LC and operation thereof shall be borne by the contractor and shall be recovered from his bills.
 - (d) The LC shall be opened initially for duration of 180 to 365 days in consultation with contractor. The LC shall be extended time to time as per the progress of the contract, on the request of the contractor. The value of LC to be opened initially as well as extended thereafter shall be finalised by the engineer in consultation with the contractor on the basis of expected progress of work.
 - (e) The LC terms and conditions shall inter-alia indemnify and save harmless the Railway from and against all losses, claims and demands of every nature and description brought or recovered against the Railways by reason of any act or omission of the contractor, his agents or employees, in relation to the Letter of Credit (LC). All sums payable/borne by Railways on this account shall be considered as reasonable compensation and paid by contractor.
 - (f) The LC terms and conditions shall inter-alia provide that Railways will issue a Document of Authorizations after passing the bill for completed work, to enable contractor to claim the authorized amount from their bank.
 - (g) The acceptable, agreed upon document for payments to be released under the LC shall be the Document of Authorisation.
 - (h) The Document of Authorisation shall be issued by Railway Accounts Office against each bill passed by Railways.
 - (i) On issuance of Document of Authorisation, a copy of Document of Authorisation shall be posted on IREPS for download by the contractor. A digitally signed copy of Document of Authorisation shall also be sent by Railway Accounts Office to Railway's bank (Local SBI Branch).
 - (j) The contractor shall take print out of the Document of Authorisation available on IREPS and present his claim to his bank (advising Bank) for necessary payments as per LC terms and conditions. The claim shall comprise of copy of Document of Authorisation, Bill of Exchange and Bill.

- (k) The payment against LC shall be subject to verification from Railway's Bank (Local SBI Branch).
- (l) The contractor's bank (advising bank) shall submit the documents to the Railway's Bank (Local SBI Branch).
- (m) The railway's bank (issuing bank) shall, after verifying the claim so received w.r.t. the digitally signed Document of Authorisation received from Railway Accounts Office, release the payment to contractor's bank (advising bank) for crediting the same to contractor's account.
- (n) Any number of bills can be dealt within one LC, provided the sum total of payments to contractor is within the amount for which LC has been opened.
- (o) The LC shall be closed after the release of final payment including PVC amount, if any, to the contractor.
- (p) The release of performance guarantee or security deposit shall be dealt directly by railway with the contractor i.e., not through LC.”

(Authority: Railway Board L. No. 2018/CE-I/CT/9 dated 04-06-2018)

2.33.0 JOINT VENTURE (JV) FIRMS IN WORKS TENDERS: -Not applicable in this tender.

(Vide Railway Board's letter No. 2002/CE-I/CT/37 JV Pt. VIII dated 14-12-2012)

CHAPTER – III

PRICES AND PAYMENTS

CHAPTER – III

PRICES AND PAYMENT

3.1 SCOPE:-

This chapter deals with prices to be paid for the various items of work and other amount payable in accordance with accepted schedule of prices and rates and conditions of payment herein mentioned.

3.2 SCHEDULE OF PRICES: -

The Tenderer shall quote his rates in percentage above / below / at par with respect to estimated cost given in the tender and fill up the form given in the tender's schedule of quantities and rates.

3.3 INCIDENTAL CHARGES:-

The unit prices are including of loss, wastage, incidental charges for transportation, loading, unloading and handling of materials. It also include commissioning for arranging dispatch by rail, completing all necessary formalities in this respect, arranging payment of wages collection of railway receipt all insurance premier banker's charges etc.

3.4 OTHER PRICE PAYMENT :-

No adjustment in unit price on account of price fluctuation will be permitted on any account.

3.5 PAYMENT TERMS:-

- (1) On account payment for equipment, components, fittings and materials, shall be made @ 95% of the supply and erection value of the item indicated in the tender schedule to the contractor only after successful erection, testing and commissioning of the materials, subject to complying the following:
 - a. Suppliers delivery challan.
 - b. Inspection certificates of Engineers Representative after receipt of material.
 - c. Joint inspection report of work executed
 - d. Firm will submit manufactures original test certificate wherever applicable.
 - d. All the Test Reports.
 - e. Any other document mention in the Tender Document
- (2) The contractor shall certify that **“I have uploaded the correct details of contract labours engaged in connection with this contract and payments made to them during the wage period in Railway's Shramik portal at www.shramikkalyan.indianrailways.gov.in till ____Month ____ years.”**

3.6 PROGRESS PAYMENT FOR SUPPLY & ERECTION: -

On completion of supply and erection / contract period, the contractor shall receive payment @ 95% for supply and erection value of the item indicated in the tender schedule to the contractor only after successful erection, testing and commissioning of the materials.

3.7 FINAL PAYMENT :

On completion of entire work of schedule A, B, C & D in all respect and on submission of PROVISIONAL ACCEPTANCE CERTIFICATE and No Claim Certificate, the contractor shall receive balance 5 % of supply & erection rates as final payment for the remaining works not covered in the above bill.

3.8 REFUND OF SECURITY DEPOSIT :-

The security deposit will be refunded on submission of Final Completion Certificate from the Railways authorized representative after successful completion of the contract and after expiry of the guarantee / warranty obligation and submission of No Claim Certificate by the contractor.

3.9 TAXES :- (If applicable)

In case of octroi the Railway can issue necessary certificate for octroi exemption but it will not be binding on Railway if same is not accepted by octroi authorities.

3.9.1 Taxes wherever applicable should be shown separately and not all inclusive rates in the price schedule.

3.9.2 If service tax is leviable, the section under which it is levied is to be mentioned by the tenderer. If abatement of service taxes the notification under which abatement taken should be submitted by the tenderer.

3.9.3 The service tax registration number of the tenderer and copy of the same should be submitted. The category of service for which the firm registered with CBEC should be submitted.

Note: -All the bidders / tenders should ensure that they are GST compliant and their quoted tax structure / rates are as per GST Law. (Ref- Rly Bd's L. No. 2008/RS(G)/777/1 dated. 29.05.2017)

3.10 PENALTY:-

- 1) As per GCC April 2022 or latest.
- 2) In the event of any safety violation observed during the contract period by Railway officials, a penalty of ₹2,000/- per incident shall be levied on the contractor.
- 3)

SN	Item	Period allotted	Penalty after expiring of reasonable period allotted in col "c".
a	b	c	d
i	Not attending the failure of equipment's/ fittings / materials, workmanship in guarantee period on receiving of information from Rly/ Rly representative / electronic mail within one week time after receiving information.	One week	Rs.1000/- per week

The above penalties if any will be deducted from progressive bills of firm's or any dues laying with Railway.

4) Penalty for Cable Damage: (Rly Bd's L.No.2021/Tele/5(2)/3-Part (1) (3425647) dtd 12.06.2023)

(i) Penalty to be imposed for damages to cable shall be as under:

Cable damaged	Penalty per location
Only Quad cable or Signaling cable	1.0 Lakh
Only OFC	1.25 Lakh
Both OFC & Quad	1.5 Lakh
Electrical Cable	1.0 Lakh

(ii) Penalty shall be levied on the contractor when they work without permission or resort to careless working without making arrangements for protecting cables and other utilities. Based upon the local conditions and practices, Central Railway shall devise its own conditions for examining and levying penalty. For each cable cut, a joint report at the level of supervisors should be prepared on the same day and it should become the basis for levying penalty and fixing responsibility.

(iii) Railways will not lodge FIR with RPF in cases of works being executed by authorized contractors of Railways who have been duly permitted to execute the works.

CHAPTER - IV

EXPLANATORY NOTES OF

TENDER SCHEDULE

CHAPTER-IV

EXPLANATORY NOTES OF TENDER SCHEDULE

Tender No: - **BB.LG.W.THK.2026.01**

Name of work: - “(A) Electrification for upgradation of SM office, other utility offices, construction and improvement of toilet, beautification of FOBs and allied works at Thakurli station. (B) Rewiring for renovation and improvement of service buildings in between Kanjurmarg-Kopar Section. (C) Rewiring for renovation and improvement of service building at Thakurli, Dombivli and Kalyan Station. (D) Electrification for Provision of extension of platform at Vikhroli, Kalva, Mumbra & Diva of through lines for running of 15 car EMU services.”

In case of any discrepancy / difference between description mentioned in the schedule of price and explanatory note of each item, the description specified in explanatory note shall be applicable.

The work as per this tender call for the above mentioned work. This tender comprises of following items mentioned as brought below: -

Schedule-A	Electrification for upgradation of SM office, other utility offices, construction and improvement of toilet, beautification of FOBs and allied works at Thakurli station.
Schedule-B	Rewiring for renovation and improvement of service buildings in between Kanjurmarg-Kopar Section.
Schedule-C	Rewiring for renovation and improvement of service building at Thakurli, Dombivli and Kalyan Station.
Schedule-D	Electrification for Provision of extension of platform at Vikhroli, Kalva, Mumbra & Diva of through lines for running of 15 car EMU services.
D-1	Electrification for Provision of extension of platform at <u>Vikhroli</u> of through lines for running of 15 car EMU services.
D-2	Electrification for Provision of extension of platform at <u>Mumbra</u> of through lines for running of 15 car EMU services.
D-3	Electrification for Provision of extension of platform at <u>Kalva</u> of through lines for running of 15 car EMU services.
D-4	Electrification for extension of platform no 3&4 of through line at Diva Station for running of 15 car EMU service.

Note: -

- (i)** All materials shall conform to relevant IS, BIS, IEC, International etc. Standards / parameters wherever applicable. All IS/IEC mentioned in this document, shall be applicable with their latest amendments/revisions in force at the time of execution of the work.
- (ii)** In cases where specific technical details are not covered in this document, the provisions of the relevant IS/IEC/CPWD/RDSO standards and the Electrical General Services Manual, Volume-I (Power Supply) issued by Railway Board, shall be referred. Soft copy of the manual can be accessed at:
https://indianrailways.gov.in/railwayboard/uploads/directorate/ele_engg/Circulars/Elect_PS/other_circulars/Electrical%20General%20Service%20Manual%20Volume-I%20Power%20Supply_Ebook_26-11-22.pdf.
- (iii)** The scope of work will be executed as per location in the tender schedule. However, the site / location may also be changed as per the requirement of the Railways.
- (iv)** Any kind of drawings are required for execution of work, the contractor shall prepare and submit feasibility of location along with detailed drawings and wiring diagram at his own cost, based on site survey and consultation with the consignee. The drawings shall be prepared in accordance with relevant details, codes & standards and must clearly show all particulars required by the Railways for approval and execution.

Schedule-A: Electrification for upgradation of SM office, other utility offices, construction and improvement of toilet, beautification of FOBs and allied works at Thakurli station.

Schedule item no. 1

Supply, erection, testing and commissioning of 2 x 18 W LED fitting complete with connection and necessary fixing arrangements as per site requirement.

The price shall cover cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of surface/suspended mounted, corrosion-resistant, IP66/65 protected light fitting with 2 nos. 4 feet long 18-20 Watt LED tube light, System efficacy ≥ 110 lm/W, PF ≥ 0.90 , THD $\leq 10\%$, with inbuilt electronic driver min. 2.5 kV surge protection complete with all accessories and fixing arrangement with clamps, brackets, nut-bolts etc. as per site condition. The fitting shall be constructed with high grade polycarbonate / CRCA powder coated housing with CRCA white powder coated reflector, UV-stabilized clear polycarbonate diffuser cover, stainless steel clamps/toggles. The batten should be similar or substantially equivalent to model no. BJI 218 LED of M/s Bajaj make. The cost shall also cover the wiring from ceiling rose / junction box / overhead wire to luminaries by 1.5 sq.mm cable of 3 core PVC insulated multistrands copper conductor with suitable size of flexible PVC conduit and fixing arrangement with clamps, brackets, nut-bolts etc. The technical parameter will be generally conforming to specification enclosed and submit test certificates/reports as per this technical specification. Luminaire to be got approved by Sr. DEE (G) CSMT before supply.

Schedule item no. 2

Supply, erection, testing and commissioning of 18-20 W 4 feet LED slim fitting complete with connection as per site requirement

The price shall cover cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of 4 feet 18-20 Watt LED light fitting, THD ≥ 10 , efficacy 110 lm/W with extruded aluminium housing including aluminium framing, glare-free diffuser complete with inbuilt constant current driver and all accessories and fixing arrangements as per site condition. The cost shall also cover the wiring from ceiling rose / junction box / overhead wire to luminaries by 0.75 sq.mm flexible cable of 3 core PVC insulated multistrands copper conductor with suitable size of flexible PVC conduit with fixing arrangement as per site condition. The LED fittings should be similar or substantially equivalent to model no. BCLAB 20W LED of M/s Bajaj or model no. LUMILINEPLUSPROBS18WLED of M/s Havells make. The technical parameter will be generally conforming to specification enclosed and submit test certificates/reports as per this technical specification. Luminaire to be got approved by Sr. DEE (G) CSMT before supply.

Schedule item no. 3

Supply, erection, testing and commissioning of 9-10 W LED (2 ft) slim fitting complete with fixing arrangement, etc.

The price shall cover cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of 2 feet 9-10 Watt LED light fitting, THD ≥ 10 , efficacy 110 lm/W, extruded aluminium housing with suitable driver complete with all accessories and fixing arrangements as per site condition. The cost shall also cover the wiring from ceiling rose / junction box / overhead wire to luminaries by 0.75 sq.mm flexible cable of 3 core PVC insulated multistrands copper conductor cable with suitable size of flexible PVC conduit with fixing arrangement as per site condition. The LED fittings should be similar or substantially equivalent to model no. LUMILINEPLUSPROBS10WLED of M/s Havells make. The technical parameter will be generally conforming to specification enclosed and mandatorily submit test certificates/reports as per this technical specification. Luminaire to be got approved by Sr. DEE (G) CSMT before supply.

Schedule item no. 4

Supply, erection, testing and commissioning of 2 x 2 36 W LED fitting with IP 20 complete with connection and necessary fixing arrangements as per site requirement.

The price shall cover cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of surface and recess mounted 2ft x 2ft, 36-40 W LED, IP-20, efficacy ≥ 120 lm/W, constant current driver min. 4 kV surge protection, opal diffuser, white powder coated CRCA housing

complete with all accessories for fixing arrangement as per site condition. The LED fittings shall be of both types, recessed and surface mounted as per site requirement. The cost shall also cover the wiring from ceiling rose / junction box / overhead wire to luminaries by 1.5 sq.mm flexible cable of 3 Core PVC insulated multistrands copper conductor with suitable size of flexible PVC conduit with fixing arrangement as per site condition. The LED fittings should be similar or substantially equivalent to model no. BZRSQL 43L XE WH OD SD 36 W of M/s Bajaj make or SM367 LED36S of M/s Philips make. The technical parameter will be generally conforming to specification enclosed and submit test certificates/reports as per this technical specification. Luminaire to be got approved by Sr. DEE (G) CSMT before supply.

Schedule item no. 5

Supplying and erecting integrated LED flood light fitting Max. 70-80W including driver with U shaped bracket as per specification

The price shall cover cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of 70-80 Watt LED flood light fitting with high lumen LED, secondary lens optics, IP-66, IK07, efficacy 140 lm/W including suitable constant current driver with built in surge, open/short circuit protection. The housing shall be made of powder coated pressure die cast aluminium with heat resistant protective toughened glass cover complete with all accessories with gasket, U-shaped, bracket, GI bracket/clamp, stainless steel screw, washer, nut bolts etc. as per site condition. Outdoor luminaire shall have name of the manufacturer embossed on the luminaire. The cost shall also cover the wiring from ceiling rose / junction box / overhead wire to luminaries by 1.5 sq.mm cable of 3 core PVC insulated multistrands copper conductor with suitable size of flexible heavy duty PVC conduit with PVC gland and fixing arrangement with SS hardware i.e. clamps, brackets, nut-bolts etc. The LED fittings should be similar or substantially equivalent to model no. PRAZE F112L WH NB-A5 TG SD 80 W of M/s Bajaj make. The technical parameter will be generally conforming to specification enclosed and submit test certificates/reports as per this technical specification. Luminaire to be got approved by Sr. DEE (G) CSMT before supply.

Schedule item no. 6

Supply and fixing of 18-20 watts LED round recessed/surface mounted downlighter with a pressure die-cast aluminum heat sink luminaire of, with a supply connection using a 3-core x 1.5 sq.mm PVC insulated copper cable fittings complete with fixing.

The price shall cover cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of recess and surface mounted downlight 18-20 W LED, opal diffuser, min. efficacy 110 lm/W, THD \geq 10, IP-20, constant current output driver min. 4 kV surge protection with pressure die-cast aluminum heat sink, aluminium housing complete with all accessories and fixing arrangements as per site condition. The LED fittings shall be of both types, recessed and surface mounted as per site requirement. The cost shall also cover the wiring from ceiling rose / junction box / overhead wire to luminaries by 1.5 sq.mm flexible cable of 3 core PVC insulated multistrands copper conductor with suitable size of flexible PVC conduit with fixing arrangement as per site condition. The LED fittings should be similar or substantially equivalent to model no. BGSLO Pro recess/surface of M/s Bajaj make. The technical parameter will be generally conforming to specification enclosed and submit test certificates/reports as per this technical specification. Luminaire to be got approved by Sr. DEE (G) CSMT before supply.

Schedule item no. 7

Supply, fixing, testing & commissioning of LED 15-20W, spot light fitting, Effective heat dissipation with extruded aluminum heat sink, inbuilt protection, protected from dust and insects, complete with cover/ other accessories etc. with aluminum housing powder coated with white reflector, and necessary fixing arrangements as per site requirement.

The price shall cover cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of 15-20 W LED spot light, min. efficacy 85 lm/W, CCT (3000/4000/6500°K as per requirements), IP-20, constant current output driver min. 4 kV surge protection with white reflector, effective heat dissipation extruded aluminum heat sink, powder coated aluminium housing complete with all accessories and fixing arrangements as per site condition. The cost shall also cover the wiring

from ceiling rose / junction box / overhead wire to luminaries by 1.5 sq.mm flexible cable of 3 core PVC insulated multistrands copper conductor with suitable size of flexible PVC conduit with fixing arrangement as per site condition. The LED fittings should be similar or substantially equivalent to model no. BRDCSL 18W of M/s Bajaj make. The technical parameter will be generally conforming to specification enclosed and submit test certificates/reports as per this technical specification. Luminaire to be got approved by Sr. DEE (G) CSMT before supply.

Schedule item no. 8

Supply, erection, testing and commissioning of timer panel board as per railway's requirement

The price shall cover the cost of Supply, transportation, multiple loading/unloading, storage, erection, testing and commissioning of outdoor-type min. IP-54, double-door distribution timer panel board comprising of 01 no. 63 amps FP MCCB as incoming and 03 no. 32 amps ML-2 contactors with bypass arrangement by 03 nos. 6A SP MCB, 06 nos. 32 A SP MCB as outgoing and 03 nos. Astronomical / Digital timer complete with suitable rating copper bus bars, neutral links, cable gland, lugs, nut-bolts and other accessories as per site requirements condition and details given below:

MCCB:

MCCB shall be current-limiting, quick-make/quick-break, trip-free type, conforming to IEC 60947-2, 4-pole with 100% neutral, 35 kA breaking capacity ($I_{cs}=I_{cu}=100\%$), thermal-magnetic adjustable release and inbuilt/CT-based ground fault protection of same make. MCCB shall have phase barriers, spreader links, extended rotary handle with interlock defeat and padlock, trip indication, auxiliary contact, UV/shunt release, and be line-load independent. Panel incomer shall include a 96×96 mm digital Earth Leakage Relay with adjustable setting. The contractor shall submit valid Test Certificates as per IEC 60947-2, issued by the OEM of the MCCB.

MCB:

MCB shall be housed in high-grade insulating material with high dielectric, arc, flame and temperature resistance, suitable for isolation and compatible with auxiliary contact, shunt release and trip alarm. MCB shall have 10 kA breaking capacity, 4 kV impulse withstand and an integrated tripping mechanism for simultaneous disconnection of all poles on any phase/neutral fault, conforming to IS/IEC 60898-1 and IS 12640-2 (latest). The contractor shall submit valid Test Certificates as per IEC 60898-1, issued by the Original Equipment Manufacturer (OEM) of the MCB.

Timer:

SN	Description	Digital Timer / Astronomical Digital Timer
1	Protection	IP 20
2	Voltage	230 V, 50/60 Hz
3	Running Reserve	5 years or above
4	Nos. of channels	1
5	Switching capacity:	
a	Ohmic 250 V a.c. $\cos\phi = 1$	16 Amp
b	Inductive 230 V a.c. $\cos\phi = 0.6$	10 Amp
6	Cycle function (pulse time)	Min 1sec, max 1 hr 59 min 59sec
7	Clock precision (typical)	~ 0.1 s/day
8	Shortest switching step	1 sec
9	Operating Temperature	-20 to +55° C

Busbar:

One set of (3-phase + neutral) high-conductivity ETP grade copper bus bars, extensible on either side, supported on non-breakable SMC insulators (Comparative Tracking Index (CTI) $\geq 600V$ as per IS 2824) at regular intervals to withstand fault forces. Busbars shall be color-coded with minimum clearances of 25 mm between phases and 19 mm from phase to neutral. Current carrying capacity shall be 1.25 A/sq.mm and the supplier shall provide a conductivity certificate from reputed manufacturer.

Timer Panel fabrication: The LT panel shall be fabricated from minimum 2 mm thick CRCA sheet, properly folded and reinforced to ensure strong and rigid structure. All doors and covers shall also be 2 mm thick CRCA and shall be fully gasketed with EPDM/Neoprene to prevent dust, moisture and vermin entry. Heavy-duty hinges made of corrosion-resistant stainless steel shall be provided and the panel shall have minimum IP54 protection. The panel shall be compartmentalized with separate enclosed sections

for horizontal bus bars, vertical bus bars, switchgears and cable alleys to ensure operational safety and ease of maintenance. Cable chambers shall be sized for easy termination with top/bottom entry. CRCA sheet steel used in fabrication shall be cleaned and surface-treated through a seven-tank process (alkaline degreasing, descaling in dilute sulphuric acid and phosphating). After treatment, primer paint shall be applied, followed by final oven-baked powder coating of minimum 70-micron thickness. All switchboards and circuits shall be fitted with permanently engraved black-on-white nameplates and metal labels, clearly indicating the feeder number and designation. Internal separation shall be minimum Form-3B as per IEC 61439. The panel shall be floor-mounted on suitable GI angle (min. 50x50x6 mm or higher, as per panel load-bearing requirement) frame properly grouted on concrete foundation and covered with 14 SWG MS sheet duly painted as per site requirements.

Wiring: All wiring shall be with 1.5 sq.mm PVC insulated copper multistranded FRLSH wire (IS 694:2010) and 2.5 sq.mm for CT wiring. Wires shall be coded, labelled with approved ferrules at both ends, neatly bunched, clamped and brought out on terminal board for external connections.

Design & Approval: The LT panel shall be designed, manufactured and type-tested as per latest IEC 61439 (Parts 1 & 2) standards. The contractor shall submit GA drawings for Sr.DEE(G) office approval before fabrication & provide original test reports from CPRI/ERDA or equivalent Govt. testing agencies.

Schedule item no. 9

Supply, erection, testing and commissioning of LED mirror light for washing basin, complete with accessories.

The price shall cover cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of aesthetically designed linear LED mirror light of 6-10 Watts (min. 300 mm length), warm white with acrylic diffuser complete with suitable driver and all accessories including suitable decorative fixing arrangements as per site conditions. The cost shall also cover the wiring from ceiling rose / junction box to luminaries by 0.75 sq.mm flexible cable of 3 core PVC insulated multistrands copper conductor with suitable size of flexible PVC conduit with fixing arrangement as per site condition. The fittings shall have the warranty for a period of two years from the date of commissioning. The tenderer shall submit guarantee certificate & test certificates of offered fittings. The mirror light fittings should be similar or substantially equivalent to model no. Vanity Insanity Stainless Steel Vanity Light (Model-WL47-10008) of White Teak. The sample of the fitting shall be got approved by Sr. DEE (G) CSMT before supply.

Schedule item no. 10

Supply, erection, testing and commissioning of LED strip 5 meters light complete with all fixing arrangements. . (1 no. = 5 meter length LED strip)

The price shall cover cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of 28-30 W/5mtr LED strip light fitting (warm/natural/cool as per requirement) with suitable driver complete with all accessories & fixing arrangement such as inter connector etc. as per site condition and wiring from junction box/connector to fittings by 0.75 sq.mm 3 core PVC insulated multistrands copper conductor. The LED strip light shall be suitable for cutting at suitable size and re-connectable using suitable connectors. The LED fittings should be similar or substantially equivalent to model no. Philips Sky Cove LED Strip light of M/s Philips make. The contractor shall submit Guarantee certificates & Test Certificate of offered fittings from Manufacturers. The LED strip light fitting shall be got approved by Sr.DEE (G) CSMT before supply.

Schedule item no. 11

Supply, erection, testing and commissioning of Aluminium LED profile complete with all fixing arrangements.

The price shall cover cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of aluminium profile channel complete with diffuser/cover for housing for above LED strip lights. The profile shall be made of high-quality anodized aluminium for efficient heat dissipation, durability and aesthetic finish suitable for recessed and surface mounting as per site requirement with necessary end-caps, clips and other fixing accessories for installation as per site requirement. The size of the aluminium profile channel shall be of suitable size as per LED strip to be provided in above Schedule item to ensure proper fitting as per site condition.

Schedule item no. 12

Supply, erection, testing and commissioning of 85-90W LED outdoor lighting fitting complete with all fixing arrangements.

The price shall cover cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of 85-90 Watt LED outdoor light fitting, with secondary lens optics, IP-66, IK07, efficacy 120 lm/W including suitable constant current driver with built in surge, open/short circuit protection. The housing shall be made of powder coated pressure die cast aluminium with protective toughened glass cover complete with all accessories with gasket, GI bracket/clamp made of 25x5 mm GI strip, stainless steel hardware like screw, washer, nut bolts etc. as per site condition. Outdoor luminaire shall have name of the manufacturer embossed on the luminaire. The cost shall also cover the wiring from ceiling rose / junction box / overhead wire to luminaries by 1.5 sq.mm cable of 3 core PVC insulated multistrands copper conductor with suitable size of flexible heavy duty PVC conduit with PVC gland and fixing arrangement with SS hardware i.e. clamps, brackets, nut-bolts etc. The LED fittings should be similar or substantially equivalent to model no. ZELA P108L WH PO TG SD 90 W of M/s Bajaj or ENDURASUNDOWNSL90W LED of M/s Havells make. The technical parameter will be generally conforming to specification enclosed and mandatorily submit test certificates/reports as per this technical specification. Luminaire to be got approved by Sr. DEE (G) CSMT before supply.

Schedule item no. 13

Supply, fixing, testing and commissioning of heritage type pole with post top weather proof LED light fitting complete with all accessories and cement concrete foundation

The price shall cover cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of heritage type pole with post top weather proof LED light fitting complete with all accessories, fixing arrangements and cement concrete foundation as per site condition. Details as below:

1. Supply, erection, testing and commissioning of heritage type decorative pole of approx. 8 to 10 feet height complete with weatherproof LED light fitting, lantern arrangement and necessary mounting accessories
2. The heritage pole shall be made of high quality die-cast aluminium/ Ductile Cast Iron (SG Iron) with corrosion resistant material having heritage type decorative design with antique finish and suitable outdoor grade black powder coating.
3. The pole design shall be match the heritage/aesthetic requirement of the site. The pole shall have suitable provision for internal cable entry, termination and maintenance access. Made of one piece and closed at bottom to ensure high protection against external agents. The structure shall be robust, weather resistant and protected against external environmental conditions.
4. The pole shall be erected on suitable cement concrete foundation of 1:3:6 ratio, including excavation, casting, grouting, base plate, foundation bolts/anchor fasteners and all required materials/accessories as per site condition. The foundation shall be 200 mm above ground level or as per site requirement to ensure proper stability, alignment and safe operation of the pole.
5. The lantern assembly shall be made of shockproof, UV stabilized, weather resistant and corrosion-free material suitable for outdoor application. The diffuser shall be UV stabilized PMMA/polycarbonate material resistant to yellowing due to sunlight.
6. The LED luminaire shall be minimum 40W energy efficient type, providing uniform 360° illumination with suitable optics. The fitting shall be dust, moisture and insect protected with minimum IP65 protection and suitable for outdoor environmental conditions.
7. The LED fitting shall be provided with high efficiency constant current driver suitable for input voltage range 100-240V AC with necessary protections against surge, over voltage and short circuit. The complete fitting shall be supplied with all required accessories.
8. Internal wiring from junction box/terminal arrangement to LED luminaire shall be carried out with 3 core, 1.5 sq.mm PVC insulated flexible multistrand copper conductor FRLSH cable including all required connectors and accessories.
9. The complete pole, fitting, wiring and earthing arrangement shall be installed to ensure safe, reliable and satisfactory operation.
10. The fittings shall have the warranty for a period of two years from the date of commissioning. The contractor shall submit Guarantee certificates & Test Certificate of offered fittings from Manufacturers. The fitting should be got approved by Sr. DEE (G) CSTM before supply.

Schedule item no. 14**Supply, erection, testing & commissioning of LED Bollard 10-15W fitting complete with connection and necessary fixing arrangements as per site requirement.**

The price shall cover cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of LED Bollard 10-15 W Light fitting with suitable constant current driver, mounting on concrete foundation with necessary GI hardware as per site requirement. The LED bollard fittings should be similar or substantially equivalent to model no. BGBOM 1000 15W LED M/s Bajaj make. The fittings shall have the warranty for a period of two years from the date of **commissioning**. The contractor shall submit Guarantee certificates and LM79, driver test report from NABL lab of Offered fittings. The sample of the fitting shall be got approved by Sr.DEE (G) CSMT before supply.

The fittings shall be as per details given below:

Technical Specifications

Bollard Height	-: 1000 mm
Operating Temperature	-: 10°C to 45°C
Operating Voltage	-: 140-270 V
Rated Input Voltage & Frequency	-: 220-240 V/AC & 50 Hz
Rated Input Wattage	-: 15 W
Power Factor	-: ≥ 0.95
Rated Luminous	-: 1200 Lm
Color Temperature (CCT)	-: 3000/5700K
CRI	-: > 70
LED Life Span	-: $> 50,000$ Hours
Housing	-: Made of aluminium pipe UV protected, epoxy powder coated
Diffuser	-: Polycarbonate diffuser
Surface Mounting	-: With casting of CC foundation, flange, Base plate, nut-bolts, etc.
Protections	-: Over Voltage Protection, Short/open Circuit Protection, min. 4kV Surge Protection, IP 66, IK07

Schedule item no. 15**Supply, erection, testing and commissioning of LED decorative wall light fitting complete with all fixing arrangements.**

The price shall cover cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of aesthetically designed, ceiling / wall mounted decorative LED light fitting with wide voltage range protected from dust and insects, complete with all accessories including suitable decorative fixing arrangements as per site conditions. Colour temperature (warm/ natural/ cool) and Wattage shall be as per site requirement. The cost shall also cover the cost wiring from ceiling rose / junction box to fitting by 0.75 sq.mm flexible cable of 3 core PVC insulated multistrands copper conductor with suitable size of flexible decorative PVC conduit and fixing arrangement as per site condition. The decorative light fittings should be similar or substantially equivalent to model Dime A Dozen Ceiling light (Model-CL9-10001) or Glow Maze (Gold) Glass wall light (Model-WL51-10001) or Afloat (Gold, Milky white) Wall light (Model-WL56-10003) of White Teak. The fittings should be of reputed brands. The fittings shall have the warranty for a period of two years from the date of commissioning. The tenderer shall submit guarantee certificates & test certificate of offered fitting & light. The fittings should be of reputed brands. The sample of the fitting shall be got approved by Sr. DEE (G) CSMT before supply.

Schedule item no. 16**Supply, erection, testing and commissioning of 48" sweep energy efficient BLDC ceiling fan with down rod, motor, etc. with necessary connection.**

The price shall cover the cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of BEE certified 5 star rated BLDC fan of size 48 inch (1200mm) sweep ceiling fan not more than 35 Watt, Service value not less than 7.5, minimum air delivery 230 cum/minute, min. 2kV surge protection complete with step-type electronic regulator or remote control (as per Railway requirement) **conforming to enclosed specification no. PCEE/CR/BLDC CEILING FAN/1200 & 1400 MM Rev.0**. The fan shall be provided and installed complete with all standard accessories and safety devices including suitably sized MS down rod, blades, canopies, rubber insulators, hook, MS

bracket/clamp, split pin, nuts, bolts and spring washers as required at site. The MS down rod shall be of suitable length (not less than 300 mm) and finished with white paint or matching fan colour as approved. All MS brackets, clamps and supporting hardware shall be hot-dip galvanized. The cost shall also cover the wiring from ceiling rose / junction box / overhead wire to fan by 0.75 sq.mm flexible cable of 3 core PVC insulated multistrands copper conductor (FRLSH) with suitable size of flexible PVC conduit and fixing arrangement as per site condition. The fan shall have the warranty for a period of five year from the date of commissioning. The contractor shall submit test report from Govt Lab / NABL / ILAC accredited lab.

Schedule item no. 17

Supply, erection, testing and commissioning of exhaust fans 9" metal body with motor guard, cover, etc

The price shall cover the cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of 9" (230 mm) sweep metal body heavy duty exhaust fan, air delivery min. 750 Cu.M/H, 1400 rpm, copper wound, securely attached protecting wire guard, motor guard & cover, suitable to work at 230 V, 50 Hz AC supply. The fans should be tested and conform to IS: 2312 with latest amendments. The fan should be similar or substantially equivalent to model no. Aeroclean Plus 230 mm of M/s Usha make. The fan shall have the warranty for a period of two years from the date of commissioning. The contractor shall submit Guarantee certificates & Test Certificate of offered fan from Manufacturers

Schedule item no. 18

Supply, erection, testing and commissioning of 12" metal body type exhaust fan complete with motor guard, cover, etc.

The price shall cover the cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of 12" (300 mm) sweep metal body heavy duty exhaust fan, air delivery 1600 Cu.M/H, 1350-1400 rpm, copper wound, securely attached wire guard/protective grill, motor guard & cover, suitable to work at 230 V, 50 Hz AC supply. The fans should be tested and conform to IS: 2312 with latest amendments. The fan should be similar or substantially equivalent to model no. Aeroclean Plus 300 mm of M/s Usha make. The fan shall have the warranty for a period of two years from the date of commissioning. The contractor shall submit Guarantee certificates & Test Certificate of offered fan from Manufacturers.

Schedule item no. 19

Supply, erection, testing and commissioning of Air circulator (BLDC) wall mounted 24" sweep fan with necessary connection

The price shall cover the cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of heavy duty 3 blade 24 inch sweep BLDC Air circulator fan. The cost shall also cover the wiring complete with connection with existing nearby power supply by 1.5 sq.mm flexible cable of 3 core PVC insulated multistrands copper conductor with suitable size flexible PVC conduit and fixing arrangement as per site condition. The technical details of the Air circulator shall be as follows:

1	Type of Air circulator /Size	BLDC / 24 inch, with inbuilt oscillation mechanism
2	Supply	1- ϕ , 230 \pm 10% V AC, 50Hz supply
3	Speed regulation	3 Step Manual Speed regulator
4	Number of blade/Material	3 / Aluminium
5	Minimum Air delivery	Not less than 200 CMM (Maximum speed)
6	Service value	Not less than 4.2
7	Rated speed (RPM)	1350-1400
8	Input Voltage Range	1- ϕ , 160-280 Volt
9	Power consumption	Not more than 150 Watt
10	Motor /Class of insulation	Copper wound BLDC motor / Class A
11	Construction	SS wire guard/fan guard
12	Vertical Tilt adjustment	4 Position Tilt adjustment
13	Protection Features	Over voltage, short-circuit, blocked blade protection

14	Length of Cord	Min. 2 meter 3 core PVC insulated, PVC Sheathed, 1.5 sq.mm, multi stranded copper cable as per IS 694 or latest
15	MCB Protection	Each fan to be provided with C curve 6A DP MCB with common internal integrated tripping mechanism in metal enclosure.
16	Mounting Type	Wall/pole mounted with base plate, GI clamps, channel, nuts-bolts, safety accessories etc. as per site requirements.
17	Conformity & Tests	(1) The fans shall comply with the requirements given in IS 2997 or latest and submit test report from Govt Lab/NABL/ILAC as per IS 2997 with latest amendments. (2) The contractor shall submit BEE Certification for Energy Efficiency labeling of Star Marking
18	Guarantee / warranty	Min. 3 Years, Firm shall submit guaranty certificate along with supply.

Schedule item no. 20

Supply, erection, testing and commissioning of 16" sweep wall bracket fan complete with necessary fixing arrangement

The price shall cover the cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of wall mounted bracket fan 16" (400 mm) sweep with speed & oscillation regulator and tilting adjustment, 3/5 aerodynamically balanced blades, 2100-2200 rpm, air delivery 90-100 Cu.M/minute, copper wound, securely attached both side wire guard, motor guard & cover, suitable to work at 230 V, 50 Hz AC supply and suitable mounting arrangement as per site condition. The fan should be similar or substantially equivalent to model no. Helix XT 400 mm of M/s Usha make. The fans should be tested and conform to relevant latest IS. The fan shall have the warranty for a period of two years from the date of commissioning. The contractor shall submit Guarantee certificates & Test Certificate of offered fan from Manufacturers.

Schedule item no. 21

Wiring of the concealed Light / fan / call bell point with all accessories. The switches shall be of modular type.

The price shall cover the cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of material, fixing of concealed light / fan point / call bell point wiring with 1.5 sq.mm PVC insulated 1.1 KV grade, Halogen free FRLS multistranded copper conductor wires along with 1.5 sq.mm green colour copper earth wire in 25/32 mm dia, at least 2 mm thick heavy duty PVC conduit pipes, 5/6 amps switch on control board, angular holder / ceiling rose, etc. including sub-mains of 2.5 sq.mm PVC insulated copper wire and 0.75 sq.mm 3 core PVC insulated multistrands copper conductor flexible cable from ceiling rose to fitting as per standard practice. The price shall also cover the cost of supply and fixing of all required materials including modular switches, sockets, plates, switch boards, PVC conduit pipes, FRLSH copper conductor wires, earth wires, ceiling rose, connectors, fixing accessories, etc., required for completion of the work in all respects as per site requirement. The switches, plugs, sockets, board shall be of modular type. The terminal of switch, socket shall be made of Brass. Earth wire must be connected with 3rd/earth terminal. The wiring shall be as per IS 732:2019 and wire shall be 1.1 KV grade conform to IS:694 2010 with latest amendments and specification attached. The switches, sockets, board, PVC conduit pipe, wiring accessories, etc. shall be ISI marked and conform to relevant IS/BIS viz. IS:3854, IS:1293, IS:14927 IS: 9537 (Part III), IS: 3419, IS 1258, IS 371 with latest amendments. The work shall also include wall cutting for concealed wiring, after providing concealed wiring the surface of wall/ceiling shall be made as earlier by providing cement, plaster, painting etc. If a wall is being constructed and RCC slab is being poured for the roof, the contractor shall lay the conduit pipe at the same time for concealed wiring.

Schedule item no. 22

Wiring of the Universal plug point on switch board with all accessories and running earthing copper conductor as per standard practice. The switches shall be of modular type

The price shall cover the cost of wiring of wall socket point with 5 Amps universal plug socket, switch etc. complete with 1.5 sq.mm Copper PVC insulated, 1.1KV, Halogen Free FRLS, multi-stranded wire

in rigid PVC fire retardant casing capping with running earthing of 1.5 sq.mm copper conductor with green colour PVC insulated wire and mounted on switch board. The price shall also cover the cost of supply and fixing of all required materials including modular switches, sockets, plates, switch boards, PVC conduit pipes, FRLSH copper conductor wires, earth wires, ceiling rose, connectors, fixing accessories, etc., required for completion of the work in all respects as per site requirement. The switches, sockets, board shall be of modular type. Earth wire must be connected with 3rd/earth terminal of switch/socket/fixture. The terminal of switch, socket shall be made of Brass. The wiring shall be as per IS 732:2019 and wire shall be 1.1 KV grade conform to IS:694 2010 with latest amendments and specification attached. The switches, sockets, board, PVC casing/caping, wiring accessories, etc. shall be ISI marked & conform to relevant IS/BIS viz. IS:3854, IS:1293, IS:14927, IS:9537(Part-III), IS:3419, IS:1258, IS:371 with latest amendments. The casing capping will be fixed with adequate size galvanized screw plugged involved after proper drilling and fixing.

Schedule item no. 23

Wiring of the concealed Universal plug point on separate switch board with all accessories. The switches shall be of modular type.

The price shall cover the cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of material, fixing of concealed wiring 5A plug point and switch on separate switch board as per specification and connection with 1.5 sq.mm PVC insulated 1.1 KV grade, Halogen free FRLS multistranded copper conductor along with 1.5 sq.mm green colour copper earth wire including sub-mains of 2.5 sq.mm PVC insulated copper wire in 25/32 mm dia, at least 2 mm thick heavy duty PVC conduit pipes as per standard practice. The price shall also cover the cost of supply and fixing of all required materials including modular switches, sockets, plates, switch boards, PVC conduit pipes, FRLSH copper conductor wires, earth wires, fixing accessories, etc., required for completion of the work in all respects as per site requirement. The switches, plugs, sockets, board shall be of modular type. The terminal of switch, socket shall be made of Brass. Earth wire must be connected with 3rd/earth terminal. The wiring shall be as per IS 732:2019 and wire shall be 1.1 KV grade conform to IS:694 2010 with latest amendments and specification attached. The switches, sockets, board, PVC conduit pipe, wiring accessories, etc. shall be ISI marked and conform to relevant IS/BIS viz. IS:3854, IS:1293, IS:14927 IS: 9537 (Part III), IS: 3419, IS 1258, IS 371 with latest amendments. The work shall also include wall cutting for concealed wiring, after providing concealed wiring the surface of wall/ceiling shall be made as earlier by providing cement plaster etc. If a wall is being constructed and RCC slab is being poured for the roof, the contractor shall lay the conduit pipe at the same time for concealed wiring.

Schedule item no. 24

Wiring of the concealed 5A/ 5-Pin Universal plug point (4 plug & 4 switch on separate board) with all accessories. The switches shall be of modular type.

The price shall cover the cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of material, fixing of concealed wiring for 5 amps universal socket outlet, switch (4 plug socket & 4 switch on separate board) as per specification complete with sub-mains of 4 sq.mm, PVC insulated 1.1 KV grade, Halogen free FRLS multistranded copper conductor wires along with 2.5 sq.mm green colour copper earth wire in 25/32 mm dia. at least 2 mm thick heavy duty PVC conduit pipes as per standard practice. The price shall also cover the cost of supply and fixing of all required materials including modular switches, sockets, plates, switch boards, PVC conduit pipes, FRLSH copper conductor wires, earth wires, fixing accessories, etc., required for completion of the work in all respects as per site requirement. The switches, plugs, sockets, board shall be of **modular type**. The terminal of switch, socket shall be made of Brass. The wiring shall be as per IS 732:2019 and wire shall be 1.1 KV grade conform to IS:694 2010 with latest amendments and specification attached. The switches, sockets, board, PVC conduit pipe, wiring accessories, etc. shall be ISI marked and conform to relevant IS/BIS viz. IS:3854, IS:1293, IS:14927 IS: 9537 (Part III), IS: 3419, IS 1258, IS 371 with latest amendments. The work shall also include wall cutting for concealed wiring, after providing concealed wiring the surface of wall/ceiling shall be made as earlier by providing cement plaster etc. If a wall is being constructed and RCC slab is being poured for the roof, the contractor shall lay the conduit pipe at the same time for concealed wiring.

Schedule item no. 25

Wiring of concealed 15 Amps 6 pin wall socket point complete on separate switch board with 20 Amp DP MCB & all accessories and running earthing copper conductor as per standard practice. The switches shall be of modular type.

The price shall cover the cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of material, fixing of concealed wiring of 15 Amps wall plug with universal socket complete with switch, indicator, etc. on separate board with 20 Amp DP MCB having common internal integral inbuilt tripping mechanism, copper wiring complete with 4 sq.mm Copper PVC insulated, 1.1 KV, Halogen Free FRLS, multi-stranded wire in rigid 25/32 mm dia. at least 2 mm thick heavy duty PVC conduit pipes with sub mains of 4 sq.mm copper with running earth wire of copper 2.5 sq.mm PVC insulated complete all accessories as per standard practice. The price shall also cover the cost of supply and fixing of all required materials including modular switches, sockets, plates, indicator, DP MCB, switch boards, PVC conduit pipes, FRLSH copper conductor wires, earth wires, fixing accessories, etc., required for completion of the work in all respects as per site requirement. The switches, plugs, sockets, board shall be of **modular type**. The terminal of switch, socket shall be made of Brass. Earth wire must be connected with 3rd/earth terminal. The wiring shall be as per IS 732:2019 and wire shall be 1.1 KV grade conform to IS:694 2010 with latest amendments and specification attached. The switches, sockets, board, MCB, PVC conduit pipe, wiring accessories, etc. shall be ISI marked and conform to relevant IS/BIS viz. IS:3854, IS:1293, IS:14927 IS: 9537 (Part III), IS: 3419, IS 1258, IS 371 with latest amendments. The MCB shall be confirming to IEC 60898-1 2002 or latest. The work shall also include wall cutting for concealed wiring, after providing concealed wiring the surface of wall/ceiling shall be made as earlier by providing cement plaster etc. If a wall is being constructed and RCC slab is being poured for the roof, the contractor shall lay the conduit pipe at the same time for concealed wiring.

Schedule item no. 26

Supply, laying, running fixing of following sizes of XLPE insulated, PVC sheathed, 1.1 KV grade cables as per IS.

- (a) 4 core 50 sq.mm AL conductor, armoured**
- (b) 4 core 16 sq.mm AL conductor armoured**
- (c) 4 core 10 sq.mm AL conductor armoured**
- (d) 3 core 06 sq.mm AL conductor, armoured**
- (e) 4 core 10 sq.mm CU conductor, armoured**

The price shall cover cost of supply, loading, transportation and multiple unloading to site, laying, testing and commissioning of LT cable 1.1 KV grade, XLPE insulated, inner & outer PVC sheathed, multi-stranded Aluminium / Copper conductor armoured cables of above sizes **conforming to IS 7098 Part-1 and specification attached**. Price shall also include supply and erection of lugs, clamps, saddles made of aluminum strips of size 25 x 4 mm etc. for laying and raising of the cable as per site requirements. The termination of mains cable shall be carried out with suitable size glands and lugs wherever required. The no. of saddles to be fixed shall be two in one-meter length of cable. The Armour of the cable shall be properly connected to earth with brass glands for proper earthing. Cable shall be laid underground in cable trench, under and across Railway track, along wall / RCC structures etc. as per site requirement. Where ever cables are running parallel both cables shall be laid in the same trench only through separate trunking in such a way that the cable shall not cross each other throughout the length of the trench. Cable identification tags shall be provided throughout the length at every 25 meter interval. Cables with kinks, straightened kinks, defective armouring, or any visible damage/defects shall not be supplied or laid. The contractor shall submit valid Type Test Reports from NABL/Govt. accredited lab for the offered cable along with Acceptance and Routine Test Certificates as per relevant IS/IEC viz. IS:7098 Part-1, IS:10810, IEC 60332-1, IEC 60228 with latest amendments. The type test report carried out during last five year shall be valid

Schedule item no. 27

Excavation of cable trench in soil & filling the trench with sand, pebbles etc. after laying of the cable complete with RCC warning cover & cable markers, sand etc. as per railways requirement

The price shall include excavation of cable trench of size 900 mm deep x 500 mm wide in normal soil under rail / road. The price shall also include back filling of trench after laying of cable. While crossing

rail, care should be taken that track alignment is not disturbed. Rate of cable trench per meter shall be considered pro rata basis where depth of cable trench is less than standard depth of 900 mm. where it cannot be dug exactly due to site condition. While excavation, care shall be taken not to damage any cable or any other Railway structure.

Schedule item no. 28

Excavation of cable trench on CC flooring / Hard / rocky soil & making of trench & recasting of flooring/pit after laying of cable as per railways requirement.

The price shall include excavation of cable trench of size 900 mm deep x 500 mm wide in cement concrete flooring under rail / road / hard rocky soil and platforms. The price shall also include back filling of trench with river sand & soil after laying of cable / pipe. In case of laying of cable / pipe on platform, surface of the platform after laying of cable shall be made as original. While crossing rail, care should be taken that track alignment is not disturbed. Rate of pipe / cable trench per meter shall be considered pro rata basis where depth of cable trench is less than standard depth of 900 mm. where it cannot be dug exactly due to site condition. The excavated trench should be recasted with cement, sand etc. along with tiles as per site requirement and look of surrounding area. While excavation, care shall be taken not to damage any cable or any other Railway structure.

Schedule item no. 29

Supply, erection, testing and commissioning of 2 KVA UPS with battery backup as per Railway specification

The price shall cover cost of supply, loading, transportation and multiple unloading of material at site, erection testing and commissioning of full set 2x2 KVA (1 + 1) UPS set suitable for single phase AC input and single phase AC output power supply with suitable capacity & suitable number of SMF battery bank of minimum 6400 VAH and 2 hours battery backup complete with connecting cables as per site condition. One set UPS consist of 2 nos. online UPS with common battery bank complete with all associate accessories. The contractor shall submit warranty card/certificate containing the details of the complete system. The UPS system shall be an integrated system comprising of input rectifier, charger, inverter, in-built isolation transformer (copper wound), static bypass switch and manual bypass switch. In addition to the above, the technical parameter of UPS set will be conforming to specification enclosed and relevant IS/IEC. The price shall also cover the cost of supply & erection of suitable capacity of TP MCB (for input) & TP MCB (for output) in separate metallic enclosure complete with suitable size of copper cables for input and output power supply of UPS set. The contractor shall submit original test report from Central Govt./NABL/ILAC Accredited lab with covering all technical requirements. UPS should be got approved from Sr. DEE (G) CSMT office.

Schedule item no. 30

Supply, erection, testing and commissioning of LT Distribution Panel Board comprising of 100-125 Amp FP MCCB 36kA Microprocessor based release 02 nos, RCBO 4 Pole, 32 Amp 415V 50Hz 10kA Sensitivity-300 mA - 4 nos, RCBO 4Pole 63 Amp 415V 50Hz 10kA Sensitivities- 300 mA - 6 nos. as outgoing complete with busbars, neutral link, etc. as per site requirement

The price shall cover the cost of Supply, transportation, multiple loading/unloading, storage, erection, testing and commissioning of outdoor-type min. IP-54, three-phase, double-door LT distribution panel board comprising of 2 no. 125 Amps FP MCCB as incoming with 1 no. 150/160 Amp automatic transfer switch (with auto, manual and bypass arrangements as per Railway requirement) and 6 nos. 63 Amp FP RCBO & 4 nos. 32-40 Amp FP RCBO with 30/100/300mA sensitivity (as per requirement) as outgoing, busbars, LED type indication lamp for outgoing and incoming supply, digital multifunction meter, separate cable alley chamber for termination by cable gland, lugs, nut-bolts, washers, etc. as per site condition and details given below:

MCCB: MCCB shall be microprocessor-based, current-limiting type with quick-make, quick-break and trip-free mechanism, conforming to IEC 60947-2. The MCCB shall be 4-pole with 100% neutral, line-load independent and provided with phase barriers, both-side spreader links and extended rotary handle with door-interlock defeat and padlocking facility. The breaking capacity of MCCB shall be 35 KA with $I_{cs}=I_{cu}=100\%$. The microprocessor release shall provide fully adjustable protection settings including Long-time (L), Short-time (S), Instantaneous (I) and Ground-fault (G) protection (LSIG), with selectable

tripping characteristics. The release shall include inbuilt, adjustable protection against overload and short-circuit faults. MCCB shall have trip indication and be equipped with auxiliary contacts, shunt-trip / under-voltage release, and event indication features. For incomer applications, the MCCB shall be provided and integrated with 96×96 mm digital Earth Leakage Relay (ELR) having adjustable leakage-current settings. The system shall allow smooth and compatible integration of the ELR and MCCB to ensure proper selectivity and coordinated protection for overload, short-circuit, instantaneous and earth-leakage faults. The contractor shall submit valid Test Certificates as per IEC 60947-2, issued by the OEM of the MCCB.

RCBO: The RCBO shall comply with IS 12640-2 / IEC 61009-1 and have 10 kA breaking capacity with sensitivity of 30/100/300 mA (as per Railway requirement). RCBO shall be non-line-load-biased, have minimum electrical life of 10,000 operations and provide separate indication for short-circuit and earth-leakage faults. The RCBO shall trip on AC leakage current including pulsating DC, transients and harmonics, and be rated for pollution degree 3, 6 kV impulse withstand and IP20 protection. It shall operate between -5°C to +60°C, include a safety shutter and test button and have bi-connect terminals suitable up to 35 sq.mm (rigid) / 25 sq.mm (flexible) for ratings up to 63 A. Provision for padlock, auxiliary contacts, trip alarm, UV/OV release and shunt release shall be provided. DIN-rail mounting shall be possible from both sides. OEM test certificates as per IS/IEC standards shall be submitted.

Busbar:

The panel shall be provided with high-conductivity ETP-grade copper busbars (3-phase + neutral), extendable on either side. Busbars shall be mounted on strong, non-hygroscopic SMC insulators with CTI \geq 600 V (IS 2824) to withstand fault stresses. They shall be colour-coded with minimum clearances of 25 mm between phases and 19 mm to neutral/earth. Busbar sizing shall be based on 1.25 A per sq.mm current-carrying capacity. A conductivity certificate from the original busbar manufacturer shall be submitted.

Panel fabrication:

The LT panel shall be fabricated from minimum 2 mm thick CRCA sheet, properly folded and reinforced to ensure strong and rigid structure. All doors and covers shall also be 2 mm thick CRCA and shall be fully gasketed with EPDM/Neoprene to prevent dust, moisture and vermin entry. Heavy-duty hinges made of corrosion-resistant stainless steel shall be provided and the panel shall have minimum IP54 protection. The panel shall be compartmentalized with separate enclosed sections for horizontal bus bars, vertical bus bars, switchgears and cable alleys to ensure operational safety and ease of maintenance. Cable chambers shall be sized for easy termination with top/bottom entry. CRCA sheet steel used in fabrication shall be cleaned and surface-treated through a seven-tank process (alkaline degreasing, descaling in dilute sulphuric acid and phosphating). After treatment, primer paint shall be applied, followed by final oven-baked powder coating of minimum 70-micron thickness. All switchboards and circuits shall be fitted with permanently engraved black-on-white nameplates and metal labels, clearly indicating the feeder number and designation. Internal separation shall be minimum Form-3B as per IEC 61439. The panel shall be floor-mounted on suitable GI angle (min. 50x50x6 mm or higher, as per panel load-bearing requirement) frame properly grouted on concrete foundation and covered with 14 SWG MS sheet duly painted as per site requirements.

Multifunction Energy meter: Multifunction Energy meter should be min Class 1.0 Accuracy & should be with RS485 Modbus protocol. Min parameter requirement for MFM should be V, A, F, PF, kW, kVA, kVAR, kWh, kVAh, kVARh, Runhours, On hours, Phase angle, Interrupts, THD, Events (High-Low), Neutral Current.

Wiring: All wiring for relays and meters shall be with 1.5 sq.mm PVC insulated copper multistranded FRLSH wire confirming to IS 694 2010 and 2.5 sq.mm should be used for CT wiring. The wiring shall be coded and labelled with approved ferrules for identification. Runs of wires shall be neatly bunched and suitably supported and clamped. Means shall be provided for easy identification of wires. Identification ferrules shall use at both end of wires. All control wires meant for external connections are to be brought out on a terminal board.

Communication wiring:

Separate communication wiring should be laid through all feeders for switchgear & meters. The communication wiring should be sufficient for conveying ON-OFF-Trip feedback. The communication wiring should be terminated on to separate marshalling box in the panel. The communication cable should be low impedance, twin pair twisted & shielded (Belden/Lapp or equivalent).

Earthing – One earthing terminal shall be provided on each side of panel board. An earth bar size must be at least 6 x 50 mm Aluminium/ GI strip. The earth bar shall be electrically continuous and shall run the full extent of panel board. Door earthing shall be provided for all doors.

Design & Approval:

The LT panel shall be designed and manufactured as per the latest IEC 61439 standards. The contractor shall submit GAD to Sr.DEE(G) for approval before fabrication. Valid type test reports (not older than five years) from a NABL/Government-accredited laboratory, along with Acceptance and Routine Test Certificates as per relevant IS/IEC standards, shall be submitted for the offered panel

Schedule item no. 31

Supply, erection, testing and commissioning of maintenance free earthing

The price shall cover the cost of supply, erection, testing and commissioning of maintenance free earthing system complete with all accessories as per RDSO Spec No. RDSO/SPN/197 Version 1.0 dated 04.07.2016 with latest revisions also conforming to latest IS: 3043/IE rules, complete with Earth electrode, Earth enhancement material, backfill material, copper earth busbar, construction of earth pit with cover & inspection chamber, marking, other associated accessories, all tests and inspection as mention below:

1. **Earth electrode** is made up of high-tensile, low-carbon steel circular rod with copper molecularly bonded on the outer surface, conforming to UL 467, IEC 62561 or latest standards. The electrode shall be UL-listed. Certificates from NABL approved labs shall be submitted with test results.
The earth electrode shall have minimum diameter of 17.0 mm and minimum length of 3.0 meter. In rocky locations, three electrodes, each of 1.0 m length and 17.0 mm diameter, shall be installed in grid formation to ensure effective earthing.
The copper bonding on the electrode shall have minimum thickness of 250 microns using 99.9% electrolytic-grade copper. Each earth electrode shall be permanently marked as per UL 467 with UL marking, manufacturer's name or trade mark, length, diameter and catalogue number punched on it. Earth electrode can be visually inspected, checked for dimensions and thickness of copper coating using micron gauge. The supplier shall arrange for such inspection at the time of supply, if so desired
2. **Copper bus** bar of size 200 mm x 25 mm x 6 mm having electrical conductivity of 101% IACS, minimum 99.9% copper content shall be exothermically welded to rod with 4 hole (2 on each side) for connecting earthing conductor. The contractor shall submit the manufacturer's test certificates confirming copper purity and electrical conductivity. Exothermic weld material shall be tested as per provisions of IEEE 837 by NABL/ILAC member labs.
3. **Earth pit** - A hole of 100 mm to 125mm dia shall be augured /dug to a depth of about 3.0 meters. The earth electrode shall be placed into this hole.
4. **Earth enhancement material** (minimum approx. 30-35 kg) shall be filled into the augured/dug hole in slurry form and allowed to set. After the material gets set, the diameter of the composite structure (earth electrode + earth enhancement material) shall be of min. 100mm dia covering entire length of the hole.

Marking: The Earth enhancement material shall be supplied in sealed, moisture proof bags. These bags shall be marked with Manufacturer's name or trade name, quantity etc. Earth Enhancement compound should have characteristics as mentioned in the RDSO specs., should have low resistivity preferably below 0.2 Ohm-meters. NABL-approved test certificate for material composition shall be submitted.

5. **Backfill material:** The excavated soil is suitable as a backfill but should be sieved to remove any large stones and placed around the electrode taking care to ensure that it is well compacted. Material like sand, salt, coke breeze, cinders & ash shall not be used because of its acidic and corrosive nature.
6. **Inspection chamber:** (i) Inspection chamber should be as per IEC 62561-5 or latest.
(ii) The dimension of the chamber will be of 300 x 300 x 300 mm (inside dimension) of RCC with 50mm thick and fine finish. The masonry work shall be white washed inside and outside
(iii) A black painted RCC cover, min. 50 mm thick with two pulling hooks of sufficient strength shall be provided to cover the earth pit. The pulling hooks shall be flush with the concrete lid and shall not project out. PVC sleeve shall be provided in concrete wall to take out earthing connections. The top edge of the earthing chamber shall be made flush with the platform surface / ground level / circulating area.
(iv) The marking space should be present on an RCC cover. The date of testing and earth resistance value shall be written on the cover with black base with yellow paint.

8. A High-conductivity (101% IACS) with minimum 99.9% purity copper main bus-bar of size 300 mm x 25 mm x 6 mm copper bus bar shall be provided on nearby wall/structure as an equipotential bus and connected to electrical instruments / installations as per site requirement. The earth electrode shall be connected to the main bus bar with 2 nos. 25 mm x 3 mm copper strip laid in separate trenches of 300 mm width and 600 mm depth up to distance of 5 meter from earth bus-bar (minimum 3 meter x 2 nos. copper strips to be supplied). Each strip shall be continuous without joints; where unavoidable, only one joint per strip shall be permitted, made by exothermic welding with minimum 10 mm overlap.
9. **Earth resistance** shall be measured after installation using the fall-of-potential method in accordance with IS:3043 (latest) and shall comply with IS/RDSO/IE rule earthing norms. Testing shall be carried out in the presence of the Railway representative and the results shall be duly recorded. The date of testing and earth resistance value shall be clearly marked on the inspection chamber cover, and all earth pits shall be properly numbered for identification.
10. General arrangement of the earth system shall be as per drawing attached.
11. The Contractor shall made surrounding portion of earth pit same as previous. All debris, broken masonry, packing materials, etc. to be removed from site and site to be cleaned as per instruction of Rly Engineer.
12. The contractor shall be responsible for complete supply, installation & commissioning of the earthing& bonding system. The warranty of such system shall be 60 months from date of commissioning. During this period, any failure of earthing system due to improper materials & bad workmanship shall be attended free of cost by the Contractor.

Schedule item no. 32

Supply, erection, testing and commissioning of FRP junction box as per Railway's requirement.

The price shall cover the cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of FRP pole junction box of size approx. 230 mm x 200 mm x 100 mm with termination & connection of cable by loop in loop out method. FRP junction box shall be having terminals for the termination of 3 phase cable & neutral and one ISI marked cut out of 15 amps with cable gland, nut bolt and GI clamps for fixing of FRP junction box. The FRP box should have proper panel locking arrangement. At each junction box both incoming and outgoing cable armours should be bonded for better earth continuity.

Schedule item no. 33

Supply and laying of HDPE pipe of size 4" dia

The price shall cover the cost of supply, loading, transportation, unloading to the site and laying of double walled corrugated HDPE pipe of nominal size 4 inch conforming to IS:14930 (Part-II) with latest amendments complete with integrated coupler/socket and jointed with snap-fit couplers and EPDM rubber sealing rings conforming to IS 5382 or latest. The pipe shall be double walled, corrugated externally and smooth internally, manufactured from high density polyethylene material conforming to IS 7328 or latest. The HDPE pipe shall be laying in excavated CC/soil trench or fixed on catwalk with suitable GI clamps/saddles of suitable size, GI not-bolts, washers, etc, ensuring firm support and alignment. Cable entries shall be sealed with elastomeric sealant or fire-retardant compound after cable insertion to prevent ingress of water, dust or vermin. The work shall be carried out in all respects with proper jointing, fixing, accessories and site restoration as directed by the Engineer-in-Charge. Each pipe shall bear permanent marking at one-meter intervals indicating the manufacturer's name, IS:14930 (Part-II), nominal size, batch number and year of manufacture. The contractor shall submit manufacturer's test certificate as per IS:14930 or latest.

Schedule item no. 34

Supply and fixing of GRP / FRP cable tray made of glass fiber reinforced polyester moulding composite material, size 200mm width x 75mm depth min., 04mm thick min., including horizontal and vertical reducers, tees, cross members and other accessories as required and duly suspended from the ceiling with GI suspenders etc

The price shall cover the cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of cable tray manufactured from glass fibre reinforced polyester moulding composite material of minimum size 200mm x 75mm x 4 mm, including horizontal/vertical reducers, tees, crosses,

bends, couplers & all accessories, duly suspended from ceiling with GI suspenders as per site requirements and details given below:

1. Tray Construction

- (i) The trays shall be of single-section pultruded construction. Fabricated/assembled trays shall not be accepted.
- (ii) Trays shall be channel / trough type and furnished as a complete system including fasteners, hold-down clips, support systems, covers, hinged horizontal and vertical splice plates, elbows, reducers, bends, tees, crosses and all required hardware.
- (iii) Trays shall include fittings such as inward/outward bends, risers, tees, reducers/expanders, crosses, pultruded coupler plates with SS-304/316 hardware and moulded hinges for horizontal/vertical bends to suit changes in direction and elevation.
- (iv) Trays shall be supported at spans of 1.5 m to 2.0 m, with supports located at minimum 1.0 m from building structure using painted/galvanized MS structural members fixed with dash-fasteners or grouted anchors.
- (v) Trays shall be erected in perfect level and plumb and shall be free from sharp edges, burrs or projections injurious to cables or personnel.
- (vi) The entire tray system shall be rigid and durable.

2. Material Properties

- (i) GRP/FRP trays shall be manufactured from glass fibre reinforced polyester moulding composite material. Minimum Size of tray : 200 mm (W) × 75 mm (D) × 4 mm (T)
- (ii) Glass fibre content shall be minimum 60%.
- (iii) Material shall be: Anti-corrosive, rust-proof and weather-proof, Dust-proof, shock-proof and high-strength, Fire-retardant, non-conductive, non-magnetic and maintenance-free.
- (iv) Trays shall be supplied complete with all fixing accessories, suitable to accommodate bus-duct/cable system. Design & fixing arrangement shall be as per site requirements and certified by the consignee.

3. Applicable Standards

- (i) NEMA FG-1:1993 – Loading specifications for FRP/GRP cable trays.
- (ii) IS 6746:1994 – Fire-retardant properties of FRP/GRP materials.

4. Testing & Documentation

(i) Type Tests (Mandatory)

- a) UV Resistance: ASTM G154, 1000 hours (equivalent ≥ 10 years outdoor life). Tensile & flexural strength reduction $\leq 5\%$ after UV exposure.
- b) Fire Retardancy & Smoke Index: ASTM E-84; Flame Spread Index ≤ 25 , Smoke Index ≤ 200 .
- c) Dielectric Strength: ≥ 6 kV/mm as per ASTM D149.
- d) Glow Wire Test: Must withstand 960°C as per IEC 60695-2-12.
- e) Toxicity & Zero Halogen Content: As per NES 713; Toxicity Index < 1.0 , Halogen-NIL.
- f) Heat & Fire Resistance: Meets IEC 695 Part-2 Sec-1, 960°C .

(ii) Documentation: The contractor shall submit:

- (a) All test reports for confirmation of materials, various parameters and specifications shall be from Govt. Lab/ NABL Accredited Lab / International Accredited Lab.
- (b) Delivery challan/ OEM or Authorized Dealer original vouchers to confirm ascertain originality of the items.

Make: Sintex, Bravo, Hensel, Cape Electric, Jindal Power Corporation, ERCON, Bajaj Electricals, Satyam Composites.

Schedule item no. 35

Design, fabrication, Supply, multiple loading/ unloading, storing installation, fixing, testing & commissioning LT Distribution / Panel board having thermal magnetic MCCB's 250A 4P 36 kA breaking capacity – 1 No. a incomer and 100 A 4P 16 kA break in capacity – 1 Nos, 63A 4P 16kA breaking capacity - 4 Nos. as outgoing with, Rotary Handle vary Depth, Padlock support for operating Handle, Phase barrier, DPX spreader Links, etc. as required and complete in all respect. The price shall cover the cost of Supply, transportation, multiple loading/unloading, storage, erection, testing and commissioning of outdoor-type min. IP-54, three-phase, double-door LT distribution panel board comprising of 1 no. 250 Amps FP MCCB as incoming and 1 nos. 100 Amp FP MCCB & 4 nos. 63 Amp FP MCCB as outgoing, busbars, LED type indication lamp for outgoing and incoming supply,

digital multifunction meter, separate cable alley chamber for termination by cable gland, lugs, nut-bolts, washers, etc. as per site condition and details given below:

MCCB: MCCB shall be current-limiting type with quick-make, quick-break and trip-free mechanism, conforming to IEC 60947-2. The breaking capacity of MCCB shall be 50 kA for 250 A MCCB & 35 kA for 63A-100A MCCB with $I_{cs}=I_{cu}=100\%$. MCCB shall be 4-pole with 100% neutral, equipped with phase barriers, both-side spreader links and extended rotary handle with door interlock defeat and padlocking facility. The MCCB shall be line-load independent and shall have trip indication, auxiliary contacts and provision for under-voltage/shunt release. The MCCB shall be equipped with thermal-magnetic adjustable release having inbuilt adjustable protection against overload and short-circuit faults. Ground fault protection shall be provided either within the release or provided through compatible ground fault module with suitable CBCT/CT, ensuring that both MCCB and ground fault module are of the same make. For incomer application, MCCB shall be provided and integrated with a 96 × 96 mm Earth Leakage Relay (ELR) with digital display and adjustable earth leakage current settings. The contractor shall submit manufacturer's test certificates for the MCCB as per IEC 60947-2 or latest.

Busbar: The panel shall be provided with high-conductivity ETP-grade copper busbars (3-phase + neutral), extendable on either side. Busbars shall be mounted on strong, non-hygroscopic SMC insulators with CTI ≥ 600 V (IS 2824) to withstand fault stresses. They shall be colour-coded with minimum clearances of 25 mm between phases and 19 mm to neutral/earth. Busbar sizing shall be based on 1.25 A per sq.mm current-carrying capacity. A conductivity certificate from the original busbar manufacturer shall be submitted.

Panel fabrication: The LT panel shall be fabricated from minimum 2 mm thick CRCA sheet, properly folded and reinforced to ensure strong and rigid structure. All doors and covers shall also be 2 mm thick CRCA and shall be fully gasketed with EPDM/Neoprene to prevent dust, moisture and vermin entry. Heavy-duty hinges made of corrosion-resistant stainless steel shall be provided and the panel shall have minimum IP54 protection. The panel shall be compartmentalized with separate enclosed sections for horizontal bus bars, vertical bus bars, switchgears and cable alleys to ensure operational safety and ease of maintenance. Cable chambers shall be sized for easy termination with top/bottom entry. CRCA sheet steel used in fabrication shall be cleaned and surface-treated through a seven-tank process (alkaline degreasing, descaling in dilute sulphuric acid and phosphating). After treatment, primer paint shall be applied, followed by final oven-baked powder coating of minimum 70-micron thickness. All switchboards and circuits shall be fitted with permanently engraved black-on-white nameplates and metal labels, clearly indicating the feeder number and designation. Internal separation shall be minimum Form-3B as per IEC 61439. The panel shall be floor-mounted on suitable GI angle (min. 50x50x6 mm or higher, as per panel load-bearing requirement) frame properly grouted on concrete foundation and covered with 14 SWG MS sheet duly painted as per site requirements.

Multifunction Energy meter: Multifunction Energy meter should be min Class 1.0 Accuracy & should be with RS485 Modbus protocol. Min parameter requirement for MFM should be V, A, F, PF, kW, kVA, kVAR, kWh, kVAh, kVARh, Runhours, On hours, Phase angle, Interrupts, THD, Events (High-Low), Neutral Current.

Wiring: All wiring for relays and meters shall be with 1.5 sq.mm PVC insulated copper multistranded FRLSH wire confirming to IS 694 2010 and 2.5 sq.mm should be used for CT wiring. The wiring shall be coded and labelled with approved ferrules for identification. Runs of wires shall be neatly bunched and suitably supported and clamped. Means shall be provided for easy identification of wires. Identification ferrules shall use at both end of wires. All control wires meant for external connections are to be brought out on a terminal board.

Communication wiring: Separate communication wiring shall be provided for all feeders, switchgear and meters for ON/OFF/Trip status feedback and monitoring purpose. The wiring shall be terminated in separate marshalling box with proper identification. Communication cable shall be low impedance, twisted pair, shielded type of Belden/Lapp or equivalent.

Earthing - One earthing terminal shall be provided on each side of panel board. An earth bar size must be at least 6 x 50 mm Aluminium/ GI strip. The earth bar shall be electrically continuous and shall run the full extent of panel board. Door earthing shall be provided for all doors.

Design & Approval: The LT panel shall be designed and manufactured as per the latest IEC 61439 standards. The contractor shall submit GAD to Sr.DEE(G) for approval before fabrication. Valid type test reports (not older than five years) from a NABL/Government-accredited laboratory, along with Acceptance and Routine Test Certificates as per relevant IS/IEC standards, shall be submitted for the offered panel.

Schedule item no. 36

Design, fabrication, Supply, multiple loading/ unloading, storing, installation, fixing, testing nos. & commissioning LT Distribution/ Panel board having thermal magnetic MCCB's 250A 4P 36kA breaking capacity-2 nos. as incomer and automatic change over switch 250 A 36 kA breaking capacity-1No with inbuilt time delay primary protection against single phasing & over voltage, and 200 A 4P MCCB 36 kA breaking capacity – 1 nos., 125 A 4P MCCB 16kA breaking capacity-2 Nos., 100 A 4P MCCB 16 kA breaking capacity-3 Nos. as outgoing with 250A Copper busbar, Rotary Handle vary Depth, Padlock support for operating Handle, Phase barrier, DPX spreader Links, etc. as required and complete in all respect.

The price shall cover the cost of Supply, transportation, multiple loading/unloading, storage, erection, testing and commissioning of outdoor-type min. IP-54, three-phase, double-door LT distribution panel board comprising of 2 no. 250 Amps FP MCCB as incoming with 1 no. 250 Amp automatic transfer switch (with auto, manual and bypass arrangements as per Railway requirement) with inbuilt time delay primary protection against single phasing & over voltage and 1 nos. 200 Amp FP MCCB, 2 nos. 125 Amp FP MCCB & 3 nos. 100 Amp FP MCCB as outgoing, busbars, LED type indication lamp for outgoing and incoming supply, digital multifunction meter, separate cable alley chamber for termination by cable gland, lugs, nut-bolts, washers, etc. as per site condition and details given below:

MCCB: MCCB shall be current-limiting type with quick-make, quick-break and trip-free mechanism, conforming to IEC 60947-2. The breaking capacity of MCCB shall be 50 kA for 200-250 A MCCB & 35 kA for 63-100A MCCB with $I_{cs}=I_{cu}=100\%$. MCCB shall be 4-pole with 100% neutral, equipped with phase barriers, both-side spreader links and extended rotary handle with door interlock defeat and padlocking facility. The MCCB shall be line-load independent and shall have trip indication, auxiliary contacts and provision for under-voltage/shunt release. The MCCB shall be equipped with thermal-magnetic adjustable release having inbuilt adjustable protection against overload and short-circuit faults. Ground fault protection shall be provided either within the release or provided through compatible ground fault module with suitable CBCT/CT, ensuring that both MCCB and ground fault module are of the same make. For incomer application, the MCCB shall be provided and integrated with 96×96 mm Earth Leakage Relay (ELR) with digital display and adjustable earth leakage current settings. The contractor shall submit manufacturer's test certificates for the MCCB as per IEC 60947-2 or latest.

Busbar: The panel shall be provided with high-conductivity ETP-grade copper busbars (3-phase + neutral), extendable on either side. Busbars shall be mounted on strong, non-hygroscopic SMC insulators with CTI ≥ 600 V (IS 2824) to withstand fault stresses. They shall be colour-coded with minimum clearances of 25 mm between phases and 19 mm to neutral/earth. Busbar sizing shall be based on 1.25 A per sq.mm current-carrying capacity. A conductivity certificate from the original busbar manufacturer shall be submitted.

Panel fabrication:

The LT panel shall be fabricated from minimum 2 mm thick CRCA sheet, properly folded and reinforced to ensure strong and rigid structure. All doors and covers shall also be 2 mm thick CRCA and shall be fully gasketed with EPDM/Neoprene to prevent dust, moisture and vermin entry. Heavy-duty hinges made of corrosion-resistant stainless steel shall be provided and the panel shall have minimum IP54 protection. The panel shall be compartmentalized with separate enclosed sections for horizontal bus bars, vertical bus bars, switchgears and cable alleys to ensure operational safety and ease of maintenance. Cable chambers shall be sized for easy termination with top/bottom entry. CRCA sheet steel used in fabrication shall be cleaned and surface-treated through a seven-tank process (alkaline degreasing, descaling in dilute sulphuric acid and phosphating). After treatment, primer paint shall be applied, followed by final oven-baked powder coating of minimum 70-micron thickness. All switchboards and circuits shall be fitted with permanently engraved black-on-white nameplates and metal labels, clearly indicating the feeder number and designation. Internal separation shall be minimum Form-3B as per IEC 61439. The panel shall be floor-mounted on suitable GI angle (min. $50 \times 50 \times 6$ mm or higher, as per panel load-bearing requirement) frame properly grouted on concrete foundation and covered with 14 SWG MS sheet duly painted as per site requirements.

Multifunction Energy meter:

Multifunction Energy meter should be min Class 1.0 Accuracy & should be with RS485 Modbus protocol. Min parameter requirement for MFM should be V, A, F, PF, kW, kVA, kVAR, kWh, kVAh, kVARh, Runhours, On hours, Phase angle, Interrupts, THD, Events (High-Low), Neutral Current.

Wiring: All wiring for relays and meters shall be with 1.5 sq.mm PVC insulated copper multistranded FRLSH wire conforming to IS 694 2010 and 2.5 sq.mm should be used for CT wiring. The wiring shall be coded and labelled with approved ferrules for identification. Runs of wires shall be neatly bunched and suitably supported and clamped. Means shall be provided for easy identification of wires. Identification ferrules shall use at both end of wires. All control wires meant for external connections are to be brought out on a terminal board.

Communication wiring: Separate communication wiring shall be provided for all feeders, switchgear and meters for ON/OFF/Trip status feedback and monitoring purpose. The wiring shall be terminated in separate marshalling box with proper identification. Communication cable shall be low impedance, twisted pair, shielded type of Belden/Lapp or equivalent.

Earthing –

One earthing terminal shall be provided on each side of panel board. An earth bar size must be at least 6 x 50 mm Aluminium/ GI strip. The earth bar shall be electrically continuous and shall run the full extent of panel board. Door earthing shall be provided for all doors.

Design & Approval: The LT panel shall be designed and manufactured as per the latest IEC 61439 standards. The contractor shall submit GAD to Sr.DEE(G) for approval before fabrication. Valid type test reports (not older than five years) from a NABL/Government-accredited laboratory, along with Acceptance and Routine Test Certificates as per relevant IS/IEC standards, shall be submitted for the offered panel.

Schedule item no. 37

Design, manufacture, display, installation of wall / hanging / floor mounting type LED illuminated sign / direction boards in elliptical/half elliptical /semi elliptical etc. shape. The display sheet shall be of unbreakable 040 translucent polycarbonate sheet of 2 mm thickness. The text / graphics matter visibility shall not be less than 160 deg. The approved colour text and graphics shall be printed / router cut on monomeric calendared vinyl of 70 µm thickness and shall be firmly pasted on display sheets. The mounting arrangement shall be hanging, wall mounting, ceiling mounting, pole mounting or floor mounting and as per site requirement. The signage shall have the integral mounting arrangements with sturdy structural frame and ACP cladding on the back side of the signage to avoid rusting and entry of dust. The LED board shall have uniform illumination with 6-8 W/sq.ft and with brightness more than ambient light. Suitable size end cap of 1.5 mm thick SS 304 should be provided.

The price shall cover cost of survey the stations / sites and design, manufacture, supply, loading, transportation and unloading to site, display, installation / erection, testing and commissioning of wall / hanging / floor mounting type LED illuminated sign / direction boards in Full Elliptical (FE), Half Elliptical (HE), Semi Elliptical (SE), parabolic / Triangular shape as per site requirements. The display sheet shall be of unbreakable 040 translucent polycarbonate sheet of 2 mm thickness. The text / graphics matter visibility shall not be less than 160 deg. The approved colour text and graphics shall be printed / router cut on monomeric calendared vinyl of 70-80 µm thickness and shall be firmly pasted on display sheets. The mounting arrangement shall be hanging, wall mounting, ceiling mounting, pole mounting or floor mounting and as per site requirement. The signage shall have the integral mounting arrangements with sturdy structural frame and ACP cladding on the back side of the signage to avoid rusting and entry of dust. The LED board shall have uniform illumination with 6-8 W/square feet and with brightness more than ambient light. Suitable size end cap of 1.5 mm thick SS 304 / die moulded polycarbonate should be provided. The signage boards shall be confirming to as per technical details enclosed and shall be confirming to “Guidelines on Standard Signages at Stations on Indian Railways, 2023”

Guidelines on Standard Signages at Stations on Indian Railways, 2023, has uploaded at IREPS Portal). Please refer to this uploaded document.

Survey and design of schemes for Signages Boards:

1. The contractor or his authorized agency should have experience in carried out such type of work i.e. survey and design, manufacture, installation of LED illuminated sign / direction boards in elliptical / parabolic shape and having required infrastructure to carry out the work and testing facilities with documentary proof.
2. The tenderer shall survey station, platform, site, etc. and design the schemes for wall / hanging / floor mounting type LED illuminated sign / direction boards / Signage for Services, Utilities, Caution,

Direction and other importance, in half elliptical shape for the station buildings, as per proposed items/ accessories mentioned in the schedule. The firm shall submit Design, drawing, model, graphics and colour scheme reports for each station / location / site in soft copy presentation hard copy and shall be got approved by Sr. DEE (G) CSMT before supply. Any modification, suggestion for improvement in the scheme shall be done by the firm and shall be submitted for approval by the Railway's Competent Authority.

3. The price shall cover cost of design, manufacture, supply, loading, transportation and unloading to site, display, installation / erection, testing and commissioning of wall / hanging / floor mounting type LED illuminated sign / direction boards in Full Elliptical (FE), Half Elliptical (HE), Semi Elliptical (SE), parabolic shape as per site requirements.
4. The work which is not included in the schedule but required to complete the installation work shall be considered as the part of work and carried out by the contractor accordingly and no extra payment will be paid for that.
5. Agency shall submit the design report through professional design expert for appreciation
6. It is recommended that the manufacturer of glow sign boards/ signage should have his own resources, including but not limited to skilled manpower, machinery (Thermoforming, Die Molding, Injection molding, extrusion capability) and materials to carry out the work in a timely and efficient manner. Failure to meet the specified timelines may result in penalties.
7. The bidder firm must mandatorily involve the design manufacturer of glow sign boards / signage in the entire process of design and development of glow sign boards / signage, site survey, signage customization, maintaining installation standards and procedures, and quality control.
8. LED Elliptical Glow Sign Boards are to be provided dust environment and open space and should have proper louvers or ventilation for dissipation of heat generated by drivers / LED's.
9. The quality of the Vinyl / Polycarbonate sheet / anodized coating should be covered under three years warranty from the manufacturer. LED's/LED drivers shall be covered for free replacement five years warranty from the manufacturer.
10. Guarantee certificates & Test Certificate of LED/LED drivers / Vinyl sheet / Polycarbonate sheet from reputed approved brand shall be required to be submitted along with supply of materials.
11. The bidder must provide detailed design / pattern, drawings and schemes for the glow sign boards/ signage, which shall be similar to signage work done at Chhatrapati Shivaji Maharaj Terminus (CSMT) Mumbai of Central Railway or as desired by the Railway Authority.

Schedule item no. 38

Supply of aluminum folding ladder 10 feet

The price shall cover the cost of supply, loading, transportation, unloading at site and testing of self-supporting aluminium alloy ladder, "A" shape, 10 feet height, min. capacity 120 Kg, fabricated from high tensile aluminium alloy 'C' section of size approximately 66.68 mm x 31.75 mm x 2.5 mm thick (12 gauge) of make HINDALCO / JINDAL / OPI or equivalent, manufactured from grade HE-30 conforming to IS:733 and IS:1285. Ladder should be 100% twist proof and unbreakable, anti corrosion, anti loosen rivets, slip resistance and suitable for indoor and outdoor Railway maintenance work. The ladder shall be provided with 1 inch (25.4 mm) diameter corrugated anti-slip aluminium pipe steps at 12 inch spacing and additional flat aluminium steps of approximate size 65x30x2 mm for safety and strength, chequered top platform of size approx. 14x8 inches for workman support and fitted with two nos. scissors for folding operation and stability; both upper and bottom ends shall be provided with heavy-duty anti-skid rubber guards for firm grip and protection with smooth anodized/mill finish, burr-free construction, corrosion-resistant, slip-resistant construction, long service life and compliance with IS:3696 (Part-2) or latest safety code and supplied complete with manufacturer's warranty of min. 12 months along with inspection/test certificates. The ladder should be got approved by Consignee before supply.

Schedule item no. 39

Design, supply, erection, testing and commissioning of LED station name board with Individual English letter

The price shall cover the cost of design, fabrication, supply, erection, fixing, testing, commissioning and loading, transportation and unloading to site, erection, fixing, testing and commissioning of LED type individual letter signage boards in English letter boards complete with all accessories as per site requirement and instruction of site engineer in an approved manner at required stations. The signage

letters shall be of 450 mm height with proportionate width and fabricated using high quality 3 mm thick acrylic sheet. The depth of acrylic letters shall be approximately 4 inches to ensure uniform illumination. The acrylic letters shall be internally illuminated using 2nd generation Superflux IP-66 rated high power LED strings of reputed make of Nichia, Osram, Seoul, Philips Lumileds, Cree and Lednium. The spacing between two LEDs shall be approximately 3 inches to maintain uniform brightness. The LED circuit shall be operated through suitable capacity drivers of Philips/OSRAM or reputed make. Separate LED drivers shall be provided for each language board (Hindi and Marathi) as required. The acrylic letters along with LED arrangement shall be firmly mounted on 3 mm thick Aluminium Composite Panel (ACP) sheet. The complete ACP sheet shall be supported with suitable size GI angle frame structure from the backside with adequate strength to withstand wind pressure and site conditions. The GI support structure shall be properly fixed/grouted at the specified location with suitable cement concrete foundation as per site requirement and instructions of Railway Engineer. The complete LED signage system shall conform to RDSO Specification No. RDSO/PE/SPEC/PS/0086-2009 (Rev-0) Amendment-1 or latest revision.

Schedule item no. 40

Design, supply, erection, testing and commissioning of LED station name board with Individual Devnagari letter for Hindi & Marathi.

The price shall cover the cost of design, fabrication, supply, erection, fixing, testing, commissioning and loading, transportation and unloading to site, erection, fixing, testing and commissioning of LED type individual letter signage boards in Hindi and Marathi letter boards complete with all accessories as per site requirement and instruction of site engineer in an approved manner at required stations. The signage letters shall be of 450 mm height with proportionate width and fabricated using high quality 3 mm thick acrylic sheet. The depth of acrylic letters shall be approximately 4 inches to ensure uniform illumination. The acrylic letters shall be internally illuminated using 2nd generation Superflux IP-66 rated high power LED strings of reputed make of Nichia, Osram, Seoul, Philips Lumileds, Cree and Lednium. The spacing between two LEDs shall be approximately 3 inches to maintain uniform brightness. The LED circuit shall be operated through suitable capacity drivers of Philips/OSRAM or reputed make. Separate LED drivers shall be provided for each language board (Hindi and Marathi) as required. The acrylic letters along with LED arrangement shall be firmly mounted on 3 mm thick Aluminium Composite Panel (ACP) sheet. The complete ACP sheet shall be supported with suitable size GI angle frame structure from the backside with adequate strength to withstand wind pressure and site conditions. The GI support structure shall be properly fixed/grouted at the specified location with suitable cement concrete foundation as per site requirement and instructions of Railway Engineer. The complete LED signage system shall conform to RDSO Specification No. RDSO/PE/SPEC/PS/0086-2009 (Rev-0) Amendment-1 or latest revision.

Schedule item no. 41

Supply & erection of earthing G.I. pipe with cement concrete earth chamber, charcoal, salt, etc.

The price shall cover cost of supply of materials, erection, testing and commissioning of material, excavation of pit and preparation of pipe earthing conforming to I.E. rules, 1956 and shall confirm to IS:3043 (latest revision) as amended from time to time and as detailed below:

1. The pipe earthing shall be made out by excavation of pit and providing a single piece of hot-dip galvanized (zinc coating min. 70 microns) GI Pipe, 'B' class, 3 meter long 50mm dia. of thickness 3.2mm conform to IS:1239 (Part-1). The pipe shall be placed vertically in the ground, with holes drilled along its length to facilitate effective dispersion of earth moisture.
2. Homogenous layer of coke, charcoal, salt & sand mixture shall be provided 150 mm around the pipe along the length. The pit shall be backfilled with good quality soil, free from stones/debris and watered adequately.
3. Earthing Chamber: A concrete box of 300x300x300 mm (inside dimensions) and 50 mm thickness of wall, with smooth cement plaster finish shall be provided on the top of the pit. The masonry work shall be white washed inside and outside. A black painted RCC cover, min. 50 mm thick with two pulling hooks of sufficient strength shall be provided to cover the earth pit. The pulling hooks shall be flush with the concrete lid and shall not project out. PVC sleeve shall be provided in concrete wall to take out earthing connections. On backside of the cover, date of the testing and resistance value shall be written with yellow paint on black background. Proper watering arrangement shall be provided to

maintain low earth resistance. The chamber shall be painted black externally, with the earth resistance value marked in white paint.

4. The earth connections leading to the ground shall be provided with G.I. pipe & G.I. wire of 6 SWG. G.I. flat of 50x6mm shall be used to provide clamp & facilitated for earth connection to other installations. G.I. strip of size 50mm x 3mm to be used for clamping the earth electrode pipe using galvanised nut bolts of 10mm size as per IS. All joint shall be mechanically strong, properly tightened and electrically continuous.
5. Care shall be taken regarding level of the floor surrounding the earth so that the connector is not too deep in the masonry or projecting out of it.
6. Earth resistance shall be measured after installation using the fall-of-potential method in accordance with IS:3043 (latest) and shall comply with IS/RDSO/IE rule earthing norms. Testing shall be carried out in the presence of the Railway representative, and the results shall be duly recorded. The date of testing and earth resistance value shall be clearly marked on the inspection chamber cover, and all earth pits shall be properly numbered for identification.
7. The Contractor shall made surrounding portion of earth pit same as previous. All debris, broken masonry, packing materials, etc. to be removed from site and site to be cleaned as per instruction of Railway Engineer.

Schedule item no. 42

Supply, erection, testing and commissioning of GI strip of 25 mm x 5mm

The price shall cover cost of supply of material, laying and fixing of 25 mm × 5 mm hot-dip galvanized mild steel strip for earth continuity connection, conforming to IS 2062. The strip shall be hot-dip galvanized as per IS 4759 / IS 2629 with minimum zinc coating of 70 microns. The strip shall be laid in ground or fixed on surface and securely connected to earth electrodes, panels and equipment using suitable GI clamps/bolts, nuts and washers as per site requirement. All cut ends, welded portions and joints shall be protected with zinc-rich paint. Earthing installation and testing shall be carried out as per IS 3043 (latest revision) and as directed by the Engineer-in-Charge.

Schedule-B: Rewiring for renovation and improvement of service buildings in between Kanjurmarg-Kopar Section.

Schedule item no. 1

Supply, erection, testing and commissioning of 70-75W LED outdoor lighting fitting complete with all fixing arrangements.

The price shall cover cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of 70-75 Watt LED outdoor light fitting, with secondary lens optics, IP-66, IK07, efficacy 120 lm/W including suitable driver with built in surge, open/short circuit protection. The housing shall be made of powder coated pressure die cast aluminum with protective toughened glass cover complete with all accessories with gasket, GI bracket, GI clamp made of 25 mm x 5 mm Patti, down rod, nut-bolts etc. as per site condition. Outdoor luminaire shall have name of the manufacturer embossed on the luminaire. The cost shall also cover the wiring from ceiling rose / junction box / overhead wire to luminaries by 1.5 sq.mm cable of 3 core PVC insulated multistrands copper conductor with suitable size of flexible PVC conduit and fixing arrangement with clamps, brackets, nut-bolts etc. The LED fittings should be similar or substantially equivalent to model no. ZELA P86L WH PO TG SD J 72 W of M/s Bajaj or ENDURASUNDOWNSL72W LED of M/s Havells make. The technical parameter will be generally conforming to specification enclosed and mandatorily submit test certificates/reports as per this technical specification. Luminaire to be got approved by Sr. DEE (G) CSMT before supply.

Schedule item no. 2

Supply, erection, testing and commissioning of 2 x 2 36 W LED fitting with IP 20 complete with connection and necessary fixing arrangements as per site requirement.

The price shall cover cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of surface and recess mounted 2ft x 2ft, 36-40 W LED, IP-20, efficacy ≥ 120 lm/W, constant current driver min. 4 kV surge protection, opal diffuser, white powder coated CRCA housing complete with all accessories for fixing arrangement as per site condition. The LED fittings shall be of

both types, recessed and surface mounted as per site requirement. The cost shall also cover the wiring from ceiling rose / junction box / overhead wire to luminaries by 1.5 sq.mm flexible cable of 3 Core PVC insulated multistrands copper conductor with suitable size of flexible PVC conduit with fixing arrangement as per site condition. The LED fittings should be similar or substantially equivalent to model no. BZRSQ 43L XE WH OD SD 36 W of M/s Bajaj make or SM367 LED36S of M/s Philips make. The technical parameter will be generally conforming to specification enclosed and submit test certificates/reports as per this technical specification. Luminaire to be got approved by Sr. DEE (G) CSMT before supply.

Schedule item no. 3

Supply, erection, testing and commissioning of 18-20 W 4 feet LED slim fitting complete with connection as per site requirement

The price shall cover cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of 4 feet 18-20 Watt LED light fitting, THD \geq 10, efficacy 110 lm/W with extruded aluminium housing including aluminium framing, glare-free diffuser complete with inbuilt constant current driver and all accessories and fixing arrangements as per site condition. The cost shall also cover the wiring from ceiling rose / junction box / overhead wire to luminaries by 0.75 sq.mm flexible cable of 3 core PVC insulated multistrands copper conductor with suitable size of flexible PVC conduit with fixing arrangement as per site condition. The LED fittings should be similar or substantially equivalent to model no. BCLAB 20W LED of M/s Bajaj or model no. LUMILINEPLUSPROBS18WLED of M/s Havells make. The technical parameter will be generally conforming to specification enclosed and submit test certificates/reports as per this technical specification. Luminaire to be got approved by Sr. DEE (G) CSMT before supply.

Schedule item no. 4

Supply, erection, testing and commissioning of 9-10 W LED (2 ft) slim fitting complete with fixing arrangement, etc.

The price shall cover cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of 2 feet 9-10 Watt LED light fitting, THD \geq 10, efficacy 110 lm/W, extruded aluminium housing with suitable driver complete with all accessories and fixing arrangements as per site condition. The cost shall also cover the wiring from ceiling rose / junction box / overhead wire to luminaries by 0.75 sq.mm flexible cable of 3 core PVC insulated multistrands copper conductor cable with suitable size of flexible PVC conduit with fixing arrangement as per site condition. The LED fittings should be similar or substantially equivalent to model no. LUMILINEPLUSPROBS10WLED of M/s Havells make. The technical parameter will be generally conforming to specification enclosed and mandatorily submit test certificates/reports as per this technical specification. Luminaire to be got approved by Sr. DEE (G) CSMT before supply.

Schedule item no. 5

Supply, erection, testing and commissioning of decorative wall light fitting complete with all fixing arrangements.

The price shall cover cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of aesthetically designed, ceiling / wall mounted decorative LED light fitting with wide voltage range protected from dust and insects, complete with all accessories including suitable decorative fixing arrangements as per site conditions. Colour temperature (warm/ natural/ cool) and Wattage shall be as per site requirement. The cost shall also cover the cost wiring from ceiling rose / junction box to fitting by 0.75 sq.mm flexible cable of 3 core PVC insulated multistrands copper conductor with suitable size of flexible decorative PVC conduit and fixing arrangement as per site condition. The decorative light fittings should be similar or substantially equivalent to model Dime A Dozen Ceiling light (Model-CL9-10001) or Glow Maze (Gold) Glass wall light (Model-WL51-10001) or Afloat (Gold, Milky white) Wall light (Model-WL56-10003) of White Teak. The fittings should be of reputed brands. The fittings shall have the warranty for a period of two years from the date of commissioning. The tenderer shall submit guarantee certificates & test certificate of offered fitting & light. The fittings should be of reputed brands. The sample of the fitting shall be got approved by Sr. DEE (G) CSMT before supply.

Schedule item no. 6**Supply, erection, testing and commissioning of 48" sweep energy efficient BLDC ceiling fan with down rod, motor, etc. with necessary connection.**

The price shall cover the cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of BEE certified 5 star rated BLDC fan of size 48 inch (1200mm) sweep ceiling fan not more than 35 Watt, Service value not less than 7.5, minimum air delivery 230 cum/minute, min. 2kV surge protection complete with step-type electronic regulator or remote control (as per Railway requirement) **conforming to enclosed specification no. PCEE/CR/BLDC CEILING FAN/1200 & 1400 MM Rev.0.** The fan shall be provided and installed complete with all standard accessories and safety devices including suitably sized MS down rod, blades, canopies, rubber insulators, hook, MS bracket/clamp, split pin, nuts, bolts and spring washers as required at site. The MS down rod shall be of suitable length (not less than 300 mm) and finished with white paint or matching fan colour as approved. All MS brackets, clamps and supporting hardware shall be hot-dip galvanized. The cost shall also cover the wiring from ceiling rose / junction box / overhead wire to fan by 0.75 sq.mm flexible cable of 3 core PVC insulated multistrands copper conductor (FRLSH) with suitable size of flexible PVC conduit and fixing arrangement as per site condition. The fan shall have the warranty for a period of five year from the date of commissioning. The contractor shall submit test report from Govt Lab/NABL/ILAC accredited lab.

Schedule item no. 7**Supply, erection, testing and commissioning of exhaust fans 9" metal body with motor guard, cover, etc**

The price shall cover the cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of 9" (230 mm) sweep metal body heavy duty exhaust fan, air delivery min. 750 Cu.M/H, 1400 rpm, copper wound, securely attached protecting wire guard, motor guard & cover, suitable to work at 230 V, 50 Hz AC supply. The fans should be tested and conform to IS: 2312 with latest amendments. The fan should be similar or substantially equivalent to model no. Aeroclean Plus 230 mm of M/s Usha make. The fan shall have the warranty for two years from date of commissioning. The contractor shall submit Guarantee certificates & Test Certificate of offered fan from Manufacturers.

Schedule item no. 8**Supply, erection, testing and commissioning of 12" metal body type exhaust fan complete with motor guard, cover, etc.**

The price shall cover the cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of 12" (300 mm) sweep metal body heavy duty exhaust fan, air delivery 1600 Cu.M/H, 1350-1400 rpm, copper wound, securely attached wire guard/protective grill, motor guard & cover, suitable to work at 230 V, 50 Hz AC supply. The fans should be tested and conform to IS: 2312 with latest amendments. The fan should be similar or substantially equivalent to model no. Aeroclean Plus 300 mm of M/s Usha make. The fan shall have the warranty for two years from date of commissioning. The contractor shall submit Guarantee certificates & Test Certificate of offered fan from Manufacturers.

Schedule item no. 9**Wiring of the concealed Light / fan / call bell point with all accessories. The switches shall be of modular type.**

The price shall cover the cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of material, fixing of concealed light / fan point / call bell point wiring with 1.5 sq.mm PVC insulated 1.1 KV grade, Halogen free FRLS multistranded copper conductor wires along with 1.5 sq.mm green colour copper earth wire in 25/32 mm dia, at least 2 mm thick heavy duty PVC conduit pipes, 5/6 amps switch on control board, angular holder / ceiling rose, etc. including sub-mains of 2.5 sq.mm PVC insulated copper wire and 0.75 sq.mm 3 core PVC insulated multistrands copper conductor flexible cable from ceiling rose to fitting as per standard practice. The price shall also cover the cost of supply and fixing of all required materials including modular switches, sockets, plates, switch boards, PVC conduit pipes, FRLSH copper conductor wires, earth wires, ceiling rose, connectors, fixing accessories, etc., required for completion of the work in all respects as per site requirement. The switches, plugs, sockets, board shall be of modular type. The terminal of switch, socket shall be made of Brass. Earth wire must be connected with 3rd/earth terminal. The wiring shall be as per IS 732:2019 and

wire shall be 1.1 KV grade conform to IS:694 2010 with latest amendments and specification attached. The switches, sockets, board, PVC conduit pipe, wiring accessories, etc. shall be ISI marked and conform to relevant IS/BIS viz. IS:3854, IS:1293, IS:14927 IS: 9537 (Part III), IS: 3419, IS 1258, IS 371 with latest amendments. The work shall also include wall cutting for concealed wiring, after providing concealed wiring the surface of wall/ceiling shall be made as earlier by providing cement, plaster, painting etc. If a wall is being constructed and RCC slab is being poured for the roof, the contractor shall lay the conduit pipe at the same time for concealed wiring.

Schedule item no. 10

Wiring of light point/fan point/exhaust fan point/call bell point with 1.5 sq.mm FRLS PVC insulated copper conductor single core cable in surface/recessed medium class PVC conduit, with modular switch, modular plate, suitable GI box and earthing the point with 1.5 sq.mm FRLS PVC insulated copper conductor single core etc.

The price shall cover the cost of supply, loading, transportation, unloading at site, erection, testing and commissioning of materials and wiring of light point, fan point, exhaust fan point and call bell point using 1.5 sq.mm FRLS PVC insulated, 1.1 kV grade, multistranded copper conductor single core cables drawn in surface/recessed medium class rigid PVC conduit complete with all accessories such as bends, tees, inspection boxes, saddles, etc. The work shall include wiring from switch board to point and running sub-mains from circuit DB to switch board using 2.5 sq.mm FRLS PVC insulated multistranded copper conductor cable, complete in PVC conduit. Each point shall be controlled by modular switches mounted on modular plates with suitable GI concealed/surface box, etc. The price shall also cover the cost of supply and fixing of all required materials including modular switches, sockets, plates, switch boards, PVC conduit pipes, FRLSH copper conductor wires, earth wires, ceiling rose, connectors, fixing accessories, etc., required for completion of the work in all respects as per site requirement. The switches, plugs, sockets, plate, board shall be of modular type. Earthing shall be provided with 1.5 sq.mm FRLS PVC insulated green copper conductor connected to the earth terminal of switch/socket/fixture. The terminal of switches and sockets shall be made of brass. The wiring shall be as per IS 732:2019 and wire shall be 1.1 KV grade conform to IS:694 2010 with latest amendments and specification attached. All switches, sockets, modular plates, GI boxes, PVC conduit and wiring accessories shall be ISI marked and conform to relevant IS/BIS standards such as IS 3854, IS 1293, IS 9537 (Part III), IS 3419, IS 1258, IS 371, etc. with latest amendments. The conduit shall be properly fixed using suitable saddles and GI screws with proper alignment and workmanship. The work shall be completed in all respects as directed by the Engineer-in-Charge.

Schedule item no. 11

Wiring of the 5A/ 5-Pin Universal plug point (4 plug & 4 switch on separate board) in PVC casing / capping. The switches shall be of modular type.

The price shall cover the cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of material, fixing of wiring of universal design wall socket point with 5 Amps plug socket, switch (4 plug socket & 4 switch on separate board) etc. copper wiring complete with 4 sq.mm Copper PVC insulated, 1.1KV, Halogen Free FRLS, multi-stranded wire in rigid PVC fire retardant casing capping with running earthing of 2.5 sq.mm copper conductor with green colour PVC insulated wire and mounted on separate switch board for electrical & electronics hardware / equipment. Earth wire must be connected with 3rd/earth terminal of the switch/socket/fixture. The price shall also cover the cost of supply and fixing of all required materials including modular switches, sockets, plates, switch boards, PVC conduit pipes, FRLSH copper conductor wires, earth wires, ceiling rose, connectors, fixing accessories, etc., required for completion of the work in all respects as per site requirement. The switches, plugs, sockets, board shall be of modular type. The terminal of switch, socket shall be made of Brass. The wiring shall be as per IS 732:2019 and wire shall be 1.1 KV grade conform to IS:694 2010 with latest amendments and specification attached. All switches, sockets, modular plates, boards, PVC conduit/ casing-capping and wiring accessories shall be ISI marked and conform to relevant IS/BIS standards such as IS 3854, IS 1293, IS 9537 (Part III), IS 3419, IS 1258, IS 371, etc. with latest amendments. The conduit / casing-capping shall be neatly fixed with suitable saddles, adequate size galvanized screws, including proper drilling and plugging, ensuring proper alignment and workmanship, complete in all respects as directed by the Engineer-in-Charge.

Schedule item no. 12

Wiring of 15 Amps 6 pin wall socket point complete all accessories and running earthing as per standard practice on separate board. The switches shall be of modular type

The price shall cover the cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of material, fixing of wiring of 15 Amps wall socket point with universal socket, plug & switch on separate board, copper wiring complete with 4 sq.mm Copper PVC insulated, 1.1KV, Halogen Free FRLS, multi-stranded wire in rigid PVC fire retardant casing capping with all accessories with running earth wire of copper 2.5 sq.mm PVC insulated complete with all accessories. The price shall also cover the cost of supply and fixing of all required materials including modular switches, sockets, plates, switch boards, PVC conduit pipes, FRLSH copper conductor wires, earth wires, ceiling rose, connectors, fixing accessories, etc., required for completion of the work in all respects as per site requirement. Earth wire must be connected with 3rd/earth terminal of the switch/socket/fixture. The switches, sockets, board shall be of modular type. The terminal of switch, socket shall be made of Brass. All switches, sockets, modular plates, boards, PVC conduit/ casing-capping and wiring accessories shall be ISI marked and conform to relevant IS/BIS standards such as IS 3854, IS 1293, IS 9537 (Part III), IS 3419, IS 1258, IS 371, etc. with latest amendments. The conduit / casing-capping shall be neatly fixed with suitable saddles, adequate size galvanized screws, including proper drilling and plugging, ensuring proper alignment and workmanship, complete in all respects as directed by the Engineer-in-Charge.

Schedule item no. 13

Supply, laying, running fixing of following sizes of XLPE insulated, PVC sheathed, 1.1 KV grade cables as per IS.

(a) 4 core 50 sq.mm AL conductor, armoured

(b) 4 core 25 sq.mm AL conductor, armoured

(c) 2 core 6 sq.mm Cu conductor armoured

The price shall cover cost of supply, loading, transportation and multiple unloading to site, laying, testing and commissioning of LT cable 1.1 KV grade, XLPE insulated, inner & outer PVC sheathed, multi-stranded Aluminium / Copper conductor armoured cables of above sizes **conforming to IS 7098 Part-1 and specification attached**. Price shall also include supply and erection of lugs, clamps, saddles made of aluminum strips of size 25 x 4 mm etc. for laying and raising of the cable as per site requirements. The termination of mains cable shall be carried out with suitable size glands and lugs wherever required. The no. of saddles to be fixed shall be two in one-meter length of cable. The Armour of the cable shall be properly connected to earth with brass glands for proper earthing. Cable shall be laid underground in cable trench, under and across Railway track, along wall / RCC structures etc. as per site requirement. Where ever cables are running parallel both cables shall be laid in the same trench only through separate trunking in such a way that the cable shall not cross each other throughout the length of the trench. Cable identification tags shall be provided throughout the length at every 25 meter interval. Cables with kinks, straightened kinks, defective armouring, or any visible damage/defects shall not be supplied or laid. The contractor shall submit valid Type Test Reports from NABL/Govt. accredited lab for the offered cable along with Acceptance and Routine Test Certificates as per relevant IS/IEC viz. IS:7098 Part-1, IS:10810, IEC 60332-1, IEC 60228 with latest amendments. The type test report carried out during last five year shall be valid.

Schedule item no. 14

Excavation of cable trench in soil & filling the trench with sand, pebbles etc. after laying of the cable complete with RCC warning cover & cable markers, sand etc. as per railways requirement

The price shall include excavation of cable trench of size 900 mm deep x 500 mm wide in normal soil under rail / road. The price shall also include back filling of trench after laying of cable. While crossing rail, care should be taken that track alignment is not disturbed. Rate of cable trench per meter shall be considered pro rata basis where depth of cable trench is less than standard depth of 900 mm. where it cannot be dug exactly due to site condition. While excavation, care shall be taken not to damage any cable or any other Railway structure.

Schedule item no. 15**Excavation of cable trench on CC flooring / Hard / rocky soil & making of trench & recasting of flooring/pit after laying of cable as per railways requirement.**

The price shall include excavation of cable trench of size 900 mm deep x 500 mm wide in cement concrete flooring under rail / road / hard rocky soil and platforms. The price shall also include back filling of trench with river sand & soil after laying of cable / pipe. In case of laying of cable / pipe on platform, surface of the platform after laying of cable shall be made as original. While crossing rail, care should be taken that track alignment is not disturbed. Rate of pipe / cable trench per meter shall be considered pro rata basis where depth of cable trench is less than standard depth of 900 mm. where it cannot be dug exactly due to site condition. The excavated trench should be recasted with cement, sand etc. along with tiles as per site requirement and look of surrounding area. While excavation, care shall be taken not to damage any cable or any other Railway structure.

Schedule item no. 16**Supply, erection, testing and commissioning of 63 A MCCB 1 no. as incoming and 12 nos. 10/20/32 A DP MCB as outgoing complete with busbars, neutral link, etc. and other accessories housed in CRCA sheet enclosure.**

The price shall cover the cost of Supply, transportation, multiple loading/unloading, storage, erection, testing and commissioning of outdoor-type min. IP-54, three-phase, double-door LT distribution panel board comprising of 1 no. 63 Amps FP MCCB as incoming and 12 nos. 32/20/10 Amp DP MCB as outgoing, busbars, LED type indication lamp for outgoing and incoming supply, separate cable alley chamber for termination by cable gland, lugs, nut-bolts, washers, etc. as per site condition and details given below:

MCCB: MCCB shall be current-limiting type with quick-make, quick-break and trip-free mechanism, conforming to IEC 60947-2. The breaking capacity of MCCB shall be 35 kA with $I_{cs}=I_{cu}=100\%$. MCCB shall be 4-pole with 100% neutral, equipped with phase barriers, both-side spreader links and extended rotary handle with door interlock defeat and padlocking facility. The MCCB shall be line-load independent and shall have trip indication, auxiliary contacts and provision for under-voltage/shunt release. The MCCB shall be equipped with thermal-magnetic adjustable release having inbuilt adjustable protection against overload and short-circuit faults. Ground fault protection shall be provided either within the release or provided through compatible ground fault module with suitable CBCT/CT, ensuring that both MCCB and ground fault module are of the same make. For incomer application, the MCCB shall be provided and integrated with a 96×96 mm Earth Leakage Relay (ELR) with digital display and adjustable earth leakage current settings. The contractor shall submit manufacturer's test certificates for the MCCB as per IEC 60947-2 or latest.

MCB: MCB shall be housed in high-grade insulating material with high dielectric strength, arc resistance, flame retardancy and temperature resistance and suitable for isolation and compatible with accessories like auxiliary contact, shunt release and trip alarm. MCB shall have minimum breaking capacity of 10 kA, impulse withstand voltage of 4 kV and common internal integrated tripping mechanism ensuring simultaneous disconnection of all poles in case of fault in any phase or neutral. MCB shall conform to IS/IEC 60898-1 and IS 12640-2 (latest).

Busbar: The panel shall be provided with high-conductivity ETP-grade copper busbars (3-phase + neutral), extendable on either side. Busbars shall be mounted on strong, non-hygroscopic SMC insulators with CTI ≥ 600 V (IS 2824) to withstand fault stresses. They shall be colour-coded with minimum clearances of 25 mm between phases and 19 mm to neutral/earth. Busbar sizing shall be based on 1.25 A per sq.mm current-carrying capacity. A conductivity certificate from the original busbar manufacturer shall be submitted.

Panel fabrication: - The LT panel shall be fabricated from minimum 2 mm thick CRCA sheet, properly folded and reinforced to ensure strong and rigid structure. All doors and covers shall also be 2 mm thick CRCA and shall be fully gasketed with EPDM/Neoprene to prevent dust, moisture and vermin entry. Heavy-duty hinges made of corrosion-resistant stainless steel shall be provided and the panel shall have minimum IP54 protection. The panel shall be compartmentalized with separate enclosed sections for horizontal bus bars, vertical bus bars, switchgears and cable alleys to ensure operational safety and ease of maintenance. Cable chambers shall be sized for easy termination with top/bottom entry. CRCA sheet steel used in fabrication shall be cleaned and surface-treated through a seven-tank process (alkaline

degreasing, descaling in dilute sulphuric acid and phosphating). After treatment, primer paint shall be applied, followed by final oven-baked powder coating of minimum 70-micron thickness. All switchboards and circuits shall be fitted with permanently engraved black-on-white nameplates and metal labels, clearly indicating the feeder number and designation. Internal separation shall be minimum Form-3B as per IEC 61439. The panel shall be floor-mounted on suitable GI angle (min. 50x50x6 mm or higher, as per panel load-bearing requirement) frame properly grouted on concrete foundation and covered with 14 SWG MS sheet duly painted as per site requirements.

Wiring:

All wiring for relays and meters shall be with 1.5 sq.mm PVC insulated copper multistranded FRLSH wire conforming to IS 694 2010 and 2.5 sq.mm should be used for CT wiring. The wiring shall be coded and labelled with approved ferrules for identification. Runs of wires shall be neatly bunched and suitably supported and clamped. Means shall be provided for easy identification of wires. Identification ferrules shall use at both end of wires. All control wires meant for external connections are to be brought out on a terminal board.

Communication wiring: Separate communication wiring shall be provided for all feeders, switchgear and meters for ON/OFF/Trip status feedback and monitoring purpose. The wiring shall be terminated in separate marshalling box with proper identification. Communication cable shall be low impedance, twisted pair, shielded type of Belden/Lapp or equivalent.

Earthing – One earthing terminal shall be provided on each side of panel board. An earth bar size must be at least 6 x 50 mm Aluminium/ GI strip. The earth bar shall be electrically continuous and shall run the full extent of panel board. Door earthing shall be provided for all doors.

Design & Approval: The LT panel shall be designed manufactured and all type tested in accordance with the latest relevant IEC (viz. IEC 61439 1-2 or latest) standards. The successful tenderer shall submit the General Arrangement Drawing of the panel board and get it approved by Sr.DEE(G) office before fabrication of panel. The contractor shall submit original test report from CPRI / ERDA / Any other equivalent Govt. Testing Agencies.

Schedule item no. 17

Supply, erection, testing and commissioning of One phase distribution board comprising of one no. 40 amps DP MCB as incoming & 10 nos. 16 amps DP MCB as outgoing complete with copper bus bars, neutral link and other accessories housed in CRCA sheet enclosure with double door type

The price shall cover the cost of supply, loading, transportation, unloading at site, erection, testing and commissioning of 1-Ph distribution board, double door type, fabricated out of CRCA sheet duly powder coated with corrosion-resistant finish, complete with earthing terminals, suitable copper busbars supports of high insulating material, neutral link and earth bar, cable alleys and labeling for incomer and outgoing as per site requirements. The DB shall be comprising of 1 no. 40 A DP MCB as incomer and 10 nos. 10-16 Amp DP/SP MCBs (as required) as outgoing with uniform load distribution and circuit identification. The board shall be provided with hinged double doors with lock and key arrangement, gasket, cable gland & proper shrouding of live parts. The DB shall be suitable for wall mounting / floor mounted CC foundation with suitable MS stand, anchor fasteners complete with bottom/top cable entry with glands as per site requirements. All internal wiring shall be carried out using FRLSH copper wires with proper ferruling, lugs and dressing, ensuring neat and safe termination. The panel shall be properly earthed and tested for insulation resistance, continuity and functional operation before commissioning, complete in all respects.

MCB: MCB shall be housed in high-grade insulating material with high dielectric strength, arc resistance, flame retardancy and temperature resistance and suitable for isolation and compatible with accessories like auxiliary contact, shunt release and trip alarm. MCB shall have minimum breaking capacity of 10 kA, impulse withstand voltage of 4 kV and common internal integrated tripping mechanism ensuring simultaneous disconnection of all poles in case of fault in any phase or neutral. The contractor shall submit valid Test Certificates as per IEC 60898-1, issued by the Original Equipment Manufacturer (OEM) of the MCB.

Schedule item no. 18**Supply and laying of 50mm OD DWC/HDPE pipe**

The price shall cover the cost of supply, loading, transportation, unloading to the site and laying of double walled corrugated HDPE pipe of nominal size 2 inch (50 mm) conforming to IS:14930 (Part-II) with latest amendments complete with integrated coupler/socket and jointed with snap-fit couplers and EPDM rubber sealing rings conforming to IS 5382 or latest. The pipe shall be double walled, corrugated externally and smooth internally, manufactured from high density polyethylene material conforming to IS 7328 or latest. The HDPE pipe shall be laying in excavated CC/soil trench or fixed on catwalk with suitable GI clamps/saddles of suitable size, GI not-bolts, washers, etc, ensuring firm support and alignment. Cable entries shall be sealed with elastomeric sealant or fire-retardant compound after cable insertion to prevent ingress of water, dust or vermin. The work shall be carried out in all respects with proper jointing, fixing, accessories and site restoration as directed by the Engineer-in-Charge. Each pipe shall bear permanent marking at one-meter intervals indicating the manufacturer's name, IS:14930 (Part-II), nominal size, batch number and year of manufacture. The contractor shall submit manufacturer's test certificate as per IS:14930 or latest.

Schedule item no. 19**Supplying and erecting G.I. pipe 'C' class ERW 75/80 mm dia**

The price shall cover the cost of supply, loading, transportation, unloading to the site, erection, testing and commissioning of GI pipe of 'C' class, ERW type, of 75/80 mm diameter, conforming to IS 1239 (Part I) with latest amendments, complete with all accessories i.e. GI bends, tees, sockets, flanges, unions, etc., including cutting, threading, jointing and fixing in position with suitable clamps/supports, nuts, bolts and washers as per site requirements. The pipe shall be properly aligned and securely fixed on surface or structure as per site conditions and as directed by the Engineer-in-Charge.

Schedule item no. 20**Supply and Erection of mini feeder pillar board outdoor type with 200 Amps TPN MCCB for incoming and suitable size Al. Busbar and 4 Nos. per phase 63 Amps HRC fuse base with fuse link, connectors, stand, etc. as per specification**

The price shall cover the cost of supply, transportation and unloading of material at site, erection, testing and commissioning of outdoor-type min. IP-54, three-phase, feeder pillar board comprising of 1 No. 200A FP MCCB as incoming and 12 nos. 63-125 Amp HRC fuse Units with base as outgoing, busbars, separate cable alley chamber for termination by cable gland, lugs, nut-bolts, washers, etc. as per site condition and details given below:

MCCB:

MCCB shall be current-limiting type with quick-make, quick-break and trip-free mechanism, conforming to IEC 60947-2. The breaking capacity of MCCB shall be 50 KA with $I_{cs}=I_{cu}=100\%$. MCCB shall be 4-pole with 100% neutral, equipped with phase barriers, both-side spreader links and extended rotary handle with door interlock defeat and padlocking facility. MCCB shall be line-load independent and include trip indication, auxiliary contact and UV/shunt release. MCCB shall be provided with thermal-magnetic adjustable protection release having inbuilt adjustable protection against overload, short-circuit faults. Ground fault protection shall be incorporated either within the release or provided through ground fault module with suitable CBCT/CT. The ground fault module & MCCB should be of same make to ensure reliability. The contractor shall submit valid Test Certificates as per IEC 60947-2, issued by the OEM of the MCCB.

HRC Fuse:

The HRC fuse shall be of rating 63-A to 125 A (as per requirements) with suitable base for 415 V AC, 3-phase, 50 Hz supply and minimum breaking capacity of 80 kA and shall include fuse-blown indicator for fault identification. The fuse base shall be bolted type or DIN-rail clip-on with clear R/Y/B phase markings. The base shall be made from high-grade DMC, SMC or porcelain. The terminals shall be made of brass or copper alloy with nickel or silver plating to ensure good conductivity and long life. The fuse body shall be of ceramic or porcelain, with silver-plated copper or brass blades for reliable contact. The complete fuse unit shall conform to IS 13703 / IEC 60269 or the latest applicable IS/IEC standards. The contractor shall also submit valid OEM Test Certificates as per the relevant IS/IEC requirements.

Busbar:

The panel shall be provided with high-conductivity ETP-grade copper busbars (3-phase + neutral), extendable on either side. Busbars shall be mounted on strong, non-hygroscopic SMC insulators with CTI ≥ 600 V (IS 2824) to withstand fault stresses. They shall be colour-coded with minimum clearances of 25 mm between phases and 19 mm to neutral/earth. Busbar sizing shall be based on 1.25 A per sq.mm current-carrying capacity. A conductivity certificate from the original busbar manufacturer shall be submitted

Feeder Panel fabrication: -

The LT panel shall be fabricated from minimum 2 mm thick CRCA sheet, properly folded and reinforced to ensure strong and rigid structure. All doors and covers shall also be 2 mm thick CRCA and shall be fully gasketed with EPDM/Neoprene to prevent dust, moisture and vermin entry. Heavy-duty hinges made of corrosion-resistant stainless steel shall be provided and the panel shall have minimum IP54 protection. The panel shall be compartmentalized with separate enclosed sections for horizontal bus bars, vertical bus bars, switchgears & fuses and cable alleys to ensure operational safety and ease of maintenance. Cable chambers shall be sized for easy termination with top/bottom entry. CRCA sheet steel used in fabrication shall be cleaned and surface-treated through a seven-tank process (alkaline degreasing, descaling in dilute sulphuric acid and phosphating). After treatment, primer paint shall be applied, followed by final oven-baked powder coating of minimum 70-micron thickness. All switchboards and circuits shall be fitted with permanently engraved black-on-white nameplates and metal labels, clearly indicating the feeder number and designation. Internal separation shall be minimum Form-3B as per IEC 61439. The panel shall be floor-mounted on suitable GI angle (min. 50x50x6 mm or higher, as per panel load-bearing requirement) frame properly grouted on concrete foundation and covered with 14 SWG MS sheet duly painted as per site requirements.

Wiring: All wiring for relays and meters shall be with 1.5 sq.mm PVC insulated copper multistranded FRLSH wire conforming to IS 694 2010 and 2.5 sq.mm should be used for CT wiring. The wiring shall be coded and labelled with approved ferrules for identification. Runs of wires shall be neatly bunched and suitably supported and clamped. Means shall be provided for easy identification of wires. Identification ferrules shall use at both end of wires. All control wires meant for external connections are to be brought out on a terminal board.

Earthing –

One earthing terminal shall be provided on each side of panel board. An earth bar size must be at least 6 x 50 mm Aluminium/ GI strip. The earth bar shall be electrically continuous and shall run the full extent of panel board. Door earthing shall be provided for all doors.

Design:

The feeder panel shall be designed manufactured and all type tested in accordance with the latest relevant IEC (viz. IEC 61439 1-6, IS 13703 or latest) standards. The contractor shall submit valid Type Test Reports from NABL/Govt. accredited lab for the offered panel along with Acceptance and Routine Test Certificates as per relevant IS/IEC viz. IEC 61439 1-6 with latest amendments

Schedule item no. 21**Supply, erection, testing and commissioning of maintenance free earthing**

The price shall cover the cost of supply, erection, testing and commissioning of maintenance free earthing system complete with all accessories as per RDSO Spec No. RDSO/SPN/197 Version 1.0 dated 04.07.2016 with latest revisions also conforming to latest IS: 3043/IE rules, complete with Earth electrode, Earth enhancement material, backfill material, copper earth busbar, construction of earth pit with cover & inspection chamber, marking, other associated accessories, all tests and inspection as mention below:

1. Earth electrode is made up of high-tensile, low-carbon steel circular rod with copper molecularly bonded on the outer surface, conforming to UL 467, IEC 62561 or latest standards. The electrode shall be UL-listed. Certificates from NABL approved labs shall be submitted with test results.

The earth electrode shall have minimum diameter of 17.0 mm and minimum length of 3.0 meter. In rocky locations, three electrodes, each of 1.0 m length and 17.0 mm diameter, shall be installed in grid formation to ensure effective earthing.

The copper bonding on the electrode shall have minimum thickness of 250 microns using 99.9% electrolytic-grade copper. Each earth electrode shall be permanently marked as per UL 467 with UL

marking, manufacturer's name or trade mark, length, diameter and catalogue number punched on it. Earth electrode can be visually inspected, checked for dimensions and thickness of copper coating using micron gauge. The supplier shall arrange for such inspection at the time of supply, if so desired

2. **Copper bus** bar of size 200 mm x 25 mm x 6 mm having electrical conductivity of 101% IACS, minimum 99.9% copper content shall be exothermically welded to rod with 4 hole (2 on each side) for connecting earthing conductor. The contractor shall submit the manufacturer's test certificates confirming copper purity and electrical conductivity. Exothermic weld material shall be tested as per provisions of IEEE 837 by NABL/ILAC member labs.
3. **Earth pit** - A hole of 100 mm to 125mm dia shall be augured /dug to a depth of about 3.0 meters. The earth electrode shall be placed into this hole.
4. **Earth enhancement material** (minimum approx. 30-35 kg) shall be filled into the augured/dug hole in slurry form and allowed to set. After the material gets set, the diameter of the composite structure (earth electrode + earth enhancement material) shall be of min. 100mm dia covering entire length of the hole.
Marking: The Earth enhancement material shall be supplied in sealed, moisture proof bags. These bags shall be marked with Manufacturer's name or trade name, quantity etc. Earth Enhancement compound should have characteristics as mentioned in the RDSO specs., should have low resistivity preferably below 0.2 Ohm-meters. NABL-approved test certificate for material composition shall be submitted.
5. **Backfill material:** The excavated soil is suitable as a backfill but should be sieved to remove any large stones and placed around the electrode taking care to ensure that it is well compacted. Material like sand, salt, coke breeze, cinders & ash shall not be used because of its acidic and corrosive nature.
6. **Inspection chamber:** (i) Inspection chamber should be as per IEC 62561-5 or latest.
 (ii) The dimension of the chamber will be of 300 x 300 x 300 mm (inside dimension) of RCC with 50mm thick and fine finish. The masonry work shall be white washed inside and outside
 (iii) A black painted RCC cover, min. 50 mm thick with two pulling hooks of sufficient strength shall be provided to cover the earth pit. The pulling hooks shall be flush with the concrete lid and shall not project out. PVC sleeve shall be provided in concrete wall to take out earthing connections. The top edge of the earthing chamber shall be made flush with the platform surface / ground level / circulating area.
 (iv) The marking space should be present on an RCC cover. The date of testing and earth resistance value shall be written on the cover with black base with yellow paint.
8. A High-conductivity (101% IACS) with minimum 99.9% purity copper main bus-bar of size 300 mm x 25 mm x 6 mm copper bus bar shall be provided on nearby wall/structure as an equipotential bus and connected to electrical instruments / installations as per site requirement. The earth electrode shall be connected to the main bus bar with 2 nos. 25 mm x 3 mm copper strip laid in separate trenches of 300 mm width and 600 mm depth up to distance of 5 meter from earth bus-bar (minimum 3 meter x 2 nos. copper strips to be supplied). Each strip shall be continuous without joints; where unavoidable, only one joint per strip shall be permitted, made by exothermic welding with minimum 10 mm overlap.
9. **Earth resistance** shall be measured after installation using the fall-of-potential method in accordance with IS:3043 (latest) and shall comply with IS/RDSO/IE rule earthing norms. Testing shall be carried out in the presence of the Railway representative and the results shall be duly recorded. The date of testing and earth resistance value shall be clearly marked on the inspection chamber cover, and all earth pits shall be properly numbered for identification.
10. General arrangement of the earth system shall be as per drawing attached.
11. The Contractor shall made surrounding portion of earth pit same as previous. All debris, broken masonry, packing materials, etc. to be removed from site and site to be cleaned as per instruction of Rly Engineer.
12. The contractor shall be responsible for complete supply, installation & commissioning of the earthing& bonding system. The warranty of such system shall be 60 months from date of commissioning. During this period, any failure of earthing system due to improper materials & bad workmanship shall be attended free of cost by the Contractor.

Schedule item no. 22**Supply, erection, testing and commissioning of GI strip of 25 mm x 3 mm**

The price shall cover cost of supply of material, laying and fixing of 25 mm × 5 mm hot-dip galvanized mild steel strip for earth continuity connection, conforming to IS 2062. The strip shall be hot-dip galvanized as per IS 4759 / IS 2629 with minimum zinc coating of 70 microns. The strip shall be laid in ground or fixed on surface and securely connected to earth electrodes, panels and equipment using suitable GI clamps/bolts, nuts and washers as per site requirement. All cut ends, welded portions and joints shall be protected with zinc-rich paint. Earthing installation and testing shall be carried out as per IS 3043 (latest revision) and as directed by the Engineer-in-Charge.

Schedule-C: Rewiring for renovation and improvement of service building at Thakurli, Dombivli and Kalyan Station.**Schedule item no. 1****Supply, erection, testing and commissioning of 70-75W LED outdoor lighting fitting complete with all fixing arrangements.**

The price shall cover cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of 70-75 Watt LED outdoor light fitting, with secondary lens optics, IP-66, IK07, efficacy 120 lm/W including suitable driver with built in surge, open/short circuit protection. The housing shall be made of powder coated pressure die cast aluminum with protective toughened glass cover complete with all accessories with gasket, GI bracket, GI clamp made of 25 mm x 5 mm Patti, down rod, nut-bolts etc. as per site condition. Outdoor luminaire shall have name of the manufacturer embossed on the luminaire. The cost shall also cover the wiring from ceiling rose / junction box / overhead wire to luminaries by 1.5 sq.mm cable of 3 core PVC insulated multistrands copper conductor with suitable size of flexible PVC conduit and fixing arrangement with clamps, brackets, nut-bolts etc. The LED fittings should be similar or substantially equivalent to model no. ZELA P86L WH PO TG SD J 72 W of M/s Bajaj or ENDURASUNDOWNSL72W LED of M/s Havells make. The technical parameter will be generally conforming to specification enclosed and mandatorily submit test certificates/reports as per this technical specification. Luminaire to be got approved by Sr. DEE (G) CSMT before supply.

Schedule item no. 2**Supply, erection, testing and commissioning of 18-20 W 4 feet LED slim fitting complete with connection as per site requirement**

The price shall cover cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of 4 feet 18-20 Watt LED light fitting, THD≥10, efficacy 110 lm/W with extruded aluminium housing including aluminium framing, glare-free diffuser complete with inbuilt constant current driver and all accessories and fixing arrangements as per site condition. The cost shall also cover the wiring from ceiling rose / junction box / overhead wire to luminaries by 0.75 sq.mm flexible cable of 3 core PVC insulated multistrands copper conductor with suitable size of flexible PVC conduit with fixing arrangement as per site condition. The LED fittings should be similar or substantially equivalent to model no. BCLAB 20W LED of M/s Bajaj or model no. LUMILINEPLUSPROBS18WLED of M/s Havells make. The technical parameter will be generally conforming to specification enclosed and submit test certificates/reports as per this technical specification. Luminaire to be got approved by Sr. DEE (G) CSMT before supply.

Schedule item no. 3**Supply, erection, testing and commissioning of 48" sweep energy efficient BLDC ceiling fan with down rod, motor, etc. with necessary connection.**

The price shall cover the cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of BEE certified 5 star rated BLDC fan of size 48 inch (1200mm) sweep ceiling fan not more than 35 Watt, Service value not less than 7.5, minimum air delivery 230 cum/minute, min. 2kV surge protection complete with step-type electronic regulator or remote control (as per Railway requirement) **conforming to enclosed specification no. PCEE/CR/BLDC CEILING FAN/1200 & 1400 MM Rev.0.** The fan shall be provided and installed complete with all standard accessories and safety devices including suitably sized MS down rod, blades, canopies, rubber insulators, hook, MS

bracket/clamp, split pin, nuts, bolts and spring washers as required at site. The MS down rod shall be of suitable length (not less than 300 mm) and finished with white paint or matching fan colour as approved. All MS brackets, clamps and supporting hardware shall be hot-dip galvanized. The cost shall also cover the wiring from ceiling rose / junction box / overhead wire to fan by 0.75 sq.mm flexible cable of 3 core PVC insulated multistrands copper conductor (FRLSH) with suitable size of flexible PVC conduit and fixing arrangement as per site condition. The fan shall have the warranty for five year from date of commissioning. The contractor shall submit test report from Govt Lab / NABL / ILAC accredited lab.

Schedule item no. 4

Wiring of the concealed Light / fan / call bell point with all accessories. The switches shall be of modular type.

The price shall cover the cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of material, fixing of concealed light / fan point / call bell point wiring with 1.5 sq.mm PVC insulated 1.1 KV grade, Halogen free FRLS multistranded copper conductor wires along with 1.5 sq.mm green colour copper earth wire in 25/32 mm dia, at least 2 mm thick heavy duty PVC conduit pipes, 5/6 amps switch on control board, angular holder / ceiling rose, etc. including sub-mains of 2.5 sq.mm PVC insulated copper wire and 0.75 sq.mm 3 core PVC insulated multistrands copper conductor flexible cable from ceiling rose to fitting as per standard practice. The price shall also cover the cost of supply and fixing of all required materials including modular switches, sockets, switch boards, PVC conduit pipes, FRLSH copper conductor wires, earth wires, ceiling rose, connectors, fixing accessories, etc., required for completion of the work in all respects as per site requirement. The switches, plugs, sockets, board shall be of modular type. The terminal of switch, socket shall be made of Brass. Earth wire must be connected with 3rd/earth terminal. The wiring shall be as per IS 732:2019 and wire shall be 1.1 KV grade conform to IS:694 2010 with latest amendments and specification attached. The switches, sockets, board, PVC conduit pipe, wiring accessories, etc. shall be ISI marked and conform to relevant IS/BIS viz. IS:3854, IS:1293, IS:14927 IS: 9537 (Part III), IS: 3419, IS 1258, IS 371 with latest amendments. The work shall also include wall cutting for concealed wiring, after providing concealed wiring the surface of wall/ceiling shall be made as earlier by providing cement, plaster, painting etc. If a wall is being constructed and RCC slab is being poured for the roof, the contractor shall lay the conduit pipe at the same time for concealed wiring.

Schedule item no. 5

Wiring of light point/fan point/exhaust fan point/call bell point with 1.5 sq.mm FRLS PVC insulated copper conductor single core cable in surface/recessed medium class PVC conduit, with modular switch, modular plate, suitable GI box and earthing the point with 1.5 sq.mm FRLS PVC insulated copper conductor single core etc.

The price shall cover the cost of supply, loading, transportation, unloading at site, erection, testing and commissioning of materials and wiring of light point, fan point, exhaust fan point and call bell point using 1.5 sq.mm FRLS PVC insulated, 1.1 kV grade, multistranded copper conductor single core cables drawn in surface/recessed medium class rigid PVC conduit complete with all accessories such as bends, tees, inspection boxes, saddles, etc. The work shall include wiring from switch board to point and running sub-mains from circuit DB to switch board using 2.5 sq.mm FRLS PVC insulated multistranded copper conductor cable, complete in PVC conduit. Each point shall be controlled by modular switches mounted on modular plates with suitable GI concealed/surface box, etc. The price shall also cover the cost of supply and fixing of all required materials including modular switches, sockets, plates, switch boards, PVC conduit pipes, FRLSH copper conductor wires, earth wires, ceiling rose, connectors, fixing accessories, etc., required for completion of the work in all respects as per site requirement. The switches, plugs, sockets, plate, board shall be of modular type. Earthing shall be provided with 1.5 sq.mm FRLS PVC insulated green copper conductor connected to the earth terminal of switch/socket/fixture. The terminal of switches and sockets shall be made of brass. The wiring shall be as per IS 732:2019 and wire shall be 1.1 KV grade conform to IS:694 2010 with latest amendments and specification attached. All switches, sockets, modular plates, GI boxes, PVC conduit and wiring accessories shall be ISI marked and conform to relevant IS/BIS standards such as IS 3854, IS 1293, IS 9537 (Part III), IS 3419, IS 1258, IS 371, etc. with latest amendments. The conduit shall be properly fixed using suitable saddles and GI screws with proper alignment and workmanship. The work shall be completed in all respects as directed by the Engineer-in-Charge.

Schedule item no. 6

Wiring of the 5A Universal plug point on switch board with all accessories and running earthing copper conductor as per standard practice. The switches shall be of modular type.

The price shall cover the cost of supply, loading, transportation, unloading at site, erection, testing and commissioning of materials and wiring of wall socket point with 5 Amps universal plug socket, switch etc. complete with 1.5 sq.mm Copper PVC insulated, 1.1KV, Halogen Free FRLS, multi-stranded wire in rigid PVC fire retardant conduiting / casing capping / with running earthing of 1.5 sq.mm copper conductor with green colour PVC insulated wire and mounted on switch board. Earth wire must be connected with 3rd/earth terminal. The price shall also cover the cost of supply and fixing of all required materials including modular switches, sockets, plates, switch boards, PVC conduit pipes, FRLSH copper conductor wires, earth wires, ceiling rose, connectors, fixing accessories, etc., required for completion of the work in all respects as per site requirement. The switches, plugs, sockets, plate, board shall be of modular type. The terminal of switches and sockets shall be made of brass. The wiring shall be as per IS 732:2019 and wire shall be 1.1 KV grade conform to IS:694 2010 with latest amendments and specification attached. All switches, sockets, modular plates, GI boxes, PVC conduit and wiring accessories shall be ISI marked and conform to relevant IS/BIS standards such as IS 3854, IS 1293, IS 9537 (Part III), IS 3419, IS 1258, IS 371, etc. with latest amendments. The conduit / casing-capping shall be neatly fixed with suitable saddles, adequate size galvanized screws, including proper drilling and plugging, ensuring proper alignment and workmanship, complete in all respects as directed by the Engineer-in-Charge.

Schedule item no. 7

Supply, installation, testing & commissioning of surface wiring of modular plug point 16/6 Amps with modular switch on separate board by 3 nos. 4.0 sq mm FRLS PVC insulated copper conductor multi strand single core in PVC casing capping and accessories

The price shall cover the cost of supply, loading, transportation, unloading at site, erection, testing and commissioning of materials and surface wiring for modular plug point of 16/6 Amps with modular switch on separate switch board, using 3 runs of 4.0 sq.mm FRLSH PVC insulated, 1.1 kV grade, multistranded copper conductor single core cables laid in rigid PVC fire retardant conduiting / casing-capping complete with all accessories such as bends, tees, couplers, saddles, etc. The price shall also cover the cost of supply and fixing of all required materials including modular switches, sockets, plates, switch boards, GI/metal box, PVC conduit pipes, FRLSH copper conductor wires, earth wires, ceiling rose, connectors, fixing accessories, etc., required for completion of the work in all respects as per site requirement. Earthing shall be provided by 2.5 sq.mm copper conductor earth wire connected to the 3rd/earth terminal of the switch/socket/fixture. The switches, plugs, sockets, plate, board shall be of modular type and the terminals shall be made of brass. The wiring shall be as per IS 732:2019 and wire shall be 1.1 KV grade conform to IS:694 2010 with latest amendments and specification attached. All switches, sockets, modular plates, GI boxes, PVC conduit and wiring accessories shall be ISI marked and conform to relevant IS/BIS standards such as IS 3854, IS 1293, IS 9537 (Part III), IS 3419, IS 1258, IS 371, etc. with latest amendments. The conduit / casing-capping shall be neatly fixed with suitable saddles, adequate size galvanized screws, including proper drilling and plugging, ensuring proper alignment and workmanship, complete in all respects as directed by the Engineer-in-Charge.

Schedule item no. 8

Wiring of 15 Amps 6 pin wall socket point complete all accessories and running earthing as per standard practice on separate board. The switches shall be of modular type

The price shall cover the cost of supply, loading, transportation, unloading at site, erection, testing and commissioning of materials, fixing and wiring of 15 Amps wall plug with universal socket complete with switch, indicator, etc. on separate board copper wiring complete with 4 sq.mm Copper PVC insulated, 1.1 KV, Halogen Free FRLS, multi-stranded wire in rigid 25/32 mm dia. at least 2 mm thick heavy duty PVC conduit pipes with sub mains of 4 sq.mm copper with running earth wire of copper 2.5 sq.mm PVC insulated complete all accessories as per standard practice. The price shall also cover the cost of supply and fixing of all required materials including modular switches, sockets, plates, switch boards, PVC conduit pipes, FRLSH copper conductor wires, earth wires, ceiling rose, connectors, fixing accessories, etc., required for completion of the work in all respects as per site requirement.. Earth wire

must be connected with 3rd/earth terminal. The switches, plugs, sockets, board shall be of modular type. The terminal of switch, socket shall be made of Brass. The wiring shall be as per IS 732:2019 and wire shall be 1.1 KV grade conform to IS:694 2010 with latest amendments and specification attached. All switches, sockets, modular plates, GI boxes, PVC conduit/ casing-caping and wiring accessories shall be ISI marked and conform to relevant IS/BIS standards such as IS 3854, IS 1293, IS 9537 (Part III), IS 3419, IS 1258, IS 371, etc. with latest amendments. The conduit / casing-capping shall be neatly fixed with suitable saddles, adequate size galvanized screws, including proper drilling and plugging, ensuring proper alignment and workmanship, complete in all respects as directed by the Engineer-in-Charge.

Schedule item no. 9

Supply, laying, running fixing of following sizes of XLPE insulated, PVC sheathed, 1.1 KV grade cables as per IS.

(a) 4 core 16 sq.mm AL conductor armoured

The price shall cover cost of supply, loading, transportation and multiple unloading to site, laying, testing and commissioning of LT cable 1.1 KV grade, XLPE insulated, inner & outer PVC sheathed, multi-stranded Aluminium conductor armoured cables of above sizes **conforming to IS 7098 Part-1 and specification attached**. Price shall also include supply and erection of lugs, clamps, saddles made of aluminum strips of size 25 x 4 mm etc. for laying and raising of the cable as per site requirements. The termination of mains cable shall be carried out with suitable size glands and lugs wherever required. The no. of saddles to be fixed shall be two in one-meter length of cable. The Armour of the cable shall be properly connected to earth with brass glands for proper earthing. Cable shall be laid underground in cable trench, under and across Railway track, along wall / RCC structures etc. as per site requirement. Where ever cables are running parallel both cables shall be laid in the same trench only through separate trunking in such a way that the cable shall not cross each other throughout the length of the trench. Cable identification tags shall be provided throughout the length at every 25 meter interval. Cables with kinks, straightened kinks, defective armouring, or any visible damage/defects shall not be supplied or laid. The contractor shall submit valid Type Test Reports from NABL/Govt. accredited lab for the offered cable along with Acceptance and Routine Test Certificates as per relevant IS/IEC viz. IS:7098 Part-1, IS:10810, IEC 60332-1, IEC 60228 with latest amendments. The type test report carried out during last five year shall be valid.

Schedule item no. 10

Supply, erection, testing & commissioning of distribution board 12 way 63 A DP RCBO as I/C and 10/20/32 A SP MCB as outgoing complete with busbars, neutral link, etc. and other accessories housed in CRCA sheet enclosure.

The price shall cover the cost of supply, loading, transportation, unloading at site, erection, testing and commissioning of distribution board, double door type, fabricated out of 14 SWG CRCA sheet duly powder coated with corrosion-resistant finish, complete with earthing terminals, suitable copper busbars supports of high insulating material, neutral link and earth bar, cable alleys and labeling for incomer and outgoing as per site requirements. The DB shall be comprising of 63A DP RCBO as incomer and 18 nos. 10A–32A SP/DP MCBs (as per site requirements) as outgoing with proper phase segregation, uniform load distribution and circuit identification. The board shall be provided with hinged double doors with lock and key arrangement, gasket, cable gland and proper shrouding/insulation of live parts. The DB shall be suitable for wall mounting / floor mounted CC foundation with suitable MS stand, anchor fasteners complete with bottom/top cable entry with glands as per site requirements. All internal wiring shall be carried out using FRLSH copper wires with proper ferruling, lugs and dressing, ensuring neat and safe termination. The panel shall be properly earthed and tested for insulation resistance, continuity and functional operation before commissioning, complete in all respects. The DB shall be designed, manufactured and tested as per latest IEC 61439 standards.

RCBO:

The RCBO shall conform to IS 12640-2 / IEC 61009-1, having breaking capacity of 10 kA and sensitivity shall be 30/100/300mA (as per Railway requirement) and minimum electrical life of 10,000 operations. RCBO shall be non–line-load biased and provide separate visual indication for short-circuit and earth-leakage faults. The device shall trip on leakage currents of AC waveform with pulsating DC, including transients and harmonics and rated for pollution degree 3, impulse withstand voltage of 6 kV and IP20 protection. It shall operate in an ambient temperature of -5 °C to +60 °C, incorporate safety

shutter to prevent wrong cable insertion and have a test button to simulate a fault. Terminals shall be bi-connect type for busbar and cable with capacity up to 35 sq.mm (rigid) or 25 sq.mm (flexible) for ratings up to 63 A. The RCBO shall include provision for padlocking, be suitable for mounting auxiliary contacts, trip alarm contact, under/over voltage release, shunt release and DIN-clip mounting on both sides for easy removal. The contractor shall submit valid Test Certificates as per IS 12640-2 / IEC 61009-1, issued by the Original Equipment Manufacturer (OEM) of the RCBO.

MCB:

MCB shall be housed in high-grade insulating material with high dielectric strength, arc resistance, flame retardancy and temperature resistance and suitable for isolation and compatible with accessories like auxiliary contact, shunt release and trip alarm. MCB shall have minimum breaking capacity of 10 kA, impulse withstand voltage of 4 kV and common internal integrated tripping mechanism ensuring simultaneous disconnection of all poles in case of fault in any phase or neutral. The contractor shall submit valid Test Certificates as per IEC 60898-1, issued by the Original Equipment Manufacturer (OEM) of the MCB.

Schedule item no. 11

Supply, erection, testing and commissioning of maintenance free earthing

The price shall cover the cost of supply, erection, testing and commissioning of maintenance free earthing system complete with all accessories as per RDSO Spec No. RDSO/SPN/197 Version 1.0 dated 04.07.2016 with latest revisions also conforming to latest IS: 3043/IE rules, complete with Earth electrode, Earth enhancement material, backfill material, copper earth busbar, construction of earth pit with cover & inspection chamber, marking, other associated accessories, all tests and inspection as mention below:

1. **Earth electrode** is made up of high-tensile, low-carbon steel circular rod with copper molecularly bonded on the outer surface, conforming to UL 467, IEC 62561 or latest standards. The electrode shall be UL-listed. Certificates from NABL approved labs shall be submitted with test results.
The earth electrode shall have minimum diameter of 17.0 mm and minimum length of 3.0 meter. In rocky locations, three electrodes, each of 1.0 m length and 17.0 mm diameter, shall be installed in grid formation to ensure effective earthing.
The copper bonding on the electrode shall have minimum thickness of 250 microns using 99.9% electrolytic-grade copper. Each earth electrode shall be permanently marked as per UL 467 with UL marking, manufacturer's name or trade mark, length, diameter and catalogue number punched on it. Earth electrode can be visually inspected, checked for dimensions and thickness of copper coating using micron gauge. The supplier shall arrange for such inspection at the time of supply, if so desired
2. **Copper bus** bar of size 200 mm x 25 mm x 6 mm having electrical conductivity of 101% IACS, minimum 99.9% copper content shall be exothermically welded to rod with 4 hole (2 on each side) for connecting earthing conductor. The contractor shall submit the manufacturer's test certificates confirming copper purity and electrical conductivity. Exothermic weld material shall be tested as per provisions of IEEE 837 by NABL/ILAC member labs.
3. **Earth pit** - A hole of 100 mm to 125mm dia shall be augured /dug to a depth of about 3.0 meters. The earth electrode shall be placed into this hole.
4. **Earth enhancement material** (minimum approx. 30-35 kg) shall be filled into the augured/dug hole in slurry form and allowed to set. After the material gets set, the diameter of the composite structure (earth electrode + earth enhancement material) shall be of min. 100mm dia covering entire length of the hole.
Marking: The Earth enhancement material shall be supplied in sealed, moisture proof bags. These bags shall be marked with Manufacturer's name or trade name, quantity etc. Earth Enhancement compound should have characteristics as mentioned in the RDSO specs., should have low resistivity preferably below 0.2 Ohm-meters. NABL-approved test certificate for material composition shall be submitted.
5. **Backfill material:** The excavated soil is suitable as a backfill but should be sieved to remove any large stones and placed around the electrode taking care to ensure that it is well compacted. Material like sand, salt, coke breeze, cinders & ash shall not be used because of its acidic and corrosive nature.
6. **Inspection chamber:** (i) Inspection chamber should be as per IEC 62561-5 or latest.
(ii) The dimension of the chamber will be of 300 x 300 x 300 mm (inside dimension) of RCC with 50mm thick and fine finish. The masonry work shall be white washed inside and outside

(iii) A black painted RCC cover, min. 50 mm thick with two pulling hooks of sufficient strength shall be provided to cover the earth pit. The pulling hooks shall be flush with the concrete lid and shall not project out. PVC sleeve shall be provided in concrete wall to take out earthing connections. The top edge of the earthing chamber shall be made flush with the platform surface / ground level / circulating area.

(iv) The marking space should be present on an RCC cover. The date of testing and earth resistance value shall be written on the cover with black base with yellow paint.

8. A High-conductivity (101% IACS) with minimum 99.9% purity copper main bus-bar of size 300 mm x 25 mm x 6 mm copper bus bar shall be provided on nearby wall/structure as an equipotential bus and connected to electrical instruments / installations as per site requirement. The earth electrode shall be connected to the main bus bar with 2 nos. 25 mm x 3 mm copper strip laid in separate trenches of 300 mm width and 600 mm depth up to distance of 5 meter from earth bus-bar (minimum 3 meter x 2 nos. copper strips to be supplied). Each strip shall be continuous without joints; where unavoidable, only one joint per strip shall be permitted, made by exothermic welding with minimum 10 mm overlap.
9. **Earth resistance** shall be measured after installation using the fall-of-potential method in accordance with IS:3043 (latest) and shall comply with IS/RDSO/IE rule earthing norms. Testing shall be carried out in the presence of the Railway representative and the results shall be duly recorded. The date of testing and earth resistance value shall be clearly marked on the inspection chamber cover, and all earth pits shall be properly numbered for identification.
10. General arrangement of the earth system shall be as per drawing attached.
11. The Contractor shall made surrounding portion of earth pit same as previous. All debris, broken masonry, packing materials, etc. to be removed from site and site to be cleaned as per instruction of Rly Engineer.
12. The contractor shall be responsible for complete supply, installation & commissioning of the earthing& bonding system. The warranty of such system shall be 60 months from date of commissioning. During this period, any failure of earthing system due to improper materials & bad workmanship shall be attended free of cost by the Contractor.

Schedule item no. 12

Supply, erection, testing and commissioning of GI strip of 25 mm x 3 mm

The price shall cover cost of supply of material, laying and fixing of 25 mm × 3 mm hot-dip galvanized mild steel strip for earth continuity connection, conforming to IS 2062. The strip shall be hot-dip galvanized as per IS 4759 / IS 2629 with minimum zinc coating of 70 microns. The strip shall be laid in ground or fixed on surface and securely connected to earth electrodes, panels and equipment using suitable GI clamps/bolts, nuts and washers as per site requirement. All cut ends, welded portions and joints shall be protected with zinc-rich paint. Earthing installation and testing shall be carried out as per IS 3043 (latest revision) and as directed by the Engineer-in-Charge.

- Schedule-D:** Electrification for Provision of extension of platform at Vikhroli, Kalva, Mumbra & Diva of through lines for running of 15 car EMU services.
- Schedule-D-1** Electrification for Provision of extension of platform at Vikhroli of through lines for running of 15 car EMU services.

Schedule item no. 1

Supply, erection, testing and commissioning of 2 x 18 W LED fitting with IP 66 complete with connection and necessary fixing arrangements as per site requirement

The price shall cover cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of surface/suspended mounted, corrosion-resistant, IP66/65 protected light fitting with 2 nos. 4 feet long 18-20 Watt LED tube light, System efficacy ≥ 110 lm/W, PF ≥ 0.90 , THD $\leq 10\%$, with inbuilt electronic driver min. 2.5 kV surge protection complete with all accessories and fixing arrangement with clamps, brackets, nut-bolts etc. as per site condition. The fitting shall be constructed with high grade polycarbonate / CRCA powder coated housing with CRCA white powder coated reflector, UV-stabilized clear polycarbonate diffuser cover, stainless steel clamps/toggles. The batten should be similar or substantially equivalent to model no. BJI 218 LED of M/s Bajaj make. The cost shall also cover the wiring from ceiling rose / junction box / overhead wire to luminaries by 1.5 sq.mm cable of 3 core PVC insulated multistrands copper conductor with suitable size of flexible PVC conduit and fixing arrangement with clamps, brackets, nut-bolts etc. The technical parameter will be generally conforming to specification enclosed and submit test certificates/reports as per this technical specification. Luminaire to be got approved by Sr. DEE (G) CSMT before supply.

Schedule item no. 2

Supply, erection, testing and commissioning of 1 x 18 W LED fitting with IP 66 complete with connection and necessary fixing arrangements as per site requirement

The price shall cover cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of surface/suspended mounted, corrosion-resistant, IP66/65 protected light fitting with 1 no. 4 feet long 18-20 Watt LED tube light, System efficacy ≥ 100 lm/W, 6500°K, PF ≥ 0.90 with inbuilt electronic constant current driver min. 2.5 kV surge protection complete with all accessories and fixing arrangement with clamps, brackets, nut-bolts etc. as per site condition. The fitting shall be constructed with high grade polycarbonate / CRCA powder coated housing with CRCA white powder coated reflector, UV-stabilized clear polycarbonate diffuser cover, stainless steel clamps/toggles. The batten should be similar or substantially equivalent to model no. BJI 118 LED of M/s Bajaj make. The cost shall also cover the wiring from ceiling rose / junction box / overhead wire to luminaries by 0.75 sq.mm cable of 3 core PVC insulated multistrands copper conductor with suitable size of flexible PVC conduit and fixing arrangement with clamps, brackets, nut-bolts etc. The technical parameter will be generally conforming to specification enclosed and submit test certificates/reports as per this technical specification. Luminaire to be got approved by Sr. DEE (G) CSMT before supply.

Schedule item no. 3

Supply, erection, testing and commissioning of 40-45 W LED outdoor lighting fitting complete with all fixing arrangements.

The price shall cover cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of 40-45 Watt LED outdoor light fitting, with secondary lens optics, IP-66, IK07, efficacy 120 lm/W including suitable constant current driver with built in surge, open/short circuit protection. The housing shall be made of powder coated pressure die cast aluminium with protective toughened glass cover complete with all accessories with gasket, GI bracket, GI clamp made of 25 mm x 5 mm patti, down rod, nut-bolts etc. as per site condition. Outdoor luminaire shall have name of the manufacturer embossed on the luminaire. The cost shall also cover the wiring from ceiling rose / junction box / overhead wire to luminaries by 1.5 sq.mm cable of 3 core PVC insulated multistrands copper conductor with suitable size of flexible PVC conduit and fixing arrangement with clamps, brackets, nut-bolts etc. The LED fittings should be similar or substantially equivalent to model no. ZELA P54L WH PO TG SDJ 45 W of M/s Bajaj or ENDURASUNDOWNSL 45WLED of M/s Havells make. The technical parameter will be generally conforming to specification enclosed and submit test certificates/reports as per this technical specification. Luminaire to be got approved by Sr. DEE (G) CSMT before supply.

Schedule item no. 4**Supply, erection, testing and commissioning of 48" sweep energy efficient BLDC ceiling fan with down rod, motor, etc. with necessary connection.**

The price shall cover the cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of BEE certified 5 star rated BLDC fan of size 48 inch (1200mm) sweep ceiling fan not more than 35 Watt, Service value not less than 7.5, minimum air delivery 230 cum/minute, min. 2kV surge protection complete with step-type electronic regulator or remote control (as per Railway requirement) **conforming to enclosed specification no. PCEE/CR/BLDC CEILING FAN/1200 & 1400 MM Rev.0.**

The fan shall be provided and installed complete with all standard accessories and safety devices including suitably sized MS down rod, blades, canopies, rubber insulators, hook, MS bracket/clamp, split pin, nuts, bolts and spring washers as required at site. The MS down rod shall be of suitable length (not less than 300 mm) and finished with white paint or matching fan colour as approved. All MS brackets, clamps and supporting hardware shall be hot-dip galvanized. The cost shall also cover the wiring from ceiling rose / junction box / overhead wire to fan by 0.75 sq.mm flexible cable of 3 core PVC insulated multistrands copper conductor (FRLSH) with suitable size of flexible PVC conduit and fixing arrangement as per site condition. The fan shall have the warranty for a period of five year from the date of commissioning. The contractor shall submit test report from Govt Lab / NABL / ILAC accredited lab.

Schedule item no. 5**Supply, erection, testing and commissioning of BLDC Air circulator wall mounted 24" sweep fan with necessary connection.**

The price shall cover the cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of heavy duty 3 blade 24 inch sweep BLDC Air circulator fan. The cost shall also cover the wiring complete with connection with existing nearby power supply by 1.5 sq.mm flexible cable of 3 core PVC insulated multistrands copper conductor with suitable size flexible PVC conduit and fixing arrangement as per site condition. The technical details of the Air circulator shall be as follows:

1	Type of Air circulator / Size	BLDC / 24 inch, with inbuilt oscillation mechanism
2	Supply	1- ϕ , 230 \pm 10% V AC, 50Hz supply
3	Speed regulation	3 Step Manual Speed regulator
4	Number of blade & Material	3 / Aluminium
5	Minimum Air delivery	Not less than 200 CMM (Maximum speed)
6	Service value	Not less than 4.2
7	Rated speed (RPM)	1350-1400
8	Input Voltage Range	1- ϕ , 160-280 Volt
9	Power consumption	Not more than 150 Watt
10	Motor / Class of insulation	Copper wound BLDC motor / Class A
11	Construction	SS wire guard/fan guard
12	Vertical Tilt adjustment	4 Position Tilt adjustment
13	Protection Features	Over voltage, short-circuit, blocked blade protection
14	Length of Cord	Min. 2 meter 3 core PVC insulated, PVC Sheathed, 1.5 sq.mm, multi stranded copper cable as per IS 694 or latest
15	MCB Protection	Each fan to be provided with C curve 6A DP MCB with common internal integrated tripping mechanism in metal enclosure.
16	Mounting Type	Wall/pole mounted with base plate, GI clamps, channel, nuts-bolts, safety accessories etc. as per site requirements.
17	Conformity & Tests	(1) The fans shall comply with the requirements given in IS 2997 or latest and submit test report from Govt Lab/NABL/ILAC as per IS 2997 with latest amendments. (2) The contractor shall submit BEE Certification for Energy Efficiency labeling of Star Marking
18	Guarantee / warranty	Min. 3 Years, Firm shall submit guaranty certificate along with supply.

Schedule item no. 6**Supply, erection, testing and commissioning of 9" metal body type exhaust fan complete with motor guard, cover, etc.**

The price shall cover the cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of 9" (230 mm) sweep metal body heavy duty exhaust fan, air delivery min. 750 Cu.M/H, 1400 rpm, copper wound, securely attached protecting wire guard, motor guard & cover, suitable to work at 230 V, 50 Hz AC supply. The fans should be tested and conform to IS: 2312 with latest amendments. The fan should be similar or substantially equivalent to model no. Aeroclean Plus 230 mm of M/s Usha make. The fan shall have the warranty for a period of two years from the date of commissioning. The contractor shall submit Guarantee certificates & Test Certificate of offered fan from Manufacturers.

Schedule item no. 7**Supply, erection, testing and commissioning of astronomical timer panel board for high mast with all fixing arrangement as per Railway's requirement**

The price shall cover the cost of Supply, transportation, multiple loading/unloading, storage, erection, testing and commissioning of outdoor-type min. IP-54, double-door distribution timer panel board comprising of 01 no. 63 amps FP MCCB as incoming and 03 no. 32 amps ML-2 contactors with bypass arrangement by 03 nos. 6A SP MCB, 06 nos. 32 A SP MCB as outgoing and 03 nos. Astronomical / Digital timer complete with suitable rating copper bus bars, neutral links, cable gland, lugs, nut-bolts and other accessories as per site requirements condition and details given below:

MCCB: MCCB shall be current-limiting, quick-make/quick-break, trip-free type, conforming to IEC 60947-2, 4-pole with 100% neutral, 35 kA breaking capacity ($I_{cs}=I_{cu}=100\%$), thermal-magnetic adjustable release and inbuilt/CT-based ground fault protection of same make. MCCB shall have phase barriers, spreader links, extended rotary handle with interlock defeat and padlock, trip indication, auxiliary contact, UV/shunt release, and be line-load independent. Panel incomer shall include a 96×96 mm digital Earth Leakage Relay with adjustable setting. The contractor shall submit valid Test Certificates as per IEC 60947-2, issued by the OEM of the MCCB.

MCB: MCB shall be housed in high-grade insulating material with high dielectric, arc, flame and temperature resistance, suitable for isolation and compatible with auxiliary contact, shunt release and trip alarm. MCB shall have 10 kA breaking capacity, 4 kV impulse withstand and an integrated tripping mechanism for simultaneous disconnection of all poles on any phase/neutral fault, conforming to IS/IEC 60898-1 and IS 12640-2 (latest). The contractor shall submit valid Test Certificates as per IEC 60898-1, issued by the Original Equipment Manufacturer (OEM) of the MCB.

Timer:

SN	Description	Digital Timer / Astronomical Digital Timer
1	Protection	IP 20
2	Voltage	230 V, 50/60 Hz
3	Running Reserve	5 years or above
4	Nos. of channels	1
5	Switching capacity:	
a	Ohmic 250 V a.c. $\cos\phi = 1$	16 Amp
b	Inductive 230 V a.c. $\cos\phi = 0.6$	10 Amp
6	Cycle function (pulse time)	Min 1sec, max 1 hr 59 min 59sec
7	Clock precision (typical)	~ 0.1 s/day
8	Shortest switching step	1 sec
9	Operating Temperature	-20 to +55° C

Busbar: One set of (3-phase + neutral) high-conductivity ETP grade copper bus bars, extensible on either side, supported on non-breakable SMC insulators (Comparative Tracking Index (CTI) $\geq 600V$ as per IS 2824) at regular intervals to withstand fault forces. Busbars shall be color-coded with minimum clearances of 25 mm between phases and 19 mm from phase to neutral. Current carrying capacity shall be 1.25 A/sq.mm and the supplier shall provide a conductivity certificate from reputed manufacturer.

Timer Panel fabrication: The LT panel shall be fabricated from minimum 2 mm thick CRCA sheet, properly folded and reinforced to ensure strong and rigid structure. All doors and covers shall also be 2

mm thick CRCA and shall be fully gasketed with EPDM/Neoprene to prevent dust, moisture and vermin entry. Heavy-duty hinges made of corrosion-resistant stainless steel shall be provided and the panel shall have minimum IP54 protection. The panel shall be compartmentalized with separate enclosed sections for horizontal bus bars, vertical bus bars, switchgears and cable alleys to ensure operational safety and ease of maintenance. Cable chambers shall be sized for easy termination with top/bottom entry. CRCA sheet steel used in fabrication shall be cleaned and surface-treated through a seven-tank process (alkaline degreasing, descaling in dilute sulphuric acid and phosphating). After treatment, primer paint shall be applied, followed by final oven-baked powder coating of minimum 70-micron thickness. All switchboards and circuits shall be fitted with permanently engraved black-on-white nameplates and metal labels, clearly indicating the feeder number and designation. Internal separation shall be minimum Form-3B as per IEC 61439. The panel shall be floor-mounted on suitable GI angle (min. 50x50x6 mm or higher, as per panel load-bearing requirement) frame properly grouted on concrete foundation and covered with 14 SWG MS sheet duly painted as per site requirements.

Wiring: All wiring shall be with 1.5 sq.mm PVC insulated copper multistranded FRLSH wire (IS 694:2010) and 2.5 sq.mm for CT wiring. Wires shall be coded, labelled with approved ferrules at both ends, neatly bunched, clamped and brought out on terminal board for external connections.

Design & Approval: The LT panel shall be designed, manufactured and type-tested as per latest IEC 61439 (Parts 1 & 2) standards. The contractor shall submit GA drawings for Sr.DEE(G) office approval before fabrication & provide original test reports from CPRI/ERDA or equivalent Govt. testing agencies.

Schedule item no. 8

Supply, running, fixing and stringing of OHE mains of 5 line wire

The price shall cover cost of supply, loading, transportation and unloading to site & stringing of single core PVC insulated sheathed un-armoured aluminum conductor cable of 16 sq.mm size of 1100 V grade 5 nos. wire with 1 no. earth wire of 8 SWG GI wire with suitable size of reel insulator, GI clamps made of 25 mm x 5 mm patti, GI bracket, nut bolt, etc. Each span of the overhead wire should be in the range of 10-15 meter length as per site condition. One circuit meter will comprise of 5 wires of single core 16 sq.mm PVC insulated sheathed, un-armoured wire and one wire of 8 SWG, GI earth wire to be run over head under the cover over platform.

Schedule item no. 9

Wiring of the concealed Light / fan point with all accessories. The switches shall be of modular type.

The price shall cover the cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of material, fixing of concealed light / fan point wiring with 1.5 sq.mm PVC insulated 1.1 KV grade, Halogen free FRLS multistranded copper conductor wires along with 1.5 sq.mm green colour copper earth wire in 25/32 mm dia, at least 2 mm thick heavy duty PVC conduit pipes, 5/6 amps switch on control board, angular holder / ceiling rose, etc. including sub-mains of 2.5 sq.mm PVC insulated copper wire and 0.75 sq.mm 3 core PVC insulated multistrands copper conductor flexible cable from ceiling rose to fitting as per standard practice. The price shall also cover the cost of supply and fixing of all required materials including modular switches, sockets, plates, switch boards, PVC conduit pipes, FRLSH copper conductor wires, earth wires, ceiling rose, connectors, fixing accessories, etc., required for completion of the work in all respects as per site requirement. The switches, plugs, sockets, board shall be of modular type. The terminal of switch, socket shall be made of Brass. Earth wire must be connected with 3rd/earth terminal. The wiring shall be as per IS 732:2019 and wire shall be 1.1 KV grade conform to IS:694 2010 with latest amendments and specification attached. The switches, sockets, board, PVC conduit pipe, wiring accessories, etc. shall be ISI marked and conform to relevant IS/BIS viz. IS:3854, IS:1293, IS:14927 IS: 9537 (Part III), IS: 3419, IS 1258, IS 371 with latest amendments. The work shall also include wall cutting for concealed wiring, after providing concealed wiring the surface of wall/ceiling shall be made as earlier by providing cement, plaster, painting etc. If a wall is being constructed and RCC slab is being poured for the roof, the contractor shall lay the conduit pipe at the same time for concealed wiring.

Schedule item no. 10

Wiring of concealed 5A/ 5-Pin Universal plug point on switch board with all accessories and running earthing copper conductor as per standard practice. The switches shall be of modular type.

The price shall cover the cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of material, fixing of concealed wiring 5A plug point and switch on switch control board as per specification and connection with 1.5 sq.mm PVC insulated 1.1 KV grade, Halogen free FRLS multistranded copper conductor along with 1.5 sq.mm green colour copper earth wire including sub-mains of 2.5 sq.mm PVC insulated copper wire in 25/32 mm dia, at least 2 mm thick heavy duty PVC conduit pipes as per standard practice. The price shall also cover the cost of supply and fixing of all required materials including modular switches, sockets, plates, switch boards, PVC conduit pipes, FRLSH copper conductor wires, earth wires, ceiling rose, connectors, fixing accessories, etc., required for completion of the work in all respects as per site requirement. Earth wire must be connected with 3rd/earth terminal. The switches, plugs, sockets, board shall be of **modular type**. The terminal of switch, socket shall be made of Brass. The wiring shall be as per IS 732:2019 and wire shall be 1.1 KV grade conform to IS:694 2010 with latest amendments and specification attached. The switches, sockets, board, PVC conduit pipe, wiring accessories, etc. shall be ISI marked and conform to relevant IS/BIS viz. IS:3854, IS:1293, IS:14927 IS: 9537 (Part III), IS: 3419, IS 1258, IS 371 with latest amendments. The work shall also include wall cutting for concealed wiring, after providing concealed wiring the surface of wall/ceiling shall be made as earlier by providing cement plaster etc. If a wall is being constructed and RCC slab is being poured for the roof, the contractor shall lay the conduit pipe at the same time for concealed wiring.

Schedule item no. 11

Supply, erection, testing and commissioning of water cooler with all accessories and necessary connection.

The price shall cover cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of ISI marked storage type water cooler with water connection pipe, associated accessories, necessary foundation with fixing arrangement as per as per Railway requirement over Mumbai Division. The cost shall also includes suitable size of SS pipe 304 grade (flexible as per requirement) to water fountain and necessary connection as per site Railway requirements The water cooler shall be properly earthed as per latest IS. The storage water cooler should be got approved by Sr. DEE (G)'s office before supply. The technical details of the Water cooler shall be as follows:

SN	Description	Parameter
1	Standard	IS:1475-1 2001, ISI marked
2	Storage capacity	150 Liter
3	Cooling capacity	150 Liter/hour
4	Power Supply	Single Phase, 50Hz
5	Power Consumption	1550 KW (as per IS)
5	Body Material:	Stainless Steel with rust proof finish
6	Chiller Tank	SS 304
7	Dip Tray	SS 304
8	Faucet	2 nos. made of Brass Chrome plated
9	Refrigerant	R-22 / R-134A eco friendly
10	Compressor	Rotary (less vibration and silent operation)
11	Condensing	Grooved Copper
12	Water inlet and outlet hose pipe	Yes
13	Tests	The contractor shall submit Test Certificate from NABL/Govt. Lab of offered water cooler as per IS:1475-1 2001 with latest amendments alongwith supply.
14	Guaranty	One Year, Firm shall submit Manufacturers original Guaranty certificates.
15	The water cooler shall be similar or substantially equivalent to model no. SS150150 of M/s Usha make or SDLX150150B of M/s Bluestar make.	

Schedule item no. 12

Supply, laying, running fixing of following sizes of XLPE insulated, PVC sheathed, 1.1 KV grade cables as per IS.

(a) 4 core 25 sq.mm AL conductor armoured

(b) 4 core 16 sq.mm AL conductor armoured

(c) 2 core 6 sq.mm CU conductor armoured

The price shall cover cost of supply, loading, transportation and multiple unloading to site, laying, testing and commissioning of LT cable 1.1 KV grade, XLPE insulated, inner & outer PVC sheathed, multi-stranded Aluminium / Copper conductor armoured cables of above sizes **conforming to IS 7098 Part-1 and specification attached.** Price shall also include supply and erection of lugs, clamps, saddles made of aluminum strips of size 25 x 4 mm etc. for laying and raising of the cable as per site requirements. The termination of mains cable shall be carried out with suitable size glands and lugs wherever required. The no. of saddles to be fixed shall be two in one-meter length of cable. The Armour of the cable shall be properly connected to earth with brass glands for proper earthing. Cable shall be laid underground in cable trench, under and across Railway track, along wall / RCC structures etc. as per site requirement. Where ever cables are running parallel both cables shall be laid in the same trench only through separate trunking in such a way that the cable shall not cross each other throughout the length of the trench. Cable identification tags shall be provided throughout the length at every 25 meter interval. Cables with kinks, straightened kinks, defective armouring, or any visible damage/defects shall not be supplied or laid. The contractor shall submit valid Type Test Reports from NABL/Govt. accredited lab for the offered cable along with Acceptance and Routine Test Certificates as per relevant IS/IEC viz. IS:7098 Part-1, IS:10810, IEC 60332-1, IEC 60228 with latest amendments. The type test report carried out during last five year shall be valid.

Schedule item no. 13

Supply, erection, testing and commissioning of FRP junction box as per Railway's requirement.

The price shall cover the cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of FRP pole junction box of size approx. 230 mm x 200 mm x 100 mm with termination & connection of cable by loop in loop out method. FRP junction box shall be having terminals for the termination of 3 phase cable & neutral and one ISI marked cut out of 15 amps with cable gland, nut bolt and GI clamps for fixing of FRP junction box. The FRP box should have proper panel locking arrangement. At each junction box both incoming and outgoing cable armours should be bonded for better earth continuity.

Schedule item no. 14

Fabrication, supply, erection, testing and commissioning of double sided glow sign board of different sizes made out of Poly Carbonate sheets as per detail specification.

The price shall cover the cost of fabrication, supply, erection, testing and commissioning of double sided glow sign board of different sizes made out of Poly Carbonate sheets, illuminated from inside by clear cool white color LED module / strip with driver for uniform intensity and luminosity for excellent and uniform visibility. Wattage of the LED sign board should be 6-8 W per square feet. The number of modules and wattage of the modules should be varied proportionately to the size of board. The boards should have uniform brightness. Dark patch should not visible on the sign board. The board shall have single sided 2 to 3 mm thick white (milky white) translucent light stabilized non yellowing Poly Carbonate sheets and shall be fixed on MS frame manufactured from MS square tube of suitable size as per weight of board. The Poly Carbonate sheets shall consist along with the frame of size 25 x 25 mm stainless steel angle with board. The board fixing/hanging arrangement shall be with MS flat / GI strip of size 25 to 30 mm with thickness of min. 5 mm one side and GI chain another side of min. 5 mm thickness and suitable length as per site requirement. Internal wiring shall be with PVC insulated 1.5 sq.mm copper wire. The glow sign boards have connector 5A, 230 V capacity. On both side walls of the box shall have louvers for heat dissipation. The glow sign board shall be fabricated from 22 SWG GI sheet with powder coating of black / grey colour. The cost shall also cover the wiring from ceiling rose / junction box/overhead wire to sign boards by 0.75 sq.mm flexible cable of 3 core PVC insulated multistrands copper conductor with suitable size flexible PVC conduit and fixing arrangement as per site condition.

Schedule item no. 15

Supply, erection, testing and commissioning of One phase distribution board comprising of 8 ways 16 A DP MCB as incoming and 06 nos 10 A SP MCB as outgoing complete with bus bars neutral link and as per Railway's requirement

The price shall cover the cost of supply, loading, transportation, unloading at site, erection, testing and commissioning of 1-Ph SPN DB, double door type, fabricated out of CRCA sheet duly powder coated with corrosion-resistant finish, complete with earthing terminals, suitable copper busbars supports of high insulating material, neutral link and earth bar, cable alleys and labeling for incomer and outgoing as per site requirements. The DB shall be comprising of 1 no. 40 A DP MCB as incomer and 6 nos. 10-16 Amp SP MCBs as outgoing with uniform load distribution and circuit identification. The board shall be provided with hinged double doors with lock and key arrangement, gasket, cable gland & proper shrouding of live parts. The DB shall be suitable for wall mounting / floor mounted CC foundation with suitable MS stand, anchor fasteners complete with bottom/top cable entry with glands as per site requirements. All internal wiring shall be carried out using FRLSH copper wires with proper ferruling, lugs and dressing, ensuring neat and safe termination. The panel shall be properly earthed and tested for insulation resistance, continuity and functional operation before commissioning, complete in all respects.

MCB: MCB shall be housed in high-grade insulating material with high dielectric strength, arc resistance, flame retardancy and temperature resistance and suitable for isolation and compatible with accessories like auxiliary contact, shunt release and trip alarm. MCB shall have minimum breaking capacity of 10 kA, impulse withstand voltage of 4 kV and common internal integrated tripping mechanism ensuring simultaneous disconnection of all poles in case of fault in any phase or neutral. The contractor shall submit valid Test Certificates as per IEC 60898-1, issued by the Original Equipment Manufacturer (OEM) of the MCB.

Schedule item no. 16

Supply, erection, testing and commissioning of maintenance free earthing

The price shall cover the cost of supply, erection, testing and commissioning of maintenance free earthing system complete with all accessories as per RDSO Spec No. RDSO/SPN/197 Version 1.0 dated 04.07.2016 with latest revisions also conforming to latest IS: 3043/IE rules, complete with Earth electrode, Earth enhancement material, backfill material, copper earth busbar, construction of earth pit with cover & inspection chamber, marking, other associated accessories, all tests and inspection as mention below:

1. **Earth electrode** is made up of high-tensile, low-carbon steel circular rod with copper molecularly bonded on the outer surface, conforming to UL 467, IEC 62561 or latest standards. The electrode shall be UL-listed. Certificates from NABL approved labs shall be submitted with test results.
The earth electrode shall have minimum diameter of 17.0 mm and minimum length of 3.0 meter. In rocky locations, three electrodes, each of 1.0 m length and 17.0 mm diameter, shall be installed in grid formation to ensure effective earthing.
The copper bonding on the electrode shall have minimum thickness of 250 microns using 99.9% electrolytic-grade copper. Each earth electrode shall be permanently marked as per UL 467 with UL marking, manufacturer's name or trade mark, length, diameter and catalogue number punched on it. Earth electrode can be visually inspected, checked for dimensions and thickness of copper coating using micron gauge. The supplier shall arrange for such inspection at the time of supply, if so desired
2. **Copper bus** bar of size 200 mm x 25 mm x 6 mm having electrical conductivity of 101% IACS, minimum 99.9% copper content shall be exothermically welded to rod with 4 hole (2 on each side) for connecting earthing conductor. The contractor shall submit the manufacturer's test certificates confirming copper purity and electrical conductivity. Exothermic weld material shall be tested as per provisions of IEEE 837 by NABL/ILAC member labs.
3. **Earth pit** - A hole of 100 mm to 125mm dia shall be augured /dug to a depth of about 3.0 meters. The earth electrode shall be placed into this hole.
4. **Earth enhancement material** (minimum approx. 30-35 kg) shall be filled into the augured/dug hole in slurry form and allowed to set. After the material gets set, the diameter of the composite structure (earth electrode + earth enhancement material) shall be of min. 100mm dia covering entire length of the hole.

Marking: The Earth enhancement material shall be supplied in sealed, moisture proof bags. These bags shall be marked with Manufacturer's name or trade name, quantity etc. Earth Enhancement compound should have characteristics as mentioned in the RDSO specs., should have low resistivity preferably below 0.2 Ohm-meters. NABL-approved test certificate for material composition shall be submitted.

5. **Backfill material:** The excavated soil is suitable as a backfill but should be sieved to remove any large stones and placed around the electrode taking care to ensure that it is well compacted. Material like sand, salt, coke breeze, cinders & ash shall not be used because of its acidic and corrosive nature.
6. **Inspection chamber:** (i) Inspection chamber should be as per IEC 62561-5 or latest.
 (ii) The dimension of the chamber will be of 300 x 300 x 300 mm (inside dimension) of RCC with 50mm thick and fine finish. The masonry work shall be white washed inside and outside
 (iii) A black painted RCC cover, min. 50 mm thick with two pulling hooks of sufficient strength shall be provided to cover the earth pit. The pulling hooks shall be flush with the concrete lid and shall not project out. PVC sleeve shall be provided in concrete wall to take out earthing connections. The top edge of the earthing chamber shall be made flush with the platform surface / ground level / circulating area.
 (iv) The marking space should be present on an RCC cover. The date of testing and earth resistance value shall be written on the cover with black base with yellow paint.
8. A High-conductivity (101% IACS) with minimum 99.9% purity copper main bus-bar of size 300 mm x 25 mm x 6 mm copper bus bar shall be provided on nearby wall/structure as an equipotential bus and connected to electrical instruments / installations as per site requirement. The earth electrode shall be connected to the main bus bar with 2 nos. 25 mm x 3 mm copper strip laid in separate trenches of 300 mm width and 600 mm depth up to distance of 5 meter from earth bus-bar (minimum 3 meter x 2 nos. copper strips to be supplied). Each strip shall be continuous without joints; where unavoidable, only one joint per strip shall be permitted, made by exothermic welding with minimum 10 mm overlap.
9. **Earth resistance** shall be measured after installation using the fall-of-potential method in accordance with IS:3043 (latest) and shall comply with IS/RDSO/IE rule earthing norms. Testing shall be carried out in the presence of the Railway representative and the results shall be duly recorded. The date of testing and earth resistance value shall be clearly marked on the inspection chamber cover, and all earth pits shall be properly numbered for identification.
10. General arrangement of the earth system shall be as per drawing attached.
11. The Contractor shall made surrounding portion of earth pit same as previous. All debris, broken masonry, packing materials, etc. to be removed from site and site to be cleaned as per instruction of Rly Engineer.
12. The contractor shall be responsible for complete supply, installation & commissioning of the earthing& bonding system. The warranty of such system shall be 60 months from date of commissioning. During this period, any failure of earthing system due to improper materials & bad workmanship shall be attended free of cost by the Contractor.

Schedule item no. 17

Supply, erection, testing and commissioning of GI strip of 25 mm x 3 mm

The price shall cover cost of supply of material, laying and fixing of 25 mm × 3 mm hot-dip galvanized mild steel strip for earth continuity connection, conforming to IS 2062. The strip shall be hot-dip galvanized as per IS 4759 / IS 2629 with minimum zinc coating of 70 microns. The strip shall be laid in ground or fixed on surface and securely connected to earth electrodes, panels and equipment using suitable GI clamps/bolts, nuts and washers as per site requirement. All cut ends, welded portions and joints shall be protected with zinc-rich paint. Earthing installation and testing shall be carried out as per IS 3043 (latest revision) and as directed by the Engineer-in-Charge.

Schedule-D: Electrification for Provision of extension of platform at Vikhroli, Kalva, Mumbra & Diva of through lines for running of 15 car EMU services.

Schedule-D-2 Electrification for Provision of extension of platform at Mumbra of through lines for running of 15 car EMU services.

Schedule item no. 1

Supply, erection, testing and commissioning of 2 x 18 W LED fitting with IP 66 complete with connection and necessary fixing arrangements as per site requirement.

The price shall cover cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of surface/suspended mounted, corrosion-resistant, IP66/65 protected light fitting with 2 nos. 4 feet long 18-20 Watt LED tube light, System efficacy ≥ 110 lm/W, PF ≥ 0.90 , THD $\leq 10\%$, with inbuilt electronic driver min. 2.5 kV surge protection complete with all accessories and fixing arrangement with clamps, brackets, nut-bolts etc. as per site condition. The fitting shall be constructed with high grade polycarbonate / CRCA powder coated housing with CRCA white powder coated reflector, UV-stabilized clear polycarbonate diffuser cover, stainless steel clamps/toggles. The batten should be similar or substantially equivalent to model no. BJI 218 LED of M/s Bajaj make. The cost shall also cover the wiring from ceiling rose / junction box / overhead wire to luminaries by 1.5 sq.mm cable of 3 core PVC insulated multistrands copper conductor with suitable size of flexible PVC conduit and fixing arrangement with clamps, brackets, nut-bolts etc. The technical parameter will be generally conforming to specification enclosed and submit test certificates/reports as per this technical specification. Luminaire to be got approved by Sr. DEE (G) CSMT before supply.

Schedule item no. 2

Supply, erection, testing and commissioning of BLDC Air circulator wall mounted 24" sweep fan with necessary connection.

The price shall cover the cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of heavy duty 3 blade 24 inch sweep BLDC Air circulator fan. The cost shall also cover the wiring complete with connection with existing nearby power supply by 1.5 sq.mm flexible cable of 3 core PVC insulated multistrands copper conductor with suitable size flexible PVC conduit and fixing arrangement as per site condition. The technical details of the Air circulator shall be as follows:

1	Type of Air circulator /Size	BLDC / 24 inch, with inbuilt oscillation mechanism
2	Supply	1- ϕ , 230 \pm 10% V AC, 50Hz supply
3	Speed regulation	3 Step Manual Speed regulator
4	Number of blade/Material	3 / Aluminium
5	Minimum Air delivery	Not less than 200 CMM (Maximum speed)
6	Service value	Not less than 4.2
7	Rated speed (RPM)	1350-1400
8	Input Voltage Range	1- ϕ , 160-280 Volt
9	Power consumption	Not more than 150 Watt
10	Motor/ Class of insulation	Copper wound BLDC motor / Class A
11	Construction	SS wire guard/fan guard
12	Vertical Tilt adjustment	4 Position Tilt adjustment
13	Protection Features	Over voltage, short-circuit, blocked blade protection
14	Length of Cord	Min. 2 meter 3 core PVC insulated, PVC Sheathed, 1.5 sq.mm, multi stranded copper cable as per IS 694 or latest
15	MCB Protection	Each fan to be provided with C curve 6A DP MCB with common internal integrated tripping mechanism in metal enclosure.
16	Mounting Type	Wall/pole mounted with base plate, GI clamps, channel, nuts-bolts, safety accessories etc. as per site requirements.
17	Conformity & Tests	(1) The fans shall comply with the requirements given in IS 2997 or latest and submit test report from Govt Lab/NABL/ILAC as per IS 2997 with latest amendments. (2) The contractor shall submit BEE Certification for Energy Efficiency labeling of Star Marking
18	Guarantee / warranty	Min. 3 Years, Firm shall submit guaranty certificate along with supply.

Schedule item no. 3**Supply, erection, testing and commissioning of 56" sweep energy efficient BLDC ceiling fan with down rod, motor, etc. with necessary connection.**

The price shall cover the cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of BEE certified 5 star rated BLDC fan of size 1400 mm (56 inch) sweep ceiling fan not more than 35 Watt, working on 140-285 V, Service value not less than 7.5, minimum air delivery 250 cum/minute, min. 2kV surge protection, working on 140-285 V complete with step-type electronic regulator or remote control (as per Railway requirement) **conforming to enclosed specification no. PCEE/CR/BLDC CEILING FAN/1200 & 1400 MM Rev.0.**

The fan shall be provided and installed complete with all standard accessories and safety devices including suitably sized MS down rod, blades, canopies, rubber insulators, hook, MS bracket/clamp, split pin, nuts, bolts and spring washers as required at site. The MS down rod shall be of suitable length (not less than 300 mm) and finished with white paint or matching fan colour as approved. All MS brackets, clamps and supporting hardware shall be hot-dip galvanized. The cost shall also cover the wiring from ceiling rose / junction box / overhead wire to fan by 1.5 sq.mm flexible cable of 3 core PVC insulated multistrands copper conductor (FRLSH) with suitable size of flexible PVC conduit and fixing arrangement as per site condition. The fan shall have the warranty for a period of five year from the date of commissioning. The contractor shall submit test report from Govt Lab / NABL / ILAC accredited lab.

Schedule item no. 4**Supply, erection, testing and commissioning of water cooler with all accessories and necessary connection.**

The price shall cover cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of ISI marked storage type water cooler with water connection pipe, associated accessories, necessary foundation with fixing arrangement as per as per Railway requirement over Mumbai Division. The cost shall also includes suitable size of SS pipe 304 grade (flexible as per requirement) to water fountain and necessary connection as per site Railway requirements The water cooler shall be properly earthed as per latest IS. The storage water cooler should be got approved by Sr. DEE (G)'s office before supply.

The technical details of the Water cooler shall be as follows:

SN	Description	Parameter
1	Standard	IS:1475-1 2001, ISI marked
2	Storage capacity	150 Liter
3	Cooling capacity	150 Liter/hour
4	Power Supply	Single Phase, 50Hz
5	Power Consumption	1550 KW (as per IS)
5	Body Material:	Stainless Steel with rust proof finish
6	Chiller Tank	SS 304
7	Dip Tray	SS 304
8	Faucet	2 nos. made of Brass Chrome plated
9	Refrigerant	R-22 / R-134A eco friendly
10	Compressor	Rotary (less vibration and silent operation)
11	Condensing	Grooved Copper
12	Water inlet and outlet hose pipe	Yes
13	Tests	The contractor shall submit Test Certificate from NABL/Govt. Lab of offered water cooler as per IS:1475-1 2001 with latest amendments alongwith supply.
14	Guaranty	One Year, Firm shall submit Manufacturers original Guaranty certificates.
15	The water cooler shall be similar or substantially equivalent to model no. SS150150 of M/s Usha make or SDLX150150B of M/s Bluestar make.	

Schedule item no. 5**Supply, running, fixing and stringing of OHE mains of 5 line wire**

The price shall cover cost of supply, loading, transportation and unloading to site & stringing of single core PVC insulated sheathed un-armoured aluminum conductor cable of 16 sq. mm size of 1100 V grade 5 nos. wire with 1 no. earth wire of 8 SWG GI wire with suitable size of reel insulator, GI clamps made of 25 mm x 5 mm patti, GI bracket, nut bolt, etc. Each span of the overhead wire should be in the range of 10-15 meter length as per site condition. One circuit meter will comprise of 5 wires of single core 16 sq. mm PVC insulated sheathed, un-armoured wire and one wire of 8 SWG, GI earth wire to be run overhead under the cover over platform.

Schedule item no. 6**Supply, running, fixing and stringing of OHE mains of 3 line wire**

The price shall cover cost of supply, loading, transportation and unloading to site & stringing of single core PVC insulated sheathed un-armoured aluminum conductor cable of 16 sq. mm size of 1100 V grade 3 nos. wire with 1 no. earth wire of 8 SWG GI wire with suitable size of reel insulator, GI clamps made of 25 mm x 5 mm patti, GI bracket, nut bolt, etc. Each span of the overhead wire should be in the range of 10-15 meter length as per site condition. One circuit meter will comprise of 3 wires of single core 16 sq. mm PVC insulated sheathed, un-armoured wire and one wire of 8 SWG, GI earth wire to be run overhead under the cover over platform.

Schedule item no. 7**Supply, laying, running fixing of following sizes of XLPE insulated, PVC sheathed, 1.1 KV grade cables as per IS.****(a) 4 core 50 sq.mm AL conductor, armoured****(b) 4 core 35 sq.mm AL conductor, armoured**

The price shall cover cost of supply, loading, transportation and multiple unloading to site, laying, testing and commissioning of LT cable 1.1 KV grade, XLPE insulated, inner & outer PVC sheathed, multi-stranded Aluminium conductor armoured cables of above sizes **conforming to IS 7098 Part-1 and specification attached**. Price shall also include supply and erection of lugs, clamps, saddles made of aluminum strips of size 25 x 4 mm etc. for laying and raising of the cable as per site requirements. The termination of mains cable shall be carried out with suitable size glands and lugs wherever required. The no. of saddles to be fixed shall be two in one-meter length of cable. The Armour of the cable shall be properly connected to earth with brass glands for proper earthing. Cable shall be laid underground in cable trench, under and across Railway track, along wall / RCC structures etc. as per site requirement. Where ever cables are running parallel both cables shall be laid in the same trench only through separate trunking in such a way that the cable shall not cross each other throughout the length of the trench. Cable identification tags shall be provided throughout the length at every 25 meter interval. Cables with kinks, straightened kinks, defective armouring, or any visible damage/defects shall not be supplied or laid. The contractor shall submit valid Type Test Reports from NABL/Govt. accredited lab for the offered cable along with Acceptance and Routine Test Certificates as per relevant IS/IEC viz. IS:7098 Part-1, IS:10810, IEC 60332-1, IEC 60228 with latest amendments. The type test report carried out during last five year shall be valid

Schedule item no. 8**Supply and fixing of GRP / FRP cable tray made of glass fiber reinforced polyester moulding composite material, size 200mm width x 50mm depth min., 04mm thick min., including horizontal and vertical reducers, tees, cross members and other accessories as required and duly suspended from the ceiling with GI suspenders etc., as per specifications.**

The price shall cover the cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of cable tray manufactured from glass fibre reinforced polyester moulding composite material of minimum size 200mm x 75mm x 4 mm, including horizontal/vertical reducers, tees, crosses, bends, couplers & all accessories, duly suspended from ceiling with GI suspenders as per site requirements and details given below:

1. Tray Construction

- (i) The trays shall be of single-section pultruded construction. Fabricated/assembled trays shall not be accepted.

- (ii) Trays shall be channel / trough type and furnished as a complete system including fasteners, hold-down clips, support systems, covers, hinged horizontal and vertical splice plates, elbows, reducers, bends, tees, crosses and all required hardware.
- (iii) Trays shall include fittings such as inward/outward bends, risers, tees, reducers/expanders, crosses, pultruded coupler plates with SS-304/316 hardware and moulded hinges for horizontal/vertical bends to suit changes in direction and elevation.
- (iv) Trays shall be supported at spans of 1.5 m to 2.0 m, with supports located at minimum 1.0 m from building structure using painted/galvanized MS structural members fixed with dash-fasteners or grouted anchors.
- (v) Trays shall be erected in perfect level and plumb and shall be free from sharp edges, burrs or projections injurious to cables or personnel.
- (vi) The entire tray system shall be rigid and durable.

2. Material Properties

- (i) GRP/FRP trays shall be manufactured from glass fibre reinforced polyester moulding composite material. Minimum Size of tray : 200 mm (W) × 75 mm (D) × 4 mm (T)
- (ii) Glass fibre content shall be minimum 60%.
- (iii) Material shall be: Anti-corrosive, rust-proof and weather-proof, Dust-proof, shock-proof and high-strength, Fire-retardant, non-conductive, non-magnetic and maintenance-free.
- (iv) Trays shall be supplied complete with all fixing accessories, suitable to accommodate bus-duct/cable system. Design & fixing arrangement shall be as per site requirements and certified by the consignee.

3. Applicable Standards

- (i) NEMA FG-1:1993 – Loading specifications for FRP/GRP cable trays.
- (ii) IS 6746:1994 – Fire-retardant properties of FRP/GRP materials.

4. Testing & Documentation

(i) Type Tests (Mandatory)

- a) UV Resistance: ASTM G154, 1000 hours (equivalent ≥ 10 years outdoor life). Tensile & flexural strength reduction $\leq 5\%$ after UV exposure.
- b) Fire Retardancy & Smoke Index: ASTM E-84; Flame Spread Index ≤ 25 , Smoke Index ≤ 200 .
- c) Dielectric Strength: ≥ 6 kV/mm as per ASTM D149.
- d) Glow Wire Test: Must withstand 960°C as per IEC 60695-2-12.
- e) Toxicity & Zero Halogen Content: As per NES 713; Toxicity Index < 1.0 , Halogen-NIL.
- f) Heat & Fire Resistance: Meets IEC 695 Part-2 Sec-1, 960°C .

(ii) Documentation: The contractor shall submit:

- (c) All test reports for confirmation of materials, various parameters and specifications shall be from Govt. Lab/ NABL Accredited Lab / International Accredited Lab.
- (d) Delivery challan/ OEM or Authorized Dealer original vouchers to confirm ascertain originality of the items.

Make: Sintex, Bravo, Hensel, Cape Electric, Jindal Power Corporation, ERCON, Bajaj Electricals, Satyam Composites.

Schedule item no. 9

Supply and laying of DWC pipe of size 4" dia

The price shall cover the cost of supply, loading, transportation, unloading to the site and laying of double walled corrugated (DWC) HDPE pipe of nominal size 4 inch conforming to IS:14930 (Part-II) with latest amendments complete with integrated coupler/socket and jointed with snap-fit couplers and EPDM rubber sealing rings conforming to IS 5382 or latest. The pipe shall be double walled, corrugated externally and smooth internally, manufactured from high density polyethylene material conforming to IS 7328 or latest. The HDPE pipe shall be laying in excavated CC/soil trench or fixed on catwalk with suitable GI clamps/saddles of suitable size, GI not-bolts, washers, etc, ensuring firm support and alignment. Cable entries shall be sealed with elastomeric sealant or fire-retardant compound after cable insertion to prevent ingress of water, dust or vermin. The work shall be carried out in all respects with proper jointing, fixing, accessories and site restoration as directed by the Engineer-in-Charge. Each pipe shall bear permanent marking at one-meter intervals indicating the manufacturer's name, IS:14930 (Part-II), nominal size, batch number and year of manufacture. The contractor shall submit manufacturer's test certificate as per IS:14930 or latest.

Schedule item no. 10

Supply, erection, testing and commissioning of 125 A MCCB 1 no. as incoming and 02 nos 63 FP MCB, 32A FP MCB: 02Nos, 10 nos 20A DP MCB as outgoing complete with busbars, neutral link, etc.

The price shall cover the cost of Supply, transportation, multiple loading/unloading, storage, erection, testing and commissioning of outdoor-type min. IP-54, three-phase, double-door LT distribution panel board comprising of 1 no. 125 Amps FP MCCB as incoming and 2 nos. 63 Amp FP MCB, 2 nos. 32-40 Amp FP MCB & 10 nos. 20 Amp DP MCB as outgoing, busbars, LED type indication lamp for outgoing and incoming supply, digital multifunction meter, separate cable alley chamber for termination by cable gland, lugs, nut-bolts, washers, etc. as per site condition and details given below:

MCCB: MCCB shall be current-limiting type with quick-make, quick-break and trip-free mechanism, conforming to IEC 60947-2. The breaking capacity of MCCB shall be 35 kA with $I_{cs}=I_{cu}=100\%$. MCCB shall be 4-pole with 100% neutral, equipped with phase barriers, both-side spreader links and extended rotary handle with door interlock defeat and padlocking facility. The MCCB shall be line-load independent and shall have trip indication, auxiliary contacts and provision for under-voltage/shunt release. The MCCB shall be equipped with thermal-magnetic adjustable release having inbuilt adjustable protection against overload and short-circuit faults. Ground fault protection shall be provided either within the release or provided through compatible ground fault module with suitable CBCT/CT, ensuring that both MCCB and ground fault module are of the same make. For incomer application, the MCCB shall be provided and integrated with a 96×96 mm Earth Leakage Relay (ELR) with digital display and adjustable earth leakage current settings. The contractor shall submit manufacturer's test certificates for the MCCB as per IEC 60947-2 or latest.

MCB: MCB shall be housed in high-grade insulating material with high dielectric strength, arc resistance, flame retardancy and temperature resistance and suitable for isolation and compatible with accessories like auxiliary contact, shunt release and trip alarm. MCB shall have minimum breaking capacity of 10 kA, impulse withstand voltage of 4 kV and common internal integrated tripping mechanism ensuring simultaneous disconnection of all poles in case of fault in any phase or neutral. The contractor shall submit manufacturer's test certificates for the MCB as per IEC 60898-1 or latest.

Busbar: The panel shall be provided with high-conductivity ETP-grade copper busbars (3-phase + neutral), extendable on either side. Busbars shall be mounted on strong, non-hygroscopic SMC insulators with CTI ≥ 600 V (IS 2824) to withstand fault stresses. They shall be colour-coded with minimum clearances of 25 mm between phases and 19 mm to neutral/earth. Busbar sizing shall be based on 1.25 A per sq.mm current-carrying capacity. A conductivity certificate from the original busbar manufacturer shall be submitted.

Panel fabrication: The LT panel shall be fabricated from minimum 2 mm thick CRCA sheet, properly folded and reinforced to ensure strong and rigid structure. All doors and covers shall also be 2 mm thick CRCA and shall be fully gasketed with EPDM/Neoprene to prevent dust, moisture and vermin entry. Heavy-duty hinges made of corrosion-resistant stainless steel shall be provided and the panel shall have minimum IP54 protection. The panel shall be compartmentalized with separate enclosed sections for horizontal bus bars, vertical bus bars, switchgears and cable alleys to ensure operational safety and ease of maintenance. Cable chambers shall be sized for easy termination with top/bottom entry. CRCA sheet steel used in fabrication shall be cleaned and surface-treated through a seven-tank process (alkaline degreasing, descaling in dilute sulphuric acid and phosphating). After treatment, primer paint shall be applied, followed by final oven-baked powder coating of minimum 70-micron thickness. All switchboards and circuits shall be fitted with permanently engraved black-on-white nameplates and metal labels, clearly indicating the feeder number and designation. Internal separation shall be minimum Form-3B as per IEC 61439. The panel shall be floor-mounted on suitable GI angle (min. $50 \times 50 \times 6$ mm or higher, as per panel load-bearing requirement) frame properly grouted on concrete foundation and covered with 14 SWG MS sheet duly painted as per site requirements.

Multifunction Energy meter: Multifunction Energy meter should be min Class 1.0 Accuracy & should be with RS485 Modbus protocol. Min parameter requirement for MFM should be V, A, F, PF, kW, kVA, kVAR, kWh, kVAh, kVARh, Runhours, On hours, Phase angle, Interrupts, THD, Events (High-Low), Neutral Current.

Wiring: All wiring for relays and meters shall be with 1.5 sq.mm PVC insulated copper multistranded FRLSH wire conforming to IS 694 2010 and 2.5 sq.mm should be used for CT wiring. The wiring shall be coded and labelled with approved ferrules for identification. Runs of wires shall be neatly bunched

and suitably supported and clamped. Means shall be provided for easy identification of wires. Identification ferrules shall use at both end of wires. All control wires meant for external connections are to be brought out on a terminal board.

Communication wiring: Separate communication wiring shall be provided for all feeders, switchgear and meters for ON/OFF/Trip status feedback and monitoring purpose. The wiring shall be terminated in separate marshalling box with proper identification. Communication cable shall be low impedance, twisted pair, shielded type of Belden/Lapp or equivalent.

Earthing – One earthing terminal shall be provided on each side of panel board. An earth bar size must be at least 6 x 50 mm Aluminium/ GI strip. The earth bar shall be electrically continuous and shall run the full extent of panel board. Door earthing shall be provided for all doors.

Design & Approval: The LT panel shall be designed and manufactured as per the latest IEC 61439 standards. The contractor shall submit GAD to Sr.DEE(G) for approval before fabrication. Valid type test reports (not older than five years) from NABL/Govt. accredited laboratory, along with Acceptance and Routine Test Certificates as per relevant IS/IEC standards, shall be submitted for the offered panel.

Schedule item no. 11

Fabrication, supply, erection, testing and commissioning of single sided glow sign board of different sizes made out of Poly Carbonate sheets as per detail specification.

The price shall cover the cost of fabrication, supply, erection, testing and commissioning of single sided glow sign board of different sizes made out of Poly Carbonate sheets, illuminated from inside by clear cool white color LED module / strip with driver for uniform intensity and luminosity for excellent and uniform visibility. Wattage of the LED sign board should be 6-8 W per square feet. The number of modules and wattage of the modules should be varied proportionately to the size of board. The boards should have uniform brightness. Dark patch should not visible on the sign board. The board shall have single sided 2 to 3 mm thick white (milky white) translucent light stabilized non yellowing Poly Carbonate sheets and shall be fixed on MS frame manufactured from MS square tube of suitable size as per weight of board. The Poly Carbonate sheets shall consist along with the frame of size 25 x 25 mm stainless steel angle with board. The board fixing/hanging arrangement shall be with MS flat / GI strip of size 25 to 30 mm with thickness of min. 5 mm one side and GI chain another side of min. 5 mm thickness and suitable length as per site requirement. Internal wiring shall be with PVC insulated 1.5 sq.mm copper wire. The glow sign boards have connector 5A, 230 V capacity. On both side walls of the box shall have louvers for heat dissipation. The glow sign board shall be fabricated from 22 SWG GI sheet with powder coating of black / grey colour. The cost shall also cover the wiring from ceiling rose / junction box/overhead wire to sign boards by 0.75 sq.mm flexible cable of 3 core PVC insulated multistrands copper conductor with suitable size flexible PVC conduit and fixing arrangement as per site condition.

Schedule item no. 12

Fabrication, supply, erection, testing and commissioning of double sided glow sign board of different sizes made out of Poly Carbonate sheets as per detail specification.

The price shall cover the cost of fabrication, supply, erection, testing and commissioning of double sided glow sign board of different sizes made out of Poly Carbonate sheets, illuminated from inside by clear cool white color LED module / strip with driver for uniform intensity and luminosity for excellent and uniform visibility. Wattage of the LED sign board should be 6-8 W per square feet. The number of modules and wattage of the modules should be varied proportionately to the size of board. The boards should have uniform brightness. Dark patch should not visible on the sign board. The board shall have double sided 2 to 3 mm thick white (milky white) translucent light stabilized non yellowing Poly Carbonate sheets and shall be fixed on MS frame manufactured from MS square tube of suitable size as per weight of board. The Poly Carbonate sheets shall consist along with the frame of size 25 x 25 mm stainless steel angle with board. The board fixing/hanging arrangement shall be with MS flat / GI strip of size 25 to 30 mm with thickness of min. 5 mm one side and GI chain another side of min. 5 mm thickness and suitable length as per site requirement. Internal wiring shall be with PVC insulated 1.5 sq.mm copper wire. The glow sign boards have connector 5A, 230 V capacity. On both side walls of the box shall have louvers for heat dissipation. The glow sign board shall be fabricated from 22 SWG GI sheet with powder coating of black / grey colour. The cost shall also cover the wiring from ceiling rose / junction box/overhead wire to sign boards by 0.75 sq.mm flexible cable of 3 core PVC insulated multistrands copper conductor with suitable size flexible PVC conduit and fixing arrangement as per site condition.

Schedule item no. 13

Supply, erection, testing and commissioning of maintenance free earthing

The price shall cover the cost of supply, erection, testing and commissioning of maintenance free earthing system complete with all accessories as per RDSO Spec No. RDSO/SPN/197 Version 1.0 dated 04.07.2016 with latest revisions also conforming to latest IS: 3043/IE rules, complete with Earth electrode, Earth enhancement material, backfill material, copper earth busbar, construction of earth pit with cover & inspection chamber, marking, other associated accessories, all tests and inspection as mention below:

1. **Earth electrode** is made up of high-tensile, low-carbon steel circular rod with copper molecularly bonded on the outer surface, conforming to UL 467, IEC 62561 or latest standards. The electrode shall be UL-listed. Certificates from NABL approved labs shall be submitted with test results.
The earth electrode shall have minimum diameter of 17.0 mm and minimum length of 3.0 meter. In rocky locations, three electrodes, each of 1.0 m length and 17.0 mm diameter, shall be installed in grid formation to ensure effective earthing.
The copper bonding on the electrode shall have minimum thickness of 250 microns using 99.9% electrolytic-grade copper. Each earth electrode shall be permanently marked as per UL 467 with UL marking, manufacturer's name or trade mark, length, diameter and catalogue number punched on it. Earth electrode can be visually inspected, checked for dimensions and thickness of copper coating using micron gauge. The supplier shall arrange for such inspection at the time of supply, if so desired
2. **Copper bus** bar of size 200 mm x 25 mm x 6 mm having electrical conductivity of 101% IACS, minimum 99.9% copper content shall be exothermically welded to rod with 4 hole (2 on each side) for connecting earthing conductor. The contractor shall submit the manufacturer's test certificates confirming copper purity and electrical conductivity. Exothermic weld material shall be tested as per provisions of IEEE 837 by NABL/ILAC member labs.
3. **Earth pit** - A hole of 100 mm to 125mm dia shall be augured /dug to a depth of about 3.0 meters. The earth electrode shall be placed into this hole.

4. **Earth enhancement material** (minimum approx. 30-35 kg) shall be filled into the augured/dug hole in slurry form and allowed to set. After the material gets set, the diameter of the composite structure (earth electrode + earth enhancement material) shall be of min. 100mm dia covering entire length of the hole.

Marking: The Earth enhancement material shall be supplied in sealed, moisture proof bags. These bags shall be marked with Manufacturer's name or trade name, quantity etc. Earth Enhancement compound should have characteristics as mentioned in the RDSO specs., should have low resistivity preferably below 0.2 Ohm-meters. NABL-approved test certificate for material composition shall be submitted.

5. **Backfill material:** The excavated soil is suitable as a backfill but should be sieved to remove any large stones and placed around the electrode taking care to ensure that it is well compacted. Material like sand, salt, coke breeze, cinders & ash shall not be used because of its acidic and corrosive nature.
6. **Inspection chamber:** (i) Inspection chamber should be as per IEC 62561-5 or latest.
(ii) The dimension of the chamber will be of 300 x 300 x 300 mm (inside dimension) of RCC with 50mm thick and fine finish. The masonry work shall be white washed inside and outside
(iii) A black painted RCC cover, min. 50 mm thick with two pulling hooks of sufficient strength shall be provided to cover the earth pit. The pulling hooks shall be flush with the concrete lid and shall not project out. PVC sleeve shall be provided in concrete wall to take out earthing connections. The top edge of the earthing chamber shall be made flush with the platform surface / ground level / circulating area.
(iv) The marking space should be present on an RCC cover. The date of testing and earth resistance value shall be written on the cover with black base with yellow paint.

8. A High-conductivity (101% IACS) with minimum 99.9% purity copper main bus-bar of size 300 mm x 25 mm x 6 mm copper bus bar shall be provided on nearby wall/structure as an equipotential bus and connected to electrical instruments / installations as per site requirement. The earth electrode shall be connected to the main bus bar with 2 nos. 25 mm x 3 mm copper strip laid in separate trenches of 300 mm width and 600 mm depth up to distance of 5 meter from earth bus-bar (minimum 3 meter x 2 nos. copper strips to be supplied). Each strip shall be continuous without joints; where unavoidable, only one joint per strip shall be permitted, made by exothermic welding with minimum 10 mm overlap.

9. **Earth resistance** shall be measured after installation using the fall-of-potential method in accordance with IS:3043 (latest) and shall comply with IS/RDSO/IE rule earthing norms. Testing shall be carried out in the presence of the Railway representative and the results shall be duly recorded. The date of testing and earth resistance value shall be clearly marked on the inspection chamber cover, and all earth pits shall be properly numbered for identification.
10. General arrangement of the earth system shall be as per drawing attached.
11. The Contractor shall made surrounding portion of earth pit same as previous. All debris, broken masonry, packing materials, etc. to be removed from site and site to be cleaned as per instruction of Rly Engineer.
12. The contractor shall be responsible for complete supply, installation & commissioning of the earthing& bonding system. The warranty of such system shall be 60 months from date of commissioning. During this period, any failure of earthing system due to improper materials & bad workmanship shall be attended free of cost by the Contractor.

Schedule-D: Electrification for Provision of extension of platform at Vikhroli, Kalva, Mumbra & Diva of through lines for running of 15 car EMU services.

Schedule-D-3 Electrification for Provision of extension of platform at Kalva of through lines for running of 15 car EMU services.

Schedule item no. 1

Supply, erection, testing and commissioning of 2 x 18 W LED fitting with IP 66complete with connection and necessary fixing arrangements as per site requirement.

The price shall cover cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of surface/suspended mounted, corrosion-resistant, IP66/65 protected light fitting with 2 nos. 4 feet long 18-20 Watt LED tube light, System efficacy ≥ 110 lm/W, PF ≥ 0.90 , THD $\leq 10\%$, with inbuilt electronic driver min. 2.5 kV surge protection complete with all accessories and fixing arrangement with clamps, brackets, nut-bolts etc. as per site condition. The fitting shall be constructed with high grade polycarbonate / CRCA powder coated housing with CRCA white powder coated reflector, UV-stabilized clear polycarbonate diffuser cover, stainless steel clamps/toggles. The batten should be similar or substantially equivalent to model no. BJI 218 LED of M/s Bajaj make. The cost shall also cover the wiring from ceiling rose / junction box / overhead wire to luminaries by 1.5 sq.mm cable of 3 core PVC insulated multistrands copper conductor with suitable size of flexible PVC conduit and fixing arrangement with clamps, brackets, nut-bolts etc. The technical parameter will be generally conforming to specification enclosed and submit test certificates/reports as per this technical specification. Luminaire to be got approved by Sr. DEE (G) CSMT before supply.

Schedule item no. 2

Supply, erection, testing and commissioning of BLDC Air circulator wall mounted 24" sweep fan with necessary connection.

The price shall cover the cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of heavy duty 3 blade 24 inch sweep BLDC Air circulator fan. The cost shall also cover the wiring complete with connection with existing nearby power supply by 1.5 sq.mm flexible cable of 3 core PVC insulated multistrands copper conductor with suitable size flexible PVC conduit and fixing arrangement as per site condition. The technical details of the Air circulator shall be as follows:

1	Type of Air circulator/Size	BLDC / 24 inch, with inbuilt oscillation mechanism
2	Supply	1- ϕ , 230 \pm 10% V AC, 50Hz supply
3	Speed regulation	3 Step Manual Speed regulator
4	Number of blade & Material	3 / Aluminium
5	Minimum Air delivery	Not less than 200 CMM (Maximum speed)
6	Service value	Not less than 4.2
7	Rated speed (RPM)	1350-1400
8	Input Voltage Range	1- ϕ , 160-280 Volt
9	Power consumption	Not more than 150 Watt
10	Motor / Class of insulation	Copper wound BLDC motor / Class A
11	Construction	SS wire guard/fan guard

12	Vertical Tilt adjustment	4 Position Tilt adjustment
13	Protection Features	Over voltage, short-circuit, blocked blade protection
14	Length of Cord	Min. 2 meter 3 core PVC insulated, PVC Sheathed, 1.5 sq.mm, multi stranded copper cable as per IS 694 or latest
15	MCB Protection	Each fan to be provided with C curve 6A DP MCB with common internal integrated tripping mechanism in metal enclosure.
16	Mounting Type	Wall/pole mounted with base plate, GI clamps, channel, nuts-bolts, safety accessories etc. as per site requirements.
17	Conformity & Tests	(1) The fans shall comply with the requirements given in IS 2997 or latest and submit test report from Govt Lab/NABL/ILAC as per IS 2997 with latest amendments. (2) The contractor shall submit BEE Certification for Energy Efficiency labeling of Star Marking
18	Guarantee / warranty	Min. 3 Years, Firm shall submit guaranty certificate along with supply.

Schedule item no. 3

Supply, erection, testing and commissioning of 56" sweep energy efficient BLDC ceiling fan with down rod, motor, etc. with necessary connection.

The price shall cover the cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of BEE certified 5 star rated BLDC fan of size 1400 mm (56 inch) sweep ceiling fan not more than 35 Watt, working on 140-285 V, Service value not less than 7.5, minimum air delivery 250 cum/minute, min. 2kV surge protection, working on 140-285 V complete with step-type electronic regulator or remote control (as per Railway requirement) **conforming to enclosed specification no. PCEE/CR/BLDC CEILING FAN/1200 & 1400 MM Rev.0.** The fan shall be provided and installed complete with all standard accessories and safety devices including suitably sized MS down rod, blades, canopies, rubber insulators, hook, MS bracket/clamp, split pin, nuts, bolts and spring washers as required at site. The MS down rod shall be of suitable length (not less than 300 mm) and finished with white paint or matching fan colour as approved. All MS brackets, clamps and supporting hardware shall be hot-dip galvanized. The cost shall also cover the wiring from ceiling rose / junction box / overhead wire to fan by 1.5 sq.mm flexible cable of 3 core PVC insulated multistrands copper conductor (FRLSH) with suitable size of flexible PVC conduit and fixing arrangement as per site condition. The fan shall have the warranty for a period of five year from the date of commissioning. The contractor shall submit test report from Govt Lab / NABL / ILAC accredited lab.

Schedule item no. 4

Supply, running, fixing and stringing of OHE mains of 5 line wire

The price shall cover cost of supply, loading, transportation and unloading to site & stringing of single core PVC insulated sheathed un-armoured aluminum conductor cable of 16 sq. mm size of 1100 V grade 5 nos. wire with 1 no. earth wire of 8 SWG GI wire with suitable size of reel insulator, GI clamps made of 25 mm x 5 mm patti, GI bracket, nut bolt, etc. Each span of the overhead wire should be in the range of 10-15 meter length as per site condition. One circuit meter will comprise of 5 wires of single core 16 sq. mm PVC insulated sheathed, un-armoured wire and one wire of 8 SWG, GI earth wire to be run overhead under the cover over platform.

Schedule item no. 5

Supply, running, fixing and stringing of OHE mains of 3 line wire

The price shall cover cost of supply, loading, transportation and unloading to site & stringing of single core PVC insulated sheathed un-armoured aluminum conductor cable of 16 sq. mm size of 1100 V grade 3 nos. wire with 1 no. earth wire of 8 SWG GI wire with suitable size of reel insulator, GI clamps made of 25 mm x 5 mm patti, GI bracket, nut bolt, etc. Each span of the overhead wire should be in the range of 10-15 meter length as per site condition. One circuit meter will comprise of 3 wires of single core 16 sq. mm PVC insulated sheathed, un-armoured wire and one wire of 8 SWG, GI earth wire to be run overhead under the cover over platform.

Schedule item no. 6**Wiring of the conduit Light /fan point with all accessories.**

The price shall cover the cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of material, fixing of conduit light / fan point wiring with 1.5 sq.mm PVC insulated 1.1 KV grade, Halogen free FRLS multistranded copper conductor wires along with 1.5 sq.mm green colour copper earth wire in 25/32 mm dia, at least 2 mm thick heavy duty PVC conduit pipes, 5/6 amps switch on control board, angular holder / ceiling rose, etc. including sub-mains of 2.5 sq.mm PVC insulated copper wire and 3 core 0.75 sq.mm flexible wire from ceiling rose to fitting as per standard practice and. The price shall also cover the cost of supply and fixing of all required materials including modular switches, sockets, plates, switch boards, PVC conduit pipes, FRLSH copper conductor wires, earth wires, ceiling rose, connectors, fixing accessories, etc., required for completion of the work in all respects as per site requirement. The price shall also cover the cost of 0.75 sq.mm flexible cable of 3 Core PVC insulated multistrands copper conductor from ceiling rose to fitting. Earth wire must be connected with 3rd/earth terminal. The switches, sockets, board shall be of modular type. The terminal of switch, socket shall be made of Brass. The wiring shall be as per IS 732:2019 and wire shall be 1.1 KV grade conform to IS:694 2010 with latest amendments and specification attached. The switches, sockets, board, PVC conduit pipe, wiring accessories, etc. shall be ISI marked and conform to relevant IS/BIS viz. IS:3854, IS:1293, IS:14927 IS: 9537 (Part III), IS: 3419, IS 1258, IS 371 with latest amendments. The work shall also include necessary core/wall cutting for conduiting, after providing wiring the surface shall be made as earlier by providing cement, plaster, painting etc.

Schedule item no. 7**Supply, erection, testing and commissioning of water cooler with all accessories and necessary connection.**

The price shall cover cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of ISI marked storage type water cooler with water connection pipe, associated accessories, necessary foundation with fixing arrangement as per as per Railway requirement over Mumbai Division. The cost shall also includes suitable size of SS pipe 304 grade (flexible as per requirement) to water fountain and necessary connection as per site Railway requirements The water cooler shall be properly earthed as per latest IS. The storage water cooler should be got approved by Sr. DEE (G)'s office before supply. The technical details of the Water cooler shall be as follows:

SN	Description	Parameter
1	Standard	IS:1475-1 2001, ISI marked
2	Storage capacity	150 Liter
3	Cooling capacity	150 Liter/hour
4	Power Supply	Single Phase, 50Hz
5	Power Consumption	1550 KW (as per IS)
5	Body Material:	Stainless Steel with rust proof finish
6	Chiller Tank	SS 304
7	Dip Tray	SS 304
8	Faucet	2 nos. made of Brass Chrome plated
9	Refrigerant	R-22 / R-134A eco friendly
10	Compressor	Rotary (less vibration and silent operation)
11	Condensing	Grooved Copper
12	Water inlet and outlet hose pipe	Yes
13	Tests	The contractor shall submit Test Certificate from NABL/Govt. Lab of offered water cooler as per IS:1475-1 2001 with latest amendments alongwith supply.
14	Guaranty	One Year, Firm shall submit Manufacturers original Guaranty certificates.
15	The water cooler shall be similar or substantially equivalent to model no. SS150150 of M/s Usha make or SDLX150150B of M/s Bluestar make.	

Schedule item no. 8

Supply, laying, running fixing of following sizes of XLPE insulated, PVC sheathed, 1.1 KV grade cables as per IS.

(a) 4 core 50 sq.mm AL conductor, armoured

(b) 4 core 35 sq.mm AL conductor, armoured

The price shall cover cost of supply, loading, transportation and multiple unloading to site, laying, testing and commissioning of LT cable 1.1 KV grade, XLPE insulated, inner & outer PVC sheathed, multi-stranded Aluminium conductor armoured cables of above sizes **conforming to IS 7098 Part-1 and specification attached**. Price shall also include supply and erection of lugs, clamps, saddles made of aluminum strips of size 25 x 4 mm etc. for laying and raising of the cable as per site requirements. The termination of mains cable shall be carried out with suitable size glands and lugs wherever required. The no. of saddles to be fixed shall be two in one-meter length of cable. The Armour of the cable shall be properly connected to earth with brass glands for proper earthing. Cable shall be laid underground in cable trench, under and across Railway track, along wall / RCC structures etc. as per site requirement. Where ever cables are running parallel both cables shall be laid in the same trench only through separate trunking in such a way that the cable shall not cross each other throughout the length of the trench. Cable identification tags shall be provided throughout the length at every 25 meter interval. Cables with kinks, straightened kinks, defective armouring, or any visible damage/defects shall not be supplied or laid. The contractor shall submit valid Type Test Reports from NABL/Govt. accredited lab for the offered cable along with Acceptance and Routine Test Certificates as per relevant IS/IEC viz. IS:7098 Part-1, IS:10810, IEC 60332-1, IEC 60228 with latest amendments. The type test report carried out during last five year shall be valid

Schedule item no. 9

Supply and fixing of GRP / FRP cable tray made of glass fiber reinforced polyester moulding composite material, size 200mm width x 50mm depth min., 04mm thick min., including horizontal and vertical reducers, tees, cross members and other accessories as required and duly suspended from the ceiling with GI suspenders etc., as per specifications

The price shall cover the cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of cable tray manufactured from glass fibre reinforced polyester moulding composite material of minimum size 200mm x 75mm x 4 mm, including horizontal/vertical reducers, tees, crosses, bends, couplers & all accessories, duly suspended from ceiling with GI suspenders as per site requirements and details given below:

1. Tray Construction

- (i) The trays shall be of single-section pultruded construction. Fabricated/assembled trays shall not be accepted.
- (ii) Trays shall be channel / trough type and furnished as a complete system including fasteners, hold-down clips, support systems, covers, hinged horizontal and vertical splice plates, elbows, reducers, bends, tees, crosses and all required hardware.
- (iii) Trays shall include fittings such as inward/outward bends, risers, tees, reducers/expanders, crosses, pultruded coupler plates with SS-304/316 hardware and moulded hinges for horizontal/vertical bends to suit changes in direction and elevation.
- (iv) Trays shall be supported at spans of 1.5 m to 2.0 m, with supports located at minimum 1.0 m from building structure using painted/galvanized MS structural members fixed with dash-fasteners or grouted anchors.
- (v) Trays shall be erected in perfect level and plumb and shall be free from sharp edges, burrs or projections injurious to cables or personnel.
- (vi) The entire tray system shall be rigid and durable.

2. Material Properties

- (i) GRP/FRP trays shall be manufactured from glass fibre reinforced polyester moulding composite material. Minimum Size of tray : 200 mm (W) × 75 mm (D) × 4 mm (T)
- (ii) Glass fibre content shall be minimum 60%.
- (iii) Material shall be: Anti-corrosive, rust-proof and weather-proof, Dust-proof, shock-proof and high-strength, Fire-retardant, non-conductive, non-magnetic and maintenance-free.

- (iv) Trays shall be supplied complete with all fixing accessories, suitable to accommodate bus-duct/cable system. Design & fixing arrangement shall be as per site requirements and certified by the consignee.

3. Applicable Standards

- (i) NEMA FG-1:1993 – Loading specifications for FRP/GRP cable trays.
(ii) IS 6746:1994 – Fire-retardant properties of FRP/GRP materials.

4. Testing & Documentation

(i) Type Tests (Mandatory)

- a) UV Resistance: ASTM G154, 1000 hours (equivalent ≥ 10 years outdoor life). Tensile & flexural strength reduction $\leq 5\%$ after UV exposure.
- b) Fire Retardancy & Smoke Index: ASTM E-84; Flame Spread Index ≤ 25 , Smoke Index ≤ 200 .
- c) Dielectric Strength: ≥ 6 kV/mm as per ASTM D149.
- d) Glow Wire Test: Must withstand 960°C as per IEC 60695-2-12.
- e) Toxicity & Zero Halogen Content: As per NES 713; Toxicity Index < 1.0 , Halogen-NIL.
- f) Heat & Fire Resistance: Meets IEC 695 Part-2 Sec-1, 960°C .

(ii) Documentation: The contractor shall submit:

- (a) All test reports for confirmation of materials, various parameters and specifications shall be from Govt. Lab/ NABL Accredited Lab / International Accredited Lab.
- (b) Delivery challan/ OEM or Authorized Dealer original vouchers to confirm ascertain originality of the items.

Make: Sintex, Bravo, Hensel, Cape Electric, Jindal Power Corporation, ERCON, Bajaj Electricals, Satyam Composites.

Schedule item no. 10

Supply and laying of DWC pipe of size 4" dia

The price shall cover the cost of supply, loading, transportation, unloading to the site and laying of double walled corrugated (DWC) HDPE pipe of nominal size 4 inch conforming to IS:14930 (Part-II) with latest amendments complete with integrated coupler/socket and jointed with snap-fit couplers and EPDM rubber sealing rings conforming to IS 5382 or latest. The pipe shall be double walled, corrugated externally and smooth internally, manufactured from high density polyethylene material conforming to IS 7328 or latest. The HDPE pipe shall be laying in excavated CC/soil trench or fixed on catwalk with suitable GI clamps/saddles of suitable size, GI not-bolts, washers, etc, ensuring firm support and alignment. Cable entries shall be sealed with elastomeric sealant or fire-retardant compound after cable insertion to prevent ingress of water, dust or vermin. The work shall be carried out in all respects with proper jointing, fixing, accessories and site restoration as directed by the Engineer-in-Charge. Each pipe shall bear permanent marking at one-meter intervals indicating the manufacturer's name, IS:14930 (Part-II), nominal size, batch number and year of manufacture. The contractor shall submit manufacturer's test certificate as per IS:14930 or latest.

Schedule item no. 11

Supply, erection, testing and commissioning of 125 A MCCB 1 no. as incoming and 02 nos 63 FP MCB, 32A FP MCB: 02Nos, 10 nos 20A DP MCB as outgoing complete with busbars, neutral link, etc.

The price shall cover the cost of Supply, transportation, multiple loading/unloading, storage, erection, testing and commissioning of outdoor-type min. IP-54, three-phase, double-door LT distribution panel board comprising of 1 no. 125 Amps FP MCCB as incoming and 2 nos. 63 Amp FP MCB, 2 nos. 32-40 Amp FP MCB & 10 nos. 20 Amp DP MCB as outgoing, busbars, LED type indication lamp for outgoing and incoming supply, digital multifunction meter, separate cable alley chamber for termination by cable gland, lugs, nut-bolts, washers, etc. as per site condition and details given below:

MCCB: MCCB shall be current-limiting type with quick-make, quick-break and trip-free mechanism, conforming to IEC 60947-2. The breaking capacity of MCCB shall be 35 kA with $I_{cs}=I_{cu}=100\%$. MCCB shall be 4-pole with 100% neutral, equipped with phase barriers, both-side spreader links and extended rotary handle with door interlock defeat and padlocking facility. The MCCB shall be line-load independent and shall have trip indication, auxiliary contacts and provision for under-voltage/shunt release. The MCCB shall be equipped with thermal-magnetic adjustable release having inbuilt adjustable protection against overload and short-circuit faults. Ground fault protection shall be provided either

within the release or provided through compatible ground fault module with suitable CBCT/CT, ensuring that both MCCB and ground fault module are of the same make. For incomer application, the MCCB shall be provided and integrated with a 96×96 mm Earth Leakage Relay (ELR) with digital display and adjustable earth leakage current settings. The contractor shall submit manufacturer's test certificates for the MCCB as per IEC 60947-2 or latest.

MCB: MCB shall be housed in high-grade insulating material with high dielectric strength, arc resistance, flame retardancy and temperature resistance and suitable for isolation and compatible with accessories like auxiliary contact, shunt release and trip alarm. MCB shall have minimum breaking capacity of 10 kA, impulse withstand voltage of 4 kV and common internal integrated tripping mechanism ensuring simultaneous disconnection of all poles in case of fault in any phase or neutral. The contractor shall submit manufacturer's test certificates for the MCB as per IEC 60898-1 or latest.

Busbar: The panel shall be provided with high-conductivity ETP-grade copper busbars (3-phase + neutral), extendable on either side. Busbars shall be mounted on strong, non-hygroscopic SMC insulators with CTI ≥ 600 V (IS 2824) to withstand fault stresses. They shall be colour-coded with minimum clearances of 25 mm between phases and 19 mm to neutral/earth. Busbar sizing shall be based on 1.25 A per sq.mm current-carrying capacity. A conductivity certificate from the original busbar manufacturer shall be submitted.

Panel fabrication:

The LT panel shall be fabricated from minimum 2 mm thick CRCA sheet, properly folded and reinforced to ensure strong and rigid structure. All doors and covers shall also be 2 mm thick CRCA and shall be fully gasketed with EPDM/Neoprene to prevent dust, moisture and vermin entry. Heavy-duty hinges made of corrosion-resistant stainless steel shall be provided and the panel shall have minimum IP54 protection. The panel shall be compartmentalized with separate enclosed sections for horizontal bus bars, vertical bus bars, switchgears and cable alleys to ensure operational safety and ease of maintenance. Cable chambers shall be sized for easy termination with top/bottom entry. CRCA sheet steel used in fabrication shall be cleaned and surface-treated through a seven-tank process (alkaline degreasing, descaling in dilute sulphuric acid and phosphating). After treatment, primer paint shall be applied, followed by final oven-baked powder coating of minimum 70-micron thickness. All switchboards and circuits shall be fitted with permanently engraved black-on-white nameplates and metal labels, clearly indicating the feeder number and designation. Internal separation shall be minimum Form-3B as per IEC 61439. The panel shall be floor-mounted on suitable GI angle (min. $50 \times 50 \times 6$ mm or higher, as per panel load-bearing requirement) frame properly grouted on concrete foundation and covered with 14 SWG MS sheet duly painted as per site requirements.

Multifunction Energy meter:

Multifunction Energy meter should be min Class 1.0 Accuracy & should be with RS485 Modbus protocol. Min parameter requirement for MFM should be V, A, F, PF, kW, kVA, kVAR, kWh, kVAh, kVARh, Runhours, On hours, Phase angle, Interrupts, THD, Events (High-Low), Neutral Current.

Wiring: All wiring for relays and meters shall be with 1.5 sq.mm PVC insulated copper multistranded FRLSH wire conforming to IS 694 2010 and 2.5 sq.mm should be used for CT wiring. The wiring shall be coded and labelled with approved ferrules for identification. Runs of wires shall be neatly bunched and suitably supported and clamped. Means shall be provided for easy identification of wires. Identification ferrules shall use at both end of wires. All control wires meant for external connections are to be brought out on a terminal board.

Communication wiring: Separate communication wiring shall be provided for all feeders, switchgear and meters for ON/OFF/Trip status feedback and monitoring purpose. The wiring shall be terminated in separate marshalling box with proper identification. Communication cable shall be low impedance, twisted pair, shielded type of Belden/Lapp or equivalent.

Earthing – One earthing terminal shall be provided on each side of panel board. An earth bar size must be at least 6×50 mm Aluminium/ GI strip. The earth bar shall be electrically continuous and shall run the full extent of panel board. Door earthing shall be provided for all doors.

Design & Approval: The LT panel shall be designed and manufactured as per the latest IEC 61439 standards. The contractor shall submit GAD to Sr.DEE(G) for approval before fabrication. Valid type test reports (not older than five years) from a NABL/Government-accredited laboratory, along with Acceptance and Routine Test Certificates as per relevant IS/IEC standards, shall be submitted for the offered panel.

Schedule item no. 12**Fabrication, supply, erection, testing and commissioning of single sided glow sign board of different sizes made out of Poly Carbonate sheets as per detail specification.**

The price shall cover the cost of fabrication, supply, erection, testing and commissioning of single sided glow sign board of different sizes made out of Poly Carbonate sheets, illuminated from inside by clear cool white color LED module / strip with driver for uniform intensity and luminosity for excellent and uniform visibility. Wattage of the LED sign board should be 6-8 W per square feet. The number of modules and wattage of the modules should be varied proportionately to the size of board. The boards should have uniform brightness. Dark patch should not visible on the sign board. The board shall have single sided 2 to 3 mm thick white (milky white) translucent light stabilized non yellowing Poly Carbonate sheets and shall be fixed on MS frame manufactured from MS square tube of suitable size as per weight of board. The Poly Carbonate sheets shall consist along with the frame of size 25 x 25 mm stainless steel angle with board. The board fixing/hanging arrangement shall be with MS flat / GI strip of size 25 to 30 mm with thickness of min. 5 mm one side and GI chain another side of min. 5 mm thickness and suitable length as per site requirement. Internal wiring shall be with PVC insulated 1.5 sq.mm copper wire. The glow sign boards have connector 5A, 230 V capacity. On both side walls of the box shall have louvers for heat dissipation. The glow sign board shall be fabricated from 22 SWG GI sheet with powder coating of black / grey colour. The cost shall also cover the wiring from ceiling rose / junction box/overhead wire to sign boards by 0.75 sq.mm flexible cable of 3 core PVC insulated multistrands copper conductor with suitable size flexible PVC conduit and fixing arrangement as per site condition.

Schedule item no. 13**Fabrication, supply, erection, testing and commissioning of double sided glow sign board of different sizes made out of Poly Carbonate sheets as per detail specification.**

The price shall cover the cost of fabrication, supply, erection, testing and commissioning of double sided glow sign board of different sizes made out of Poly Carbonate sheets, illuminated from inside by clear cool white color LED module / strip with driver for uniform intensity and luminosity for excellent and uniform visibility. Wattage of the LED sign board should be 6-8 W per square feet. The number of modules and wattage of the modules should be varied proportionately to the size of board. The boards should have uniform brightness. Dark patch should not visible on the sign board. The board shall have double sided 2 to 3 mm thick white (milky white) translucent light stabilized non yellowing Poly Carbonate sheets and shall be fixed on MS frame manufactured from MS square tube of suitable size as per weight of board. The Poly Carbonate sheets shall consist along with the frame of size 25 x 25 mm stainless steel angle with board. The board fixing/hanging arrangement shall be with MS flat / GI strip of size 25 to 30 mm with thickness of min. 5 mm one side and GI chain another side of min. 5 mm thickness and suitable length as per site requirement. Internal wiring shall be with PVC insulated 1.5 sq.mm copper wire. The glow sign boards have connector 5A, 230 V capacity. On both side walls of the box shall have louvers for heat dissipation. The glow sign board shall be fabricated from 22 SWG GI sheet with powder coating of black / grey colour. The cost shall also cover the wiring from ceiling rose / junction box/overhead wire to sign boards by 0.75 sq.mm flexible cable of 3 core PVC insulated multistrands copper conductor with suitable size flexible PVC conduit and fixing arrangement as per site condition.

Schedule item no. 14**Supply, erection, testing and commissioning of maintenance free earthing**

The price shall cover the cost of supply, erection, testing and commissioning of maintenance free earthing system complete with all accessories as per RDSO Spec No. RDSO/SPN/197 Version 1.0 dated 04.07.2016 with latest revisions also conforming to latest IS: 3043/IE rules, complete with Earth electrode, Earth enhancement material, backfill material, copper earth busbar, construction of earth pit with cover & inspection chamber, marking, other associated accessories, all tests and inspection as mention below:

- 1. Earth electrode** is made up of high-tensile, low-carbon steel circular rod with copper molecularly bonded on the outer surface, conforming to UL 467, IEC 62561 or latest standards. The electrode shall be UL-listed. Certificates from NABL approved labs shall be submitted with test results.

The earth electrode shall have minimum diameter of 17.0 mm and minimum length of 3.0 meter. In rocky locations, three electrodes, each of 1.0 m length and 17.0 mm diameter, shall be installed in grid formation to ensure effective earthing.

The copper bonding on the electrode shall have minimum thickness of 250 microns using 99.9% electrolytic-grade copper. Each earth electrode shall be permanently marked as per UL 467 with UL marking, manufacturer's name or trade mark, length, diameter and catalogue number punched on it. Earth electrode can be visually inspected, checked for dimensions and thickness of copper coating using micron gauge. The supplier shall arrange for such inspection at the time of supply, if so desired

2. **Copper bus** bar of size 200 mm x 25 mm x 6 mm having electrical conductivity of 101% IACS, minimum 99.9% copper content shall be exothermically welded to rod with 4 hole (2 on each side) for connecting earthing conductor. The contractor shall submit the manufacturer's test certificates confirming copper purity and electrical conductivity. Exothermic weld material shall be tested as per provisions of IEEE 837 by NABL/ILAC member labs.
3. **Earth pit** - A hole of 100 mm to 125mm dia shall be augured /dug to a depth of about 3.0 meters. The earth electrode shall be placed into this hole.
4. **Earth enhancement material** (minimum approx. 30-35 kg) shall be filled into the augured/dug hole in slurry form and allowed to set. After the material gets set, the diameter of the composite structure (earth electrode + earth enhancement material) shall be of min. 100mm dia covering entire length of the hole.
Marking: The Earth enhancement material shall be supplied in sealed, moisture proof bags. These bags shall be marked with Manufacturer's name or trade name, quantity etc. Earth Enhancement compound should have characteristics as mentioned in the RDSO specs., should have low resistivity preferably below 0.2 Ohm-meters. NABL-approved test certificate for material composition shall be submitted.
5. **Backfill material:** The excavated soil is suitable as a backfill but should be sieved to remove any large stones and placed around the electrode taking care to ensure that it is well compacted. Material like sand, salt, coke breeze, cinders & ash shall not be used because of its acidic and corrosive nature.
6. **Inspection chamber:** (i) Inspection chamber should be as per IEC 62561-5 or latest.
 (ii) The dimension of the chamber will be of 300 x 300 x 300 mm (inside dimension) of RCC with 50mm thick and fine finish. The masonry work shall be white washed inside and outside
 (iii) A black painted RCC cover, min. 50 mm thick with two pulling hooks of sufficient strength shall be provided to cover the earth pit. The pulling hooks shall be flush with the concrete lid and shall not project out. PVC sleeve shall be provided in concrete wall to take out earthing connections. The top edge of the earthing chamber shall be made flush with the platform surface /ground level /circulating area.
 (iv) The marking space should be present on an RCC cover. The date of testing and earth resistance value shall be written on the cover with black base with yellow paint.
8. A High-conductivity (101% IACS) with minimum 99.9% purity copper main bus-bar of size 300 mm x 25 mm x 6 mm copper bus bar shall be provided on nearby wall/structure as an equipotential bus and connected to electrical instruments / installations as per site requirement. The earth electrode shall be connected to the main bus bar with 2 nos. 25 mm x 3 mm copper strip laid in separate trenches of 300 mm width and 600 mm depth up to distance of 5 meter from earth bus-bar (minimum 3 meter x 2 nos. copper strips to be supplied). Each strip shall be continuous without joints; where unavoidable, only one joint per strip shall be permitted, made by exothermic welding with minimum 10 mm overlap.
9. **Earth resistance** shall be measured after installation using the fall-of-potential method in accordance with IS:3043 (latest) and shall comply with IS/RDSO/IE rule earthing norms. Testing shall be carried out in the presence of the Railway representative and the results shall be duly recorded. The date of testing and earth resistance value shall be clearly marked on the inspection chamber cover, and all earth pits shall be properly numbered for identification.
10. General arrangement of the earth system shall be as per drawing attached.
11. The Contractor shall made surrounding portion of earth pit same as previous. All debris, broken masonry, packing materials, etc. to be removed from site and site to be cleaned as per instruction of Rly Engineer.
12. The contractor shall be responsible for complete supply, installation & commissioning of the earthing& bonding system. The warranty of such system shall be 60 months from date of commissioning. During this period, any failure of earthing system due to improper materials & bad workmanship shall be attended free of cost by the Contractor

- Schedule-D:** Electrification for Provision of extension of platform at Vikhroli, Kalva, Mumbra & Diva of through lines for running of 15 car EMU services.
- Schedule-D-4** Electrification for extension of platform no 3&4 of through line at Diva Station for running of 15 car EMU service.

Schedule item no. 1

Supply, erection, testing and commissioning of 2 x 18 W LED fitting with IP 66 complete with connection and necessary fixing arrangements as per site requirement.

The price shall cover cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of surface/suspended mounted, corrosion-resistant, IP66/65 protected light fitting with 2 nos. 4 feet long 18-20 Watt LED tube light, System efficacy ≥ 110 lm/W, PF ≥ 0.90 , THD $\leq 10\%$, with inbuilt electronic driver min. 2.5 kV surge protection complete with all accessories and fixing arrangement with clamps, brackets, nut-bolts etc. as per site condition. The fitting shall be constructed with high grade polycarbonate / CRCA powder coated housing with CRCA white powder coated reflector, UV-stabilized clear polycarbonate diffuser cover, stainless steel clamps/toggles. The batten should be similar or substantially equivalent to model no. BJI 218 LED of M/s Bajaj make. The cost shall also cover the wiring from ceiling rose / junction box / overhead wire to luminaries by 1.5 sq.mm cable of 3 core PVC insulated multistrands copper conductor with suitable size of flexible PVC conduit and fixing arrangement with clamps, brackets, nut-bolts etc. The technical parameter will be generally conforming to specification enclosed and submit test certificates/reports as per this technical specification. Luminaire to be got approved by Sr. DEE (G) CSMT before supply.

Schedule item no. 2

Supply, erection, testing and commissioning of 24" sweep 3 blade type air circulators complete with necessary fixing arrangement

The price shall cover the cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of heavy duty 3 blade 24 inch sweep BLDC Air circulator fan. The cost shall also cover the wiring complete with connection with existing nearby power supply by 1.5 sq.mm flexible cable of 3 core PVC insulated multistrands copper conductor with suitable size flexible PVC conduit and fixing arrangement as per site condition. The technical details of the Air circulator shall be as follows:

1	Type of Air circulator /Size	BLDC / 24 inch, with inbuilt oscillation mechanism
2	Supply	1- ϕ , 230 \pm 10% V AC, 50Hz supply
3	Speed regulation	3 Step Manual Speed regulator
4	Number of blade/ Material	3 / Aluminium
5	Minimum Air delivery	Not less than 200 CMM (Maximum speed)
6	Service value	Not less than 4.2
7	Rated speed (RPM)	1350-1400
8	Input Voltage Range	1- ϕ , 160-280 Volt
9	Power consumption	Not more than 150 Watt
10	Motor /Class of insulation	Copper wound BLDC motor / Class A
11	Construction	SS wire guard/fan guard
12	Vertical Tilt adjustment	4 Position Tilt adjustment
13	Protection Features	Over voltage, short-circuit, blocked blade protection
14	Length of Cord	Min. 2 meter 3 core PVC insulated, PVC Sheathed, 1.5 sq.mm, multi stranded copper cable as per IS 694 or latest
15	MCB Protection	Each fan to be provided with C curve 6A DP MCB with common internal integrated tripping mechanism in metal enclosure.
16	Mounting Type	Wall/pole mounted with base plate, GI clamps, channel, nuts-bolts, safety accessories etc. as per site requirements.
17	Conformity & Tests	(1) The fans shall comply with the requirements given in IS 2997 or latest and submit test report from Govt Lab/NABL/ILAC as per IS 2997 with latest amendments. (2) The contractor shall submit BEE Certification for Energy Efficiency labeling of Star Marking
18	Guarantee / warranty	Min. 3 Years, Firm shall submit guaranty certificate along with supply.

Schedule item no. 3**Supply, erection, testing and commissioning of astronomical timer panel board for high mast with all fixing arrangement as per Railway's requirement**

The price shall cover the cost of Supply, transportation, multiple loading/unloading, storage, erection, testing and commissioning of outdoor-type min. IP-54, double-door distribution timer panel board comprising of 01 no. 63 amps FP MCCB as incoming and 03 no. 32 amps ML-2 contactors with bypass arrangement by 03 nos. 6A SP MCB, 06 nos. 32 A SP MCB as outgoing and 03 nos. Astronomical / Digital timer complete with suitable rating copper bus bars, neutral links, cable gland, lugs, nut-bolts and other accessories as per site requirements condition and details given below:

MCCB:

MCCB shall be current-limiting, quick-make/quick-break, trip-free type, conforming to IEC 60947-2, 4-pole with 100% neutral, 35 kA breaking capacity ($I_{cs}=I_{cu}=100\%$), thermal-magnetic adjustable release and inbuilt/CT-based ground fault protection of same make. MCCB shall have phase barriers, spreader links, extended rotary handle with interlock defeat and padlock, trip indication, auxiliary contact, UV/shunt release, and be line-load independent. Panel incomer shall include a 96×96 mm digital Earth Leakage Relay with adjustable setting. The contractor shall submit valid Test Certificates as per IEC 60947-2, issued by the OEM of the MCCB.

MCB: MCB shall be housed in high-grade insulating material with high dielectric, arc, flame and temperature resistance, suitable for isolation and compatible with auxiliary contact, shunt release and trip alarm. MCB shall have 10 kA breaking capacity, 4 kV impulse withstand and an integrated tripping mechanism for simultaneous disconnection of all poles on any phase/neutral fault, conforming to IS/IEC 60898-1 and IS 12640-2 (latest). The contractor shall submit valid Test Certificates as per IEC 60898-1, issued by the Original Equipment Manufacturer (OEM) of the MCB.

Timer:

SN	Description	Digital Timer / Astronomical Digital Timer
1	Protection	IP 20
2	Voltage	230 V, 50/60 Hz
3	Running Reserve	5 years or above
4	Nos. of channels	1
5	Switching capacity:	
a	Ohmic 250 V a.c. $\cos\phi = 1$	16 Amp
b	Inductive 230 V a.c. $\cos\phi = 0.6$	10 Amp
6	Cycle function (pulse time)	Min 1sec, max 1 hr 59 min 59sec
7	Clock precision (typical)	~ 0.1 s/day
8	Shortest switching step	1 sec
9	Operating Temperature	-20 to +55° C

Busbar:

One set of (3-phase + neutral) high-conductivity ETP grade copper bus bars, extensible on either side, supported on non-breakable SMC insulators (Comparative Tracking Index (CTI) $\geq 600V$ as per IS 2824) at regular intervals to withstand fault forces. Busbars shall be color-coded with minimum clearances of 25 mm between phases and 19 mm from phase to neutral. Current carrying capacity shall be 1.25 A/sq.mm and the supplier shall provide a conductivity certificate from reputed manufacturer.

Timer Panel fabrication:

The LT panel shall be fabricated from minimum 2 mm thick CRCA sheet, properly folded and reinforced to ensure strong and rigid structure. All doors and covers shall also be 2 mm thick CRCA and shall be fully gasketed with EPDM/Neoprene to prevent dust, moisture and vermin entry. Heavy-duty hinges made of corrosion-resistant stainless steel shall be provided and the panel shall have minimum IP54 protection. The panel shall be compartmentalized with separate enclosed sections for horizontal bus bars, vertical bus bars, switchgears and cable alleys to ensure operational safety and ease of maintenance. Cable chambers shall be sized for easy termination with top/bottom entry. CRCA sheet steel used in fabrication shall be cleaned and surface-treated through a seven-tank process (alkaline degreasing, descaling in dilute sulphuric acid and phosphating). After treatment, primer paint shall be applied, followed by final oven-baked powder coating of minimum 70-micron thickness. All switchboards and circuits shall be fitted with permanently engraved black-on-white nameplates and

metal labels, clearly indicating the feeder number and designation. Internal separation shall be minimum Form-3B as per IEC 61439. The panel shall be floor-mounted on suitable GI angle (min. 50x50x6 mm or higher, as per panel load-bearing requirement) frame properly grouted on concrete foundation and covered with 14 SWG MS sheet duly painted as per site requirements.

Wiring:

All wiring shall be with 1.5 sq.mm PVC insulated copper multistranded FRLSH wire (IS 694:2010) and 2.5 sq.mm for CT wiring. Wires shall be coded, labelled with approved ferrules at both ends, neatly bunched, clamped and brought out on terminal board for external connections.

Design & Approval:

The LT panel shall be designed, manufactured and type-tested as per latest IEC 61439 (Parts 1 & 2) standards. The contractor shall submit GA drawings for Sr.DEE(G) office approval before fabrication & provide original test reports from CPRI/ERDA or equivalent Govt. testing agencies.

Schedule item no. 4

Supply, laying, running fixing of following sizes of XLPE insulated, PVC sheathed, 1.1 KV grade cables as per IS.

(a) 4 core 50 sq.mm AL conductor, armoured

(b) 4 core 10 sq.mm CU conductor , armoured

The price shall cover cost of supply, loading, transportation and multiple unloading to site, laying, testing and commissioning of LT cable 1.1 KV grade, XLPE insulated, inner & outer PVC sheathed, multi-stranded Aluminium / Cooper conductor armoured cables of above sizes **conforming to IS 7098 Part-1 and specification attached.** Price shall also include supply and erection of lugs, clamps, saddles made of aluminum strips of size 25 x 4 mm etc. for laying and raising of the cable as per site requirements. The termination of mains cable shall be carried out with suitable size glands and lugs wherever required. The no. of saddles to be fixed shall be two in one-meter length of cable. The Armour of the cable shall be properly connected to earth with brass glands for proper earthing. Cable shall be laid underground in cable trench, under and across Railway track, along wall / RCC structures etc. as per site requirement. Where ever cables are running parallel both cables shall be laid in the same trench only through separate trunking in such a way that the cable shall not cross each other throughout the length of the trench. Cable identification tags shall be provided throughout the length at every 25 meter interval. Cables with kinks, straightened kinks, defective armouring, or any visible damage/defects shall not be supplied or laid. The contractor shall submit valid Type Test Reports from NABL/Govt. accredited lab for the offered cable along with Acceptance and Routine Test Certificates as per relevant IS/IEC viz. IS:7098 Part-1, IS:10810, IEC 60332-1, IEC 60228 with latest amendments. The type test report carried out during last five year shall be valid

Schedule item no. 5

Excavation of cable trench in soil & filling the trench with sand, pebbles etc. after laying of the cable complete with RCC warning cover & cable markers, sand etc. as per railways requirement

The price shall include excavation of cable trench of size 900 mm deep x 500 mm wide in normal soil under rail / road. The price shall also include back filling of trench after laying of cable. While crossing rail, care should be taken that track alignment is not disturbed. Rate of cable trench per meter shall be considered pro rata basis where depth of cable trench is less than standard depth of 900 mm. where it cannot be dug exactly due to site condition. While excavation, care shall be taken not to damage any cable or any other Railway structure.

Schedule item no. 6

Excavation of cable trench on CC flooring / Hard / rocky soil & making of trench & recasting of flooring/pit after lying of cable as per railways requirement

The price shall include excavation of cable trench of size 900 mm deep x 500 mm wide in cement concrete flooring under rail / road / hard rocky soil and platforms. The price shall also include back filling of trench with river sand & soil after laying of cable / pipe. In case of laying of cable / pipe on platform, surface of the platform after laying of cable shall be made as original. While crossing rail, care should be taken that track alignment is not disturbed. Rate of pipe / cable trench per meter shall be considered pro rata basis where depth of cable trench is less than standard depth of 900 mm. where it

cannot be dug exactly due to site condition. The excavated trench should be recasted with cement, sand etc. along with tiles as per site requirement and look of surrounding area. While excavation, care shall be taken not to damage any cable or any other Railway structure.

Schedule item no. 7

Supply and laying of GI perforated cable tray of size 150 mm x 50 mm x 2 mm Thick

The price shall cover cost of supply, loading, transportation and unloading to site, laying, running, fixing, testing and commissioning of GI perforated cable tray of size 150 x 50 x 2 mm conforming to IS 1079/IS 513 or relevant IS standard. The cable tray shall be of standard length 2500 mm or as per Railway's site requirement and shall include all necessary connecting and fixing accessories such as coupler plates, fasteners, bolts, nuts, washers, suspension supports, wall brackets, etc., or as per site requirements. Installation shall be carried out as per site layout and instructions of Railway Engineer-in-Charge, ensuring proper alignment, leveling, and secure support throughout the run.

Schedule item no. 8

Supply and laying of DWC pipe of size 4" dia

The price shall cover the cost of supply, loading, transportation, unloading to the site and laying of double walled corrugated (DWC) HDPE pipe of nominal size 4 inch conforming to IS:14930 (Part-II) with latest amendments complete with integrated coupler/socket and jointed with snap-fit couplers and EPDM rubber sealing rings conforming to IS 5382 or latest. The pipe shall be double walled, corrugated externally and smooth internally, manufactured from high density polyethylene material conforming to IS 7328 or latest. The HDPE pipe shall be laying in excavated CC/soil trench or fixed on catwalk with suitable GI clamps/saddles of suitable size, GI not-bolts, washers, etc, ensuring firm support and alignment. Cable entries shall be sealed with elastomeric sealant or fire-retardant compound after cable insertion to prevent ingress of water, dust or vermin. The work shall be carried out in all respects with proper jointing, fixing, accessories and site restoration as directed by the Engineer-in-Charge. Each pipe shall bear permanent marking at one-meter intervals indicating the manufacturer's name, IS:14930 (Part-II), nominal size, batch number and year of manufacture. The contractor shall submit manufacturer's test certificate as per IS:14930 or latest.

Schedule item no. 9

Supply, erection, testing and commissioning of FRP junction box as per Railway's requirement.

The price shall cover the cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of FRP pole junction box of size approx. 230 mm x 200 mm x 100 mm with termination & connection of cable by loop in loop out method. FRP junction box shall be having terminals for the termination of 3 phase cable & neutral and one ISI marked cut out of 15 amps with cable gland, nut bolt and GI clamps for fixing of FRP junction box. The FRP box should have proper panel locking arrangement. At each junction box both incoming and outgoing cable armours should be bonded for better earth continuity.

Schedule item no. 10

Supply, erection, testing and commissioning of LT Distribution Panel Board comprising of 100-125 Amp FP MCCB 36kA Microprocessor based release 02 nos, 160 A FP MCCB buscoupler 1 no., RCBO 4 Pole, 32 Amp 415V 50Hz 10kA Sensitivity -300 mA - 4 nos, RCBO 4Pole 63 Amp 415V 50Hz 10kA Sensitivities- 300 mA - 6 nos. as outgoing complete with busbars, neutral link, etc. as per site requirement

The price shall cover the cost of Supply, transportation, multiple loading/unloading, storage, erection, testing and commissioning of outdoor-type min. IP-54, three-phase, double-door LT distribution panel board comprising of 2 no. 125 Amps FP MCCB as incoming with 1 no. 150/160 Amp automatic transfer switch (with auto, manual and bypass arrangements as per Railway requirement) and 6 nos. 63 Amp FP RCBO, 4 nos. 32-40 Amp FP RCBO, with 30/100/300mA sensitivity (as per requirement) as outgoing, busbars, LED type indication lamp for outgoing and incoming supply, digital multifunction meter, separate cable alley chamber for termination by cable gland, lugs, nut-bolts, washers, etc. as per site condition and details given below:

MCCB: MCCB shall be microprocessor-based, current-limiting type with quick-make, quick-break and trip-free mechanism, conforming to IEC 60947-2. The MCCB shall be 4-pole with 100% neutral, line-load independent and provided with phase barriers, both-side spreader links and extended rotary handle with door-interlock defeat and padlocking facility. The breaking capacity of MCCB shall be 35 KA with $I_{cs}=I_{cu}=100\%$. The microprocessor release shall provide fully adjustable protection settings including Long-time (L), Short-time (S), Instantaneous (I) and Ground-fault (G) protection (LSIG), with selectable tripping characteristics. The release shall include inbuilt, adjustable protection against overload and short-circuit faults. MCCB shall have trip indication and be equipped with auxiliary contacts, shunt-trip / under-voltage release, and event indication features. For incomer applications, the MCCB shall be provided with 96×96 mm digital Earth Leakage Relay (ELR) having adjustable leakage-current settings to ensure comprehensive earth-fault protection. The system shall allow smooth and compatible integration of the ELR and MCCB to ensure proper selectivity and coordinated protection for overload, short-circuit, instantaneous and earth-leakage faults. The contractor shall submit valid Test Certificates as per IEC 60947-2, issued by the OEM of the MCCB

RCBO: The RCBO shall comply with IS 12640-2 / IEC 61009-1 and have 10 kA breaking capacity with sensitivity of 30/100/300 mA (as per Railway requirement). RCBO shall be non-line-load-biased, have minimum electrical life of 10,000 operations and provide separate indication for short-circuit and earth-leakage faults. The RCBO shall trip on AC leakage current including pulsating DC, transients and harmonics, and be rated for pollution degree 3, 6 kV impulse withstand and IP20 protection. It shall operate between -5°C to $+60^{\circ}\text{C}$, include a safety shutter and test button and have bi-connect terminals suitable up to 35 sq.mm (rigid) / 25 sq.mm (flexible) for ratings up to 63 A. Provision for padlock, auxiliary contacts, trip alarm, UV/OV release and shunt release shall be provided. DIN-rail mounting shall be possible from both sides. OEM test certificates as per IS/IEC standards shall be submitted.

Busbar: The panel shall be provided with high-conductivity ETP-grade copper busbars (3-phase + neutral), extendable on either side. Busbars shall be mounted on strong, non-hygroscopic SMC insulators with CTI ≥ 600 V (IS 2824) to withstand fault stresses. They shall be colour-coded with minimum clearances of 25 mm between phases and 19 mm to neutral/earth. Busbar sizing shall be based on 1.25 A per sq.mm current-carrying capacity. A conductivity certificate from the original busbar manufacturer shall be submitted.

Panel fabrication:

The LT panel shall be fabricated from minimum 2 mm thick CRCA sheet, properly folded and reinforced to ensure strong and rigid structure. All doors and covers shall also be 2 mm thick CRCA and shall be fully gasketed with EPDM/Neoprene to prevent dust, moisture and vermin entry. Heavy-duty hinges made of corrosion-resistant stainless steel shall be provided and the panel shall have minimum IP54 protection. The panel shall be compartmentalized with separate enclosed sections for horizontal bus bars, vertical bus bars, switchgears and cable alleys to ensure operational safety and ease of maintenance. Cable chambers shall be sized for easy termination with top/bottom entry. CRCA sheet steel used in fabrication shall be cleaned and surface-treated through a seven-tank process (alkaline degreasing, descaling in dilute sulphuric acid and phosphating). After treatment, primer paint shall be applied, followed by final oven-baked powder coating of minimum 70-micron thickness. All switchboards and circuits shall be fitted with permanently engraved black-on-white nameplates and metal labels, clearly indicating the feeder number and designation. Internal separation shall be minimum Form-3B as per IEC 61439. The panel shall be floor-mounted on suitable GI angle (min. 50x50x6 mm or higher, as per panel load-bearing requirement) frame properly grouted on concrete foundation and covered with 14 SWG MS sheet duly painted as per site requirements.

Multifunction Energy meter:

Multifunction Energy meter should be min Class 1.0 Accuracy & should be with RS485 Modbus protocol. Min parameter requirement for MFM should be V, A, F, PF, kW, kVA, kVAR, kWh, kVAh, kVARh, Runhours, On hours, Phase angle, Interrupts, THD, Events (High-Low), Neutral Current.

Wiring: All wiring for relays and meters shall be with 1.5 sq.mm PVC insulated copper multistranded FRLSH wire conforming to IS 694 2010 and 2.5 sq.mm should be used for CT wiring. The wiring shall be coded and labelled with approved ferrules for identification. Runs of wires shall be neatly bunched and suitably supported and clamped. Means shall be provided for easy identification of wires. Identification ferrules shall use at both end of wires. All control wires meant for external connections are to be brought out on a terminal board.

Communication wiring:

Separate communication wiring shall be provided for all feeders, switchgear and meters for ON/OFF/Trip status feedback and monitoring purpose. The wiring shall be terminated in separate marshalling box with proper identification. Communication cable shall be low impedance, twisted pair, shielded type of Belden/Lapp or equivalent.

Earthing –

One earthing terminal shall be provided on each side of panel board. An earth bar size must be at least 6 x 50 mm Aluminium/ GI strip. The earth bar shall be electrically continuous and shall run the full extent of panel board. Door earthing shall be provided for all doors.

Design & Approval:

The LT panel shall be designed and manufactured as per the latest IEC 61439 standards. The contractor shall submit GAD to Sr.DEE(G) for approval before fabrication. Valid type test reports (not older than five years) from a NABL/Government-accredited laboratory, along with Acceptance and Routine Test Certificates as per relevant IS/IEC standards, shall be submitted for the offered panel.

Schedule item no. 11

Design, manufacture, display, installation of wall / hanging / floor mounting type LED illuminated sign / direction boards in elliptical/half elliptical /semi elliptical etc. shape. The display sheet shall be of unbreakable 040 translucent polycarbonate sheet of 2 mm thickness. The text / graphics matter visibility shall not be less than 160 deg. The approved colour text and graphics shall be printed / router cut on monomeric calendared vinyl of 70 µM thickness and shall be firmly pasted on display sheets. The mounting arrangement shall be hanging, wall mounting, ceiling mounting, pole mounting or floor mounting and as per site requirement. The signage shall have the integral mounting arrangements with sturdy structural frame and ACP cladding on the back side of the signage to avoid rusting and entry of dust. The LED board shall have uniform illumination with 6-8 W/sq.ft and with brightness more than ambient light. Suitable size end cap of 1.5 mm thick SS 304 should be provided.

The price shall cover cost of survey the stations / sites and design, manufacture, supply, loading, transportation and unloading to site, display, installation / erection, testing and commissioning of wall / hanging / floor mounting type LED illuminated sign / direction boards in Full Elliptical (FE), Half Elliptical (HE), Semi Elliptical (SE), parabolic / Triangular shape as per site requirements. The display sheet shall be of unbreakable 040 translucent polycarbonate sheet of 2 mm thickness. The text / graphics matter visibility shall not be less than 160 deg. The approved colour text and graphics shall be printed / router cut on monomeric calendared vinyl of 70-80 µM thickness and shall be firmly pasted on display sheets. The mounting arrangement shall be hanging, wall mounting, ceiling mounting, pole mounting or floor mounting and as per site requirement. The signage shall have the integral mounting arrangements with sturdy structural frame and ACP cladding on the back side of the signage to avoid rusting and entry of dust. The LED board shall have uniform illumination with 6-8 W/square feet and with brightness more than ambient light. Suitable size end cap of 1.5 mm thick SS 304 / die moulded polycarbonate should be provided. The signage boards shall be confirming to as per technical details enclosed and shall be confirming to “Guidelines on Standard Signages at Stations on Indian Railways, 2023”

Guidelines on Standard Signages at Stations on Indian Railways, 2023, has uploaded at IREPS Portal). Please refer to this uploaded document.

Survey and design of schemes for Signages Boards:

1. The contractor or his authorized agency should have experience in carried out such type of work i.e. survey and design, manufacture, installation of LED illuminated sign / direction boards in elliptical / parabolic shape and having required infrastructure to carry out the work and testing facilities with documentary proof.
2. The tenderer shall survey station, platform, site, etc. and design the schemes for wall / hanging / floor mounting type LED illuminated sign / direction boards / Signage for Services, Utilities, Caution, Direction and other importance, in half elliptical shape for the station buildings, as per proposed items/ accessories mentioned in the schedule. The firm shall submit Design, drawing, model, graphics and colour scheme reports for each station / location / site in soft copy presentation hard copy and shall be got approved by Sr. DEE (G) CSMT before supply. Any modification, suggestion for

improvement in the scheme shall be done by the firm and shall be submitted for approval by the Railway's Competent Authority.

3. The price shall cover cost of design, manufacture, supply, loading, transportation and unloading to site, display, installation / erection, testing and commissioning of wall / hanging / floor mounting type LED illuminated sign / direction boards in Full Elliptical (FE), Half Elliptical (HE), Semi Elliptical (SE), parabolic shape as per site requirements.
4. The work which is not included in the schedule but required to complete the installation work shall be considered as the part of work and carried out by the contractor accordingly and no extra payment will be paid for that.
5. Agency shall submit the design report through professional design expert for appreciation.
6. It is recommended that the manufacturer of glow sign boards/ signage should have his own resources, including but not limited to skilled manpower, machinery (Thermoforming, Die Molding, Injection molding, extrusion capability) and materials to carry out the work in a timely and efficient manner. Failure to meet the specified timelines may result in penalties.
7. The bidder firm must mandatorily involve the design manufacturer of glow sign boards / signage in the entire process of design and development of glow sign boards / signage, site survey, signage customization, maintaining installation standards and procedures, and quality control.
8. LED Elliptical Glow Sign Boards are to be provided dust environment and open space and should have proper louvers or ventilation for dissipation of heat generated by drivers / LED's.
9. The quality of the Vinyl / Polycarbonate sheet / anodized coating should be covered under three years warranty from the manufacturer. LED's/LED drivers shall be covered for free replacement five years warranty from the manufacturer.
10. Guarantee certificates & Test Certificate of LED/LED drivers / Vinyl sheet / Polycarbonate sheet from reputed approved brand shall be required to be submitted along with supply of materials.
11. The bidder must provide a detailed design / pattern, drawings and schemes for the glow sign boards/ signage, which shall be similar to signage work done at Chhatrapati Shivaji Maharaj Terminus (CSMT) Mumbai of Central Railway or as desired by the Railway Authority.

Schedule item no. 12

Supply, erection, testing and commissioning of maintenance free earthing

The price shall cover the cost of supply, erection, testing and commissioning of maintenance free earthing system complete with all accessories as per RDSO Spec No. RDSO/SPN/197 Version 1.0 dated 04.07.2016 with latest revisions also conforming to latest IS: 3043/IE rules, complete with Earth electrode, Earth enhancement material, backfill material, copper earth busbar, construction of earth pit with cover & inspection chamber, marking, other associated accessories, all tests and inspection as mention below:

1. **Earth electrode** is made up of high-tensile, low-carbon steel circular rod with copper molecularly bonded on the outer surface, conforming to UL 467, IEC 62561 or latest standards. The electrode shall be UL-listed. Certificates from NABL approved labs shall be submitted with test results.
The earth electrode shall have minimum diameter of 17.0 mm and minimum length of 3.0 meter. In rocky locations, three electrodes, each of 1.0 m length and 17.0 mm diameter, shall be installed in grid formation to ensure effective earthing.
The copper bonding on the electrode shall have minimum thickness of 250 microns using 99.9% electrolytic-grade copper. Each earth electrode shall be permanently marked as per UL 467 with UL marking, manufacturer's name or trade mark, length, diameter and catalogue number punched on it. Earth electrode can be visually inspected, checked for dimensions and thickness of copper coating using micron gauge. The supplier shall arrange for such inspection at the time of supply, if so desired
2. **Copper bus** bar of size 200 mm x 25 mm x 6 mm having electrical conductivity of 101% IACS, minimum 99.9% copper content shall be exothermically welded to rod with 4 hole (2 on each side) for connecting earthing conductor. The contractor shall submit the manufacturer's test certificates confirming copper purity and electrical conductivity. Exothermic weld material shall be tested as per provisions of IEEE 837 by NABL/ILAC member labs.
3. **Earth pit** - A hole of 100 mm to 125mm dia shall be augured /dug to a depth of about 3.0 meters. The earth electrode shall be placed into this hole.

4. **Earth enhancement material** (minimum approx. 30-35 kg) shall be filled into the augured/dug hole in slurry form and allowed to set. After the material gets set, the diameter of the composite structure (earth electrode + earth enhancement material) shall be of min. 100mm dia covering entire length of the hole.
Marking: The Earth enhancement material shall be supplied in sealed, moisture proof bags. These bags shall be marked with Manufacturer's name or trade name, quantity etc. Earth Enhancement compound should have characteristics as mentioned in the RDSO specs., should have low resistivity preferably below 0.2 Ohm-meters. NABL-approved test certificate for material composition shall be submitted.
5. **Backfill material:** The excavated soil is suitable as a backfill but should be sieved to remove any large stones and placed around the electrode taking care to ensure that it is well compacted. Material like sand, salt, coke breeze, cinders and ash shall not be used because of its acidic and corrosive nature.
6. **Inspection chamber:** (i) Inspection chamber should be as per IEC 62561-5 or latest.
(ii) The dimension of the chamber will be of 300 x 300 x 300 mm (inside dimension) of RCC with 50mm thick and fine finish. The masonry work shall be white washed inside and outside
(iii) A black painted RCC cover, min. 50 mm thick with two pulling hooks of sufficient strength shall be provided to cover the earth pit. The pulling hooks shall be flush with the concrete lid and shall not project out. PVC sleeve shall be provided in concrete wall to take out earthing connections. The top edge of the earthing chamber shall be made flush with the platform surface / ground level / circulating area.
(iv) The marking space should be present on an RCC cover. The date of testing and earth resistance value shall be written on the cover with black base with yellow paint.
8. A High-conductivity (101% IACS) with minimum 99.9% purity copper main bus-bar of size 300 mm x 25 mm x 6 mm copper bus bar shall be provided on nearby wall/structure as an equipotential bus and connected to electrical instruments / installations as per site requirement. The earth electrode shall be connected to the main bus bar with 2 nos. 25 mm x 3 mm copper strip laid in separate trenches of 300 mm width and 600 mm depth up to distance of 5 meter from earth bus-bar (minimum 3 meter x 2 nos. copper strips to be supplied). Each strip shall be continuous without joints; where unavoidable, only one joint per strip shall be permitted, made by exothermic welding with minimum 10 mm overlap.
9. **Earth resistance** shall be measured after installation using the fall-of-potential method in accordance with IS:3043 (latest) and shall comply with IS/RDSO/IE rule earthing norms. Testing shall be carried out in the presence of the Railway representative and the results shall be duly recorded. The date of testing and earth resistance value shall be clearly marked on the inspection chamber cover, and all earth pits shall be properly numbered for identification.
10. General arrangement of the earth system shall be as per drawing attached.
11. The Contractor shall made surrounding portion of earth pit same as previous. All debris, broken masonry, packing materials, etc. to be removed from site and site to be cleaned as per instruction of Rly Engineer.
12. The contractor shall be responsible for complete supply, installation & commissioning of the earthing& bonding system. The warranty of such system shall be 60 months from date of commissioning. During this period, any failure of earthing system due to improper materials & bad workmanship shall be attended free of cost by the Contractor.

Schedule item no. 13

Supply, erection, testing and commissioning of GI strip of 25 mm x 3 mm

The price shall cover cost of supply of material, laying and fixing of 25 mm × 5 mm hot-dip galvanized mild steel strip for earth continuity connection, conforming to IS 2062. The strip shall be hot-dip galvanized as per IS 4759 / IS 2629 with minimum zinc coating of 70 microns. The strip shall be laid in ground or fixed on surface and securely connected to earth electrodes, panels and equipment using suitable GI clamps/bolts, nuts and washers as per site requirement. All cut ends, welded portions and joints shall be protected with zinc-rich paint. Earthing installation and testing shall be carried out as per IS 3043 (latest revision) and as directed by the Engineer-in-Charge.

Note: -

1. During the course of execution of above work electrical fitting, fixtures, wirings etc. needs to be removed and dismantled, shall be done by the contractor and released material shall be transported to store / scrap depot by the contractor for that no extra payment will be done. Any temporary bypass arrangement for continuity of supply if required shall also be done by the contractor under guidance of consignee.

2. The required tools, tackles, ropes, insulated ladders required for work will have to be arranged by contractor and transported and shifted by him at his own cost.
3. The Contractor's staff shall in no circumstances carry any dangerous / inflammable material or explosive in the Railway premises.
4. The work has to be carried out in Railway premises, so every precaution and safety rules shall be taken & followed by firm / contractor to protect their labours, Railway employees, passengers, materials, structures etc.
5. While carrying out the work, all railway installations & assets will be protected by the contractor from being spoiled and damaged.
6. Any damage to the installation/assets provided on the platforms if taken place due to the negligence or carelessness of contractor's staff the cost of repair of the same will be borne by the contractor.
7. All safety measures to be adopted during executing the work.
8. Safety of the staff: Safety of the contractor's men engaged in the work will solemnly be the responsibility of the contractor and therefore careful supervision is required during the work to guard and warn his men against unusual incident / electrical shock / moving trains / live OHE lines.

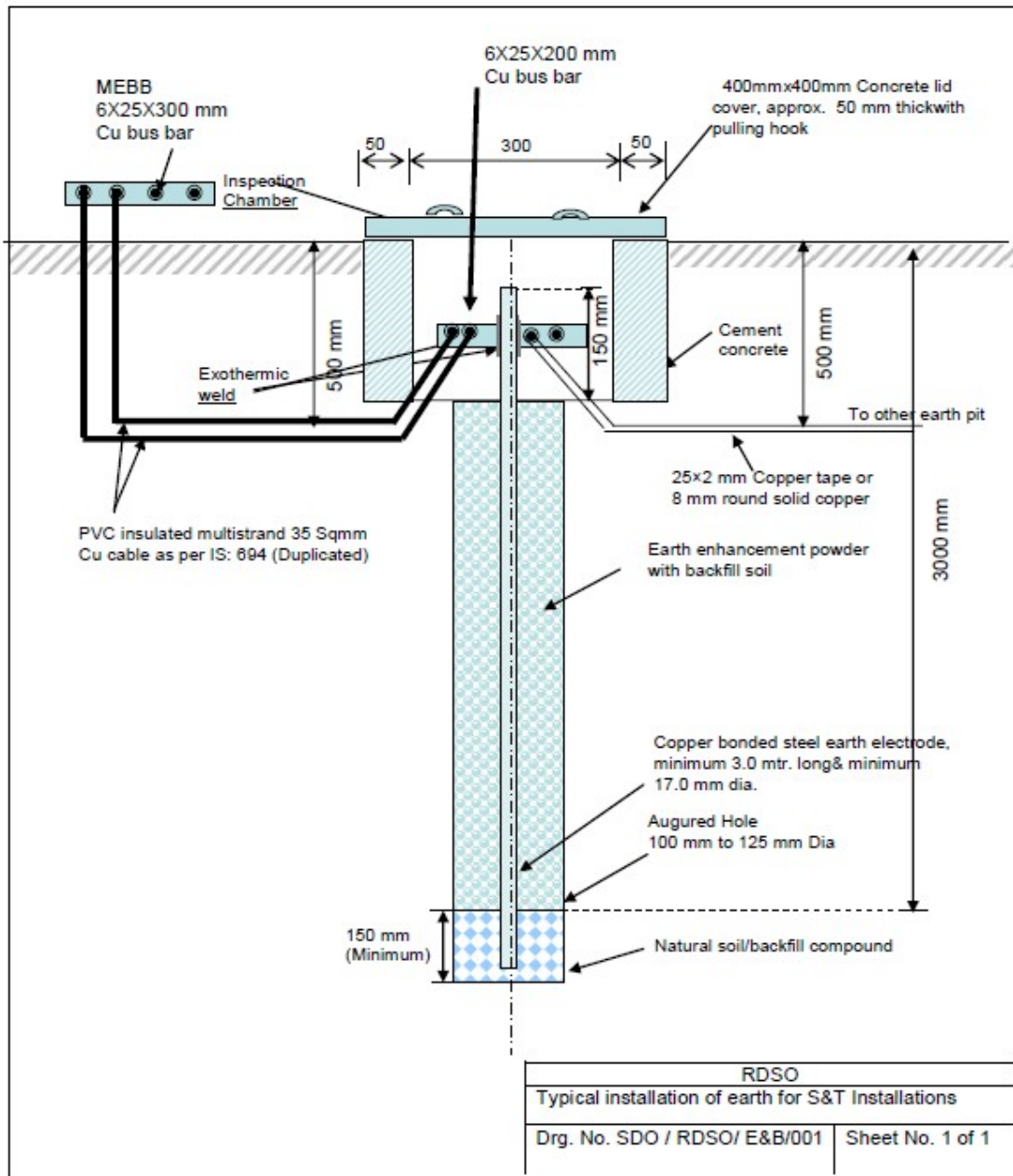
CHAPTER-V

TECHNICAL SPECIFICATION

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DRAWING

General Arrangements of Maintenance Free Earthing



SPECIFICATION OF LED LUMINAIRES

SN	Description	Specification
1.0	LEDs	
1.1	Make	Nichia, Osram, Seoul, Philips Lumileds, Cree and Lednium with LM 80 Certification.
1.2	Efficacy	> 100 Lumens/Watt (upto 45 Watt) @ 350mA drive current > 120 Lumens/Watt (above 45 Watt) @ 350mA drive current LEDs of higher power ratings, drive current greater than 350mA.
1.3	Type	High power LED, SMD (Surface Mounting Device)
1.4	Mounting	MCPCB / Ceramic PCB should be used for mounting of LEDs
1.5	Life Span	>50,000 hours (TM-21 extrapolation of the LED manufacturer shall be submitted in support of the lifespan) Depreciation- Maximum 30% after 50,000 burning hours
1.6	Color Temp. (CCT)	5700-6500 K (As per ANSI standard C78.377A) This shall be verified from the LED's datasheet.
1.7	View Angle	120° standard, (customizable optics for 30°, 60°, or asymmetric patterns as per requirement of Railway)
1.8	CRI	≥70 for outdoor light ≥80 for indoor light Manufacturer shall submit data sheet in support
1.9	LED Chip Test Reports	LM 80 / IS:16105 report with TM21 extrapolation in support of the L70 reported life in respect of the LED used in the offered luminaire. Photobiological Safety: Photobiological Safety norms as per IEC 62471/ EN 62471/ IS: 16108. Test certificate of accredited International/ National Laboratory shall be submitted.
2.0	Driver	
2.1	Driver component	Industrial Grade only
2.2	Driver type & Potting	Constant Current driver with Short Circuits protection Potted driver
2.3	Minimum Efficiency	Min. 85% (for driver power output rating ≤ 100W) Min. 90% (for driver power output rating > 100W)
2.4	Power factor	≥ 0.90
2.5	Input Voltage	140V – 277V AC with in-built high and low voltage cut-offs: 140V (Low) and 277V (High)
2.6	Surge Protection	≥ 4kV, The Surge Protection Device (SPD) should fail safe (i.e. without leading to fire hazard) and its failed status should be clearly visible through a flag / indication.
2.7	Protection	Over-voltage, Under-voltage, Over-temperature, Short Circuits protection, Open load protection.
2.8	THD	≤ 10%
2.9	Isolation	Isolated driver should be used to separate the input (AC mains) from the output (connected to LEDs).
2.10	PCB	PCB shall be FR4 grade min. thickness of 0.8-1.0 mm or more to be fixed with high thermal conductive paste.
2.11	Temp.	≤ 85°C
2.12	Driver Test Reports	The contractor shall submit test reports from NABL accredited lab for confirmation of above parameters of Driver and as mention below: (i) Driver Performance: IEC 62384 / IS 16104 or latest (ii) Driver Safety: IEC 61347-2-13 / IS 15885-2-13 or latest (iii) EMI/EMC Compliance: CISPR 15 / IEC 61547 or latest (iv) Surge Protection & THD compliance

3.0	Luminaries	
3.1	System Efficacy	Min. 80 lm/W (luminaire system wattage ≤ 45) Min. 90 lm/W (luminaire system wattage > 45)
3.2	Secondary lens / optics	The luminaire must have secondary lens/optics. The material of lens should preferably be PMMA (Poly Methyl Methacrylate)
3.3	Housing Material	<p>For Indoor fittings - Housing shall be made of Pressure die-cast aluminium / CRCA powder coated or anodized) / Extruded aluminium (LM6/ADC12/LM24)</p> <p>For Outdoor fittings - Housing shall be made of High Pressure Aluminium die-cast/ Extruded Aluminium (LM6/ADC12/LM24), corrosion resistant polyester powder coating. The housing should have two separate compartment (i) optical and (ii) control gear compartment. The housing shall be high conductivity with integral heat sink and heat proof silicon rubber gasket.</p>
3.4	Front Cover	Distortion free, clear, heat resistance Toughened glass or UV stabilized polycarbonate cover.
3.5	IP	For Indoor fitting IP-20 or more & Outdoor fitting IP65 or more
3.6	IK	\geq IK05
3.7	Heat Sink	Heat sink designed to maintain junction temperature $< 85^{\circ}\text{C}$ Material: Aluminum with anodized finish
3.8	Luminaire Test Reports	<p>The contractor shall submit test reports for confirmation of above parameters of fittings and as mention below:</p> <p>(i) LM 79 report for System Efficacy, Safety, IP & IK protection etc. from NABL Accredited LAB (IS: 16106, IEC 60598-1, IEC 60598-2-3 / IS: 10322 or latest)</p> <p>(ii) BIS Certificates for Luminaires and Drivers separately.</p> <p>(iii) Test to ensure junction temperature (T_j) remains $< 85^{\circ}\text{C}$.</p> <p>(iv) Polar Curve, Beam Distribution</p> <p>(v) Certification for die-cast aluminum (LM6/ADC12/L24) as per IS 1030 or latest and UV stability.</p>
3.9	Mounting	<p>Suspension or recess/surface mounting for indoor fittings</p> <p>Suitable for pole / universal with dedicated mounting kit/bracket mounting of adjustable type for outdoor fittings</p>
3.10	Manufacturer's Name	<p>Manufacturer's name / Brand name / Logo & Major technical details shall be available on each fitting.</p> <p>Each fitting shall have a distinct marking so as to facilitate the traceability till the end of life (Stickering is not acceptable).</p> <p>Outdoor luminaire shall have name of the manufacturer embossed on the luminaire.</p>
4.0	Warranty	<p>The supplier shall warranty satisfactory performance and manufacturing defects of LED light fittings for a period of 60 month from the date of commissioning or 72 months from the date of supply whichever is earlier.</p> <p>Firm shall submit warranty (for free replacement) certificate along with supply.</p>

Note:

- (1) All the test reports/certificates should cover / rating of the offered luminaries.
- (2) LED fittings such as decorative wall fittings, Heritage fittings, reading light / night light / foot light / spot light fittings, bulbs/ lamps, garden / Par lights / wall washer / customized fittings etc. will not require compliance of these specifications and warrantee period of such fittings shall be two year only, unless otherwise specified. Confirmation of parameters like type of LED Luminaire / LED lamp make, design, wattage, Efficacy (Lumen / Watt) etc. by the consignee.
- (3) **If any specific requirement is mentioned in the explanatory note then the same shall supersede the above and in such a case the detail in the explanatory note shall be followed.**

**TECHNICAL SPECIFICATION FOR BLDC CEILING FAN, INPUT VOLTAGE SINGLE
PHASE 230 VOLT AC 50 HZ FOR GENERAL SERVICES APPLICATIONS.
(Specification no. PCEE/CR/BLDC CEILING FAN/1200 & 1400 MM Rev.0)**

1.0 SCOPE:

This Specification defines the requirement of Design, Manufacture, Supply, Testing & inspection of Ceiling Fan & Electronic fan Regulator for various applications at Platforms. Service buildings & Railway Quarters for General services over Central Railway. This specification supersedes earlier CR specification no. PCEE/CR/2019/1400 MM BLDC FAN dtd 10.01.2019 & Rev 1 dtd 05.02.2019.

2.0 Reference Standards:

The following documents given below are for reference to the manufacturer for design, manufacture, performance, safety, environmental & other type test requirements. In the event of conflict between the documents referenced herein and the contents of this specification, the contents of this specification shall prevail.

IS/IEC:

SN	Specification no.	Description
1	IS:374- 2019 Fourth revision with latest amendment	Electric Ceiling Fan
2	IS: 302.2.80-2017	Safety Requirements
3	IS: 12360-1988, Reaffirmed 2020	Rated Voltage
4	IS: 648-2006, IS: 649-1997, IS: 3024-2006	Stampings
5	IS: 1271-1985	Insulating Materials
6	IS: 1248-2003	Routine & Acceptance Tests
7	IS: 4905-1968	Scale of Sampling
8	IS: 11037-2019	Electronic Fan Regulator
9	IS:737-2008	Fan Blade
10	IS: 13730-1993	Copper winding wire
11	IS:13778-2011	Test Method of Copper winding wire

3.0 SCOPE FOR SUPPLY OF ITEMS:

- a. Supply of 1400 mm Sweep Ceiling Fan BEE 05 star with ISI Marked confirming to IS: 374/2019 Fourth revision with latest amendment.
- b. Supply of 1200 mm Sweep Ceiling Fan BEE 05 star with ISI Marked confirming to IS: 374/2019 Fourth revision with latest amendment.
- c. **Fan regulator:** ISI marked electronic fan regulator in four/five steps or Stepless upto 100 watt.

4.0 GENERAL TECHNICAL REQUIREMENTS:-

- 4.1 The fan regulator shall be electronic type and should be able to with stand long periods of overload without getting damaged.
- 4.2 The ceiling fans 1200mm & 1400mm sweep shall be BEE 05 star with ISI Marked.
- 4.3 The tolerance limit in technical parameters if not given shall be as per reference of Indian Standard.
- 4.4 The Public Procurement (Preference to make in India), 'Order-2017' shall be applicable for procurement.

5.0 Supply ceiling Fan 'ISI' marked and latest highest BEE star ratings confirming to IS: 374/2019 Fourth revision with latest amendment.

5.1 1400 mm Sweep ceiling fan

SN	Item	Description
1	Type of motor	Brushless DC
2	Sweep size in mm	1400 mm
3	BEE star rating	5 star
4	Min. air delivery (Cubic m/min)	250
5	Service value (air delivery cum/min/watt)	Not less than 7.5
6	Power factor	Not less than 0.90
7	Power consumption	Not more than 35 watts.
8	Safety wire set	1.6 mm strand wire, 2 U clamp, 1 L clamp.
9	Rated voltage & frequency	230 V Single phase AC, 50 Hz
10	Working Voltage	140-285 V
11	Standard color	Ivory/ white or based on site requirement
12	Regulator	Fixed speed
13	No. of blades	03
14	Blade thickness	Minimum 1.1 mm
15	Blade material	Aluminum
16	Winding material	Enameled copper
17	Bearing	Double ball bearing
18	Length of down rod without shackle	300 mm or greater
19	Shank	Thickness: 1.6 mm (Minimum) Material: CRC (cold Rolled Coiled) sheet
20	shackle	Thickness: 2.0 mm (Minimum) Material: CRC (cold Rolled Coiled) sheet
21	Total harmonic distortion(THD)	Less than 15%
22	Canopy	02 nos.
23	ISI mark	IS:374:2019 Fourth revision with latest amendment
25	Noise level	Less than or equal 55 dB at 1 mtr below fan.
26	Surge protection capacity	2 KV
27	Warranty	The fan shall be with warranty of 05 years.

5.2 1200 mm Sweep ceiling fan:

SN	Item	Description
1	Type of motor	Brushless DC
2	Sweep size in mm	1200 mm
3	BEE star rating	5 star
4	Min. air delivery (Cubic m/min)	230
5	Service value (air delivery cum/min/watt).	Not less than 7.5
6	Power factor	Not less than 0.90
7	Power consumption	Not more than 35 watts.
8	Safety wire set	1.6 mm strand wire, 2 U clamp, 1 L clamp.
9	Rated voltage & frequency	230 V Single phase AC, 50 Hz
10	Working Voltage	140-285 V
11	Standard color	Ivory/ white or based on site requirement
12	Regulator	With Regulator/Remote (speed level 5 (6) speed is possible with boost mode)
13	No. of blades	03
14	Blade thickness	Minimum 1.1 mm
15	Blade material	Aluminum
16	Winding material	Enameled copper
17	Bearing	Double ball bearing
18	Length of down rod without shackle	300 mm or greater
19	Shank	Thickness: 1.6 mm (Minimum) Material: CRC (cold Rolled Coiled) sheet
20	Shackle	Thickness: 2.0 mm (Minimum) Material: CRC (cold Rolled Coiled) sheet
21	Total harmonic distortion (THD)	Less than 15%
22	Canopy	02 nos.
23	ISI mark	IS:374:2019 Fourth revision with latest amendment
25	Noise level	Less than or equal 55 dB at 1 mtr below fan.
26	Surge protection capacity	2 KV
27	Warranty	The fan shall be with warranty of 05 years.

Note: Sr.DEE/G will decide the requirement of "Remote BLDC fans". Preferably BLDC fans with regulator will be procured

5.3 'ISI' marked Electronic Fan Regulator in Four/Five steps or Stepless upto 100 watt.

SN	Item	Description
5.3.1	Fan regulator upto 100 watt	ISI marked Electronic Fan Regulator as per IS: 11037-2019.
5.3.2	Types & make of Fan Regulator	Make: Anchor, SSK, Philips, CONA, Havells, Legrand, Crabtree, & Schneider or similar. The Fan Regulator shall be Switch/Socket Type low inductive cell of metalized polyester film coated with flame retardant grade epoxy powder. The regulator shall be suitable for surface/concealed mounting complete with knob & screws.
5.3.3	Input Voltage	Single Phase 230 volt AC, 50Hz
5.3.4	Material Grade	Poly Carbonate
5.3.5	Life Test Conditions	a) Endurance Test: Loaded at 1.1 times of rated voltage at 70 deg. C for 500 hours b) Switching Test, >20,000 cycles of 4 step/5step switch type fan regulator c) Lot to Lot testing: loaded at 450 volt AC at ambient temperature for 2 hours
5.3.6	Noise level	No appreciable noise/disturbance on radio/television when operated outside a radius of 2 mtr. From the regulator

6.0 Warranty: The fan shall be with warranty of 05 years.

7.0 Identification:

Each fan shall be indelibly marked firm name, month & year of manufacture, warranty period, serial number, rated voltage, wattage, size of fan & type of fan on ceiling fan.

8.0 Inspection:

The Inspection by M/s. RITES or TPI at manufacturers works, facility for carrying out acceptance tests as per IS/IEC specification shall be made available by the manufacturer to inspecting authority at manufactures cost.

9.0 TESTS:

The ceiling fan shall be tested with the applicable IS/IEC reference standards given in Para 2.0 of this specification.

TYPES OF TESTS:

9.1.1 Types Tests:

Inspecting Agency M/s RITES or third party will verify the documents available with the firm for type tests mentioned in Para 9.1.4 carried out from Govt. Laboratory/National/International Accredited Laboratory to ensure the confirmation with the requirement of specification. However, only BIS-approved laboratories are permitted.

9.1.2 Acceptance tests:

These tests shall be carried out by an Inspecting Agency at the manufacturer works on sample taken from a lot for the purpose of acceptance of material.

9.1.3 Routine Tests:

These tests shall be performed by the manufacturer on each item and the records shall be shown to the inspecting Agency during the inspection of lot offered for acceptance tests.

9.1.4 TESTS SCHEME

9.1.4(a) For Fan

SN	Description of test	Reference Para of the IS specification	Type Test	Acceptance test	Routine test
1	Safety requirements	Clause 9 (IS: 374:2019)	Y	-	-
2	Performance requirements	Clause 15 (IS: 374:2019)	Y	-	-
3	Speed and power factor	Clause 14.4 & 14.5 (IS: 374:2019)	Y	Y	-
4	Speed regulators	Clause 10 (IS: 374:2019)	Y	Y	-
5	Starting	Clause 11 (IS: 374:2019)	Y	Y	-
6	Interchangeability	Clause 12 (IS: 374:2019)	Y	-	-
7	Silent operation	Clause 13 IS: 374:2019)	Y	-	-
8	Power input	10 of IS: 302 (part 2/sec 80) (IS: 374:2019)	Y	Y	-
9	Test for harmonic distortion	Clause 17 (IS: 374:2019)	Y	-	-
10	Endurance test	Clause 16 (IS: 374:2019)	Y	-	-
11	Leakage current at operating temperature	13 of IS 302 (part 2/sec 80)	-	Y	-
12	Earthing connection	27 of IS 302 (part 2/sec 80)	-	Y	-
13	Earth continuity test	A-1 of IS 302-1	-	-	Y
14	Electric strength test	A-2 of IS 302-1	-	-	Y
15	Functional test	A-3 of IS 302-1	-	-	Y
16	Simple running test (checking fan is operating or not)	--	-	-	Y

9.1.4 (b) For Regulator

SN	Description of test	Reference Para of the IS specification	Type Test	Acceptance test	Routine test
1	Temperature-rise	Clause 9.5.1 (IS: 11037-2019)	Y	-	-
2	Leakage current	Clause 9.5.2 (IS: 11037-2019)	Y	Y	-
3	High voltage	Clause 9.5.3 (IS: 11037-2019)	Y	Y	-
4	Insulation resistance	Clause 9.5.4 (IS: 11037-2019)	Y	Y	-
5	Earthing connection	Clause 9.5.5 (IS: 11037-2019)	Y	Y	Y
6	Protection against electric shock	Clause 9.5.6 (IS: 11037-2019)	Y	Y	-
7	Voltage drop	Clause 7.7 (IS: 11037-2019)	Y	-	-
8	Performance	Clause 8 (IS: 11037-2019)	Y	Y	-
9	Moisture resistance	Clause 9.5.7 (IS: 11037-2019)	Y	Y	-
10	Mechanical Strength	Clause 9.5.8 (IS: 11037-2019)	Y	-	-
11	Creepage distances and clearances	Clause 9.5.9 (IS: 11037-2019)	Y	--	-
12	Electrical endurance test	Clause 9.5.10 (IS: 11037-2019)	Y	Y	-
13	Environmental tests	Clause 9.5.11 (IS: 11037-2019)	Y	-	-
14	Resistance to abnormal heat and to fire	Clause 9.5.12 (IS: 11037-2019)	Y	-	-
15	Resistance to rusting	Clause 9.5.13 (IS: 11037-2019)	Y	-	-
16	Checking of dimensions	Clause 9.5.14 (IS: 11037-2019)	Y	-	-
17	Flash rate	Clause 9.5.3.4 (IS: 11037-2019)	-	-	Y
18	Insulation resistance	Clause 9.5.4.2 (IS: 11037-2019)	-	-	Y

Specification of Armoured XLPE Aluminum/Copper LT Cable

1. The LT cable should be 2/3/4-core, XLPE insulated, aluminium/copper conductor, armoured and suitable for over/ underground installation. It shall conform to IS: 7098 (Part-1), IS 8130, IS 5831, IEC 60228, IEC 60332-1, IS 3975, IS 10810, IEC 60754-1/2 with latest revision and amendments.
2. Cable shall be halogen-free, low smoke, flame retardant, fulfilling IEC 60332-1, IEC 60754-1/2 and IEC 61034-1/2 requirements.
3. **(i) Alluminium Conductor:** 1100 V, Type: A2XFY. The aluminium conductor shall be of H2/H4 grade as per IS 8130:2013, Class 2 (stranded shaped).
(ii) Copper Conductor: 1100 V, Type: 2XFY. The copper conductor shall be of H2/H4 grade, high-conductivity annealed copper as per IS 8130:2013, Class 2 (stranded shaped).
4. Continuous operating temperature: 90°C
5. Short-circuit temperature: 250°C for 1 second
6. Fire Retardant: Category C2 as per IS 10810 Part 53
7. Insulation: XLPE as per IS 7098 (Part 1) with nominal insulation thickness of 0.7 - 2.2 mm (depending on conductor size)
8. Core Identification: Cores shall be colour coded as Red, Yellow, Blue, and Black.
9. Volume Resistivity: $\geq 1 \times 10^{14} \Omega \cdot \text{cm}$ at 27°C and $\geq 1 \times 10^{12} \Omega \cdot \text{cm}$ at 90°C as per IS.
10. Minimum tensile strength of XLPE insulation: 12.5 N/mm²
11. Inner sheath shall be of extruded PVC ST2 (black in color), conforming to IS 5831, with minimum thickness as per IS 7098 (Part 1), based on overall diameter of the cable. Armouring shall be provided with galvanized steel strip (GI) as per IS 3975. Typical strip dimensions are 4×0.8 mm ($\pm 10\%$ tolerance), depending on the cable size and mechanical strength requirement.
12. Outer sheath shall be of PVC Type ST2 compound as per IS 5831. The minimum thickness shall be as per IS 7098 (Part 1), based on the overall diameter of the cable. The sheath shall have the following properties:
 - (i) Tensile strength: $\geq 12.5 \text{ N/mm}^2$
 - (ii) Elongation: $\geq 150\%$
 - (iii) Flame retardance: Burning shall cease within 60 sec after removal of flame, as per IS 10810 Part 53
13. The cable shall withstand an AC high voltage test of 3.0 kV for 5 minutes between conductor and armour without breakdown, as per IS 7098 (Part 1) and IS 10810 (Part 32/45). It shall also be capable of withstanding thermal and mechanical effects of short-circuit current for a duration of 1 second, as per the conductor size and temperature limits defined in IS 7098 (Part 1).
14. Normal current rating in Amps (air & ground) and short-circuit current rating (kA for 1 sec) shall be as per IS 3961 and IS 7098 (Part 1) / IEC 60502-1 with latest amendments and shall be clearly declared in the type test reports.
15. The resistance of the conductor shall not exceed the maximum values specified at 20°C as per IS 8130:2013.
16. **The outer sheath shall be clearly durable marked with “Manufacturer’s name, size, type, voltage, IS:7098 (Part 1), year of manufacture, and running meter marking” as per IS norm.**
17. **The cables supplied by the contractor shall be manufactured by a BIS licensee holding a valid Certification Mark License (CM/L number) under the applicable IS standard. The ISI mark, along with the corresponding CM/L number, shall be clearly and legibly embossed on the outer sheath of the cable at regular intervals, in accordance with BIS guidelines.**

- 18. Tests:** The contractor shall submit valid Type Test Reports from NABL/Govt. accredited lab for the offered cable along with Acceptance and Routine Test Certificates as per relevant IS/IEC viz. IS:7098 Part-1, IS:10810, IEC 60332-1, IEC 60228 with latest amendments. The type test report carried out during last five year shall be valid.
19. All cables shall be provided with clear and durable tags at both ends and at important points, indicating the cable number and destination as per requirement. Tags shall be of good quality (embossed/engraved/printed with permanent lettering) and shall display the cable number, size, and destination clearly as per Railway requirement.
20. The successful tenderer should submit delivery challan / copy of original voucher of OEM / Authorized dealer.
- 21. Inspection–** Inspection shall be carried out at the manufacturer's premises in the presence of the Railway Representative, as per requirements and in accordance with the latest applicable IS/IEC standards.

Note: All IS/IEC mentioned above, shall be applicable with their latest amendments/revisions in force at the time of execution of the work.

TECHNICAL SPECIFICATION FOR WIRING

1 System of Interior wiring.

- 01 The wiring (unless otherwise specified) shall be carried out in single core, multi-stranded PVC insulated copper FRLSH wire conforming to IS-694/2010 with latest amendments and of the 1100 volts grade in rigid heavy-duty non-metallic flame retarding (PVC) casing/capping. The wiring shall be done on the distribution system with main and branch distribution boards at convenient centers and without isolated fuses. All conductors shall be run, as far as possible along the walls and ceiling, so as to be easily accessible to and capable of being thoroughly inspected. Runs as marked out will be inspected and cables shall not be fixed until the lay-out is approved by Railway representative whose decision is final and binding on the contractor. The internal wiring shall be conforming to code of practice for electrical wiring as per IS 732 2019 with latest amendment. OEM test certificate for the FRLSH wire should be submitted.
- 02 The cables shall be run on rigid heavy duty non-metallic fire retarding (PVC) casing/capping with corresponding accessories. The conduit shall conform to IS 2509 and accessories to IS3419 with latest amendments. The PVC casing/capping and accessories shall be ivory white with fire retardant as per clause of BS-4678 Part-IV-82 or latest.
- 03 In case where surface wiring with PVC conduit is specified the conduits shall be fixed to walls using spacer's etc. not more than 600 mm apart. Bends or diversions shall be done by employing normal bends, inspection bends, inspection boxes, elbows or similar fittings. Conduit joints shall be by means of plain or screwed couplers. For long run of straight conduit inspection type coupler shall be provided at intervals.
- 04 Wiring (including above false ceiling), the wires shall run in PVC conduit pipes supported on ceiling / wall with ceiling rose, flexible pipe & proper saddling and fixing arrangement. The wiring should not rest/take support of false ceiling and its support structure.

2 PVC Junction box.

- 01 All ceiling roses, lamp holder etc. shall be fixed on rigid PVC square junction box.
- 02 Switch board – All electrical switchboard shall be of high quality PVC fire retardant board of standard size or customized as per requirements.

3 Plugging walls or ceilings

- 01 Plugs for ordinary walls or ceiling shall be of PVC of appropriate size. They shall be cemented into the walls or ceilings to within line of the surface and remainder being finished according to the nature of surface used with plaster or lime putty. Where owing to irregular coursings or other reasons, the plugging of the wall or ceiling present difficulties, the casing shall be attached to the walls or ceiling in a manner as per Railway authorized representative.
- 02 Plugs for fixing square box for ceiling rose or single switch shall be sufficiently large to take two screws so as to prevent box from turning while in use.

4 Passing through floors and walls

- 01 This shall be done strictly in accordance with code of practice for wiring installation as per IS 732 2019 with latest amends.

5 White washing

- 01 Walls cut or defaced during wiring will have to be made good and adequately white washed, distempered/painted as the case may be.

6 Wires and cables.

- 01 All conductors shall be standard copper and in accordance relevant IS. The wiring shall conform to the IEE, wiring rules (Latest) and no conductors shall have a cross section of less than 2.5 sq.mm unless otherwise specified.
- 02 Each coil of wire and cables proposed to be used must be accompanied by the OEM test certificates stating that the 'Class' and giving the results of insulation tests.

7 Main and sub-distribution boards.

- 01 The fuses/switch board/ meter board must be the swing back type provided with suitable hinged unglazed cover permitting of inspection at back and having ample room behind the boards for the convenience and neat arrangement of the conductors and to take a small amount of slack necessary to enable cut out to be readily connected up. The board must be made of seasoned teak wood, impregnated with varnish and with a good finish and constructed with all joints dove tailed and provided with a back of the same materials.

- 02 Placement of fuses – Fuses shall not be placed in ceiling roses or in any position other than the distribution boards or the sub-distribution boards. No fuses shall be placed in the neutral conductor of a main, sub-main or sub-circuits.
- 03 Adequate space, clear of other fittings and to the satisfaction of consignee shall be provided on each main distribution board for the installation of KWH Meters. Adequate size conduit casing/capping leading to the main board will be provided for the incoming mains.
- 04 Similarly adequate space shall be provided on the switchboards controlling fan light, plug for the installation of fan regulators.
- 05 Bus bar contacts and other live metal parts shall be suitably protected as to render it impossible for anyone to make accidental contact with them while replacing fuses. A strip of teak wood easily removable shall be provided in front of the neutral bus bar so as to avoid contact with it while fuses are being attended to.

06 Main and sub-distribution boards – Earthing.

Continuous running earth shall be provided by the contractor as given below:-

The continuity of earth wire shall be maintained throughout without any joints. This shall be in conformity with IEE Rules No. 32 & ISS-3043 section 2 clauses 12 to 13.7 or latest.

1	Main earth pit/pole to main meter board or distribution board	8 SWG GI wire
2	Meter board/distribution board to main switch inside quarters.	12 SWG GI wire.
3	Main switch insides quarters to wall plug fan, fan regulators & any other metallic / accessories.	2.5 sq.mm PVC copper stranded Green colour wire.

- 07 The distribution boards shall be fixed at such a height as to be within easy reach of a person standing on the floor. The installation of main and distribution boards shall be as per IS-732 2019 or latest.
- 08 The cost of point wiring includes the cost of sub-main circuits unless otherwise specified, which shall not be less than 4 sq.mm and No sub-main circuit shall contain more than 10 (Ten) light/fan/5A, plug points. Wherever No. of points exceeds more than 10. The contractor shall draw separate sub-main circuit for each 10 points or part thereof.
- 09 The contractor shall observe all colour code in wiring viz. Red, Yellow, Blue for phases, Black for neutral and Green for earthing.
- 10 On completion of wiring of each quarter, contractor shall do routine tests as per latest IS. Free of cost and result of same shall be submitted along with bill duly certified by Railway's representative.

8 Joints.

- 01 All joints in conductors shall be made by mechanical connections in suitable joint boxes, jointing of aluminum conductors shall be in accordance with IS 732 2019 appended 'C' Clause C-6 or latest.

9 Switches.

All switches, controlling points must be placed on 'Phase' wires. All switches shall be of Modular / Piano type (as per site requirement) 5/10 Amps capacity unless otherwise specified and conforming to relevant IS specifications and shall be provided with quick make and break movement and shall have substantial plain Bakelite cover. The switches shall be mounted at height of 4'-6" from ground level unless otherwise approved. The switches shall generally comply with the relevant IS. The switches shall be marked 'F', 'L' and 'P'.

10 Plugs and sockets.

- 01 Plugs shall be of a front entry pattern with hand shield. The shrouds of sockets and the grips of plugs shall be moulded Bakelite and the bases of sockets shall be of vitreous porcelain or Bakelite. All sockets shall be complete with plugs of standard dimensions and shall be interchangeable. Each plug point shall be controlled by a switch on the supply side. The socket shall be universal design 5 Amp unless otherwise specified with separate controlling switch and of approved acceptable make only.

11 Lamp holders, shades etc.

- 01 PVC casing/capping pendants in open verandahs, and Bakelite lamp holders with necessary accessories shall be robust. Lamp holders for use of brackets and the like shall be in accordance with IS-1258 (or latest) and as per Clause 5.5 of I.S-732 / 2019 (or latest).

- 12 Mountings.
 01 All fittings such as switches, plugs etc mounted on board shall be adequate spaced with a uniform margin to the satisfaction of consignee and only brass fixing screws/Nut bolts of approved sizes shall be used. The mounting heights from the floor shall be a generally as follows: - Switches, distribution boards etc. 1.5 mtrs., Lights –2.5 mtrs.
- 13 Flexible wires and pendants.
 01 Unless otherwise specified and except in PVC pipe pendants, flexible wire with PVC insulated and PVC sheathed copper conductors bearing ISI mark with a minimum of size of 24/0.2 mm or the nearest equivalent shall be used.
- 14 Suitable service tapings in all quarters at positions decided by Railway authorized representative will be provided by the Railway.
- 15 Special clauses for the internal wiring.
 01 The work shall comprise supply of all necessary materials, installations, testing and putting into operational lights, plugs etc. as per schedule, 'A' which is subject to slight variations at the time of execution of the work.
 02 The system of wiring for lighting and fan point shall be PVC insulated cable on rigid PVC casing capping.
 03 The contractor shall on completion of the work but before the installation is taken over by the Railway, supply drawings as under.
 a) Wiring – diagram sub-mains mains with particulars of size of cables and wires used.
 b) Main and branch distribution boards.
- 16 Special Clauses for the internal wiring.
 01 Conformity with Indian Electricity Act, 2003. The installation shall be in conformity with the requirements of the Indian Electricity Act, 2003 as amended up to the date and IE Rules, framed, there under and also the relevant regulations of the electric supply authority concerned, and IS 732 2019 with latest amends.
- 17 Materials.
 01 All materials fittings, appliances, used in electrical installations shall conform to relevant IS.
- 18 Workmanship.
 01 Good workmanship is an essential requirement for compliance with the Rules in the code. The work shall be carried out under the direct supervision of a person holding a certificate of competency issued by the State Government for the type of work involved.
 a. Position of lamp, fans and fittings, branch wires and not be shown, but the fittings etc. connected to each circuit must be clearly indicated by numbers on the fuse carrier of distribution board.
 b. Any alternations in the position of fittings or modifications of the existing lay out of the schedule of suit local conditions as indicated by the Railway representative shall also be carried out while the work is in progress.
- 03 Metal casings.
 All metal casings of metallic coverings containing or protecting any electric supply line or apparatus shall be connected with earth by the contractor shall be jointed and connected across all junction boxes and other openings as to make a good mechanical and electrical connection throughout the whole length.

NOTE:

- (i) All wall plugs shall be of Universal pin type, the earth pin being connected to the continuous running earth.
- (ii) All fan regulators even if supplied by the Railways shall be connected to the continuous running earth conductor.
- (iii) Continuous running earth through 2.5 sq.mm copper PVC conductor PVC wire green colour from the main board to the various wall plugs, fan points, regulator etc.
- (iv) All existing fittings, fans, incandescent light fittings and other equipment shall be connected to ceiling rose/power point with 2 core twisted PVC insulated copper conductor of size not less than 0.75 sq.mm

TECHNICAL DETAILS FOR ELLIPTICAL / PARABOLIC SIGNAGE BOARDS

Model /Type	Full Elliptical (FE) / Half Elliptical (HE) / Semi Elliptical (SE) / Parabolic
Mounting	<p>Mounting arrangement shall be hanging, Wall mounting, Ceiling Mounting, Pole Mounting, Floor Mounting or as per site requirement. Sign Boards shall be with integrated mounting arrangement powder coated pipes to FOB/PF Structure / walls with tension rope made of SS 304 and supplied with minimum 5 meter 2.5 sq.mm FRLS multi stranded copper flexible cable as per IS:694 with latest amendment and socket pin for connecting to power supply system. The cost of fixing of sign board with suitable clamping arrangement with SS nut, bolts, washers, square shear nut, nut-bolts, screw, T bolt, Chuck nut, shear nut or welding etc. is also included. The clamps shall be powder coated and enamel paint of approved colour.</p>
Elliptical Glow Board Frame	<p>The frame shall be made of Extruded Anodised hollow aluminium profile of size not less than 1.2 mm thickness and anodized to minimum 15µm thickness (Grade AC-15) in bronze & silver or any other approved colour. Anodizing coating shall be as per IS: 1868 or latest amendment.</p> <p>Provide Full length square SS powder coated pipe attached to bottom cap square bracket with level adjustment provision ribbiting without welding, pass thorough top cap interlock with clamp SS pipe sliding and level adjustment provision without compromising structural strength of Elliptical Glow Board.</p> <p>Provide nylon die molded & MS machine formed powder coated horizontal or vertical as per requirement heat sink bracket to hold top and bottom aluminium profile with press fit and bolting provision. Top bottom and/or side Cap as per requirement flush fixed at Profile to outer side holding all structural element together.</p>
Bracket / clamp	<p>“I” beams, “T” beams, “C” beam (size as per site requirement) and round pipes of size 2” to 6” holding machine bended seven tank processed powder coated clamp with SS 304 nut bolts & spring washers with provision of level, size and alignment adjustment. ‘T’, ‘S’ or round shaped clamp from center slot will interlock with top beam/ girder, pipe at various size with horizontal or perpendicular or tapper or slanted form with provision of beam to beam connected bracket to hold sign perpendicular or horizontal. & bottom side of clamp will interlock with pipe of Elliptical Glow Board with SS nut-bolt and spring washer.</p> <p>High strength Round Mounting Clamp set of inner & outer clamp & for installation on round pipe of dia 2/3” shall be press-formed in SS 304 grade sheet of 2mm thickness, 2mm rib deep shall be formed along the periphery for additional strength, only the inner clamp shall be used with two holes shall be used for anchoring on wall. Universal mounting clamp set consisting of sliding clamp, holding clamp, crimping lock and flexible strip shall be press-formed in SS 304 grade sheet of 1.2mm thickness this clamp shall be slid inside the mounting channels fixed to substrates. 0.8mm strip shall be passed through this clamp and around the structure on which the sign is to be installed and crimped firmly by crimping clamp. It should fix at any structure.</p> <p>M10 Square Head Bolts SS 304 grade, 4 side chamfered shall be used for installation. M10 Hexa Head shear nuts, which are high security, anti-theft, permanent fasteners, shall be used and shall be made of SS 304.</p>
Top profile	<p>Top Profile of Elliptical Glow Board shall be made up of Aluminium Alloy (6063-T6) Extruded profile anodised to 15 µm +/- 3 µm. The profile nominal wall thickness shall be 2 mm and width approx 170 mm, 137 mm and 268 mm or as per site requirements. The reflective metallic silver PU particle coated granules shall be provided on the internal face of the profile. The edges of the profile shall be rounded. The profile shall have a slot on both sides to hold 2/3/4 mm thick polycarbonate sheet. The slot shall be at a suitable angle (80-84°) to face firmly hold the polycarbonate sheet in elliptical and parabolic curvature. The Elliptical / Parabolic curvature of the polycarbonate sheet shall be maintained by its inherent flexural tension property.</p>

	<p>It should have circular slots for M6 self-tapping cheese head screws to fix the end caps. Along the centre line of the top of this profile there shall be a slot for press fitting the heat sink holding brackets in place with circular slot for M6 self tapping screw should be made available. There shall also be a flat extension to rectangular slot for additional support / fixing screws to firmly hold the heat sink holding bracket. The Total height of the central Projection should be maintained to minimize obstruction to light illumination.</p>
Bottom, top & side Profile	<p>Bottom, top and side Profile full / half of the Elliptical Glow Board shall be made of extruded anodized Aluminium Alloy hollow profile (6063-T6) having 2mm to 5mm wall thickness. It should have internal ribs and slot to firmly hold the polycarbonate sheet in elliptical and parabolic curvature using its flexural tension. A circular slot at the center of profile shall be provided to fix self tapping cheese head screw for end cap.</p> <p>An extruded extension diametrically opposite to this circular slot should have suitable slot for press fitting the heat sink holding brackets. Further flat extension shall be provided for screwing the bracket for additional strength & fixed location as per site requirements.</p> <p>Total external width & Height of the bottom, top & side profile should be as per site requirement without compromising the strength and causing any obstruction to the light while giving maximum viewing area. The bottom corner shall have a curvature of suitable radius to appear in continuous flow of elliptical Curvature of polycarbonate sheet. This also shall add to aesthetic beauty of the whole Elliptical Glow Board.</p>
Heat Sink Holding bracket (HSH)	<p>Heat Sink Holding Bracket shall be of suitable length injection moulded in Nylon 6 material & 1130mm, 1156mm, 861mm (or as per site requirement) in MS machine formed powder coated for its strength & flexibility. The bracket shall be of 'I' cross section of suitable sizes at mid portion and it should reduce proportionately in slant at both the ends for nylon 6mm, MS 5mm. Thickness without obstructing the light and without compromising on strength.</p> <p>The 'I' cross section nylon shall have ribs for maintaining stiffness. Both the ends of HSH brackets shall have locking clasp to press fit in slot of top and bottom profile.</p> <p>The mid portion shall have offset of 14mm for nylon and 12 mm for MS (or as per site condition)</p> <p>Central clasp shall be moulded in the Heat Sink Holding bracket to firmly hold the Heat Sink along the longitudinal axis of Elliptical Glow Board. The central clasp shall have two prong sets to hold the heat sink across its diagonal or along its sides as required. Two holes as per requirement shall be provided near the end clasps firmly.</p> <p>Two holes for nylon & MS shall be provided on both sides of central clasp to fix at both profiles</p> <p>Two holes shall be provided on both sides of central clasp to fix the mid portion of bracket to strip in the event longer bracket if required</p> <p>The mid portion of HSH bracket approx. 3 mm thick x 10 mm wide aluminium strip in the event longer bracket is required or more than one Heat Sink is required for bigger size of Elliptical Glow Board.</p>
Heat Sink	<p>Heat Sink shall be 25-26 mm hollow anodized Aluminium Alloy (6063-T6) profile of 2mm thickness. Corners shall be flattened to form a square across flat to hold the heat sink diagonally. Heat sink must be press fit horizontally and diagonally from all sides. All the four sides shall have dovetail of slots. Circular slots shall be provided at all four internal corners to tight fit the pins of Heat Sink connector.</p> <p>There shall be a set of three of approx 1.5mm thick ribs central of approx. 5mm height and two sides of approx. 2mm height. Provision for maximize the surface area to aid in faster cooling as well as for additional strength to hollow square profile.</p>

Heat sink connector	<p>Heat Sink connector shall be a moulded from polycarbonate profile of same cross sectional dimensions as that of Heat Sink. The thickness of the connector shall be approx. 5 mm.</p> <p>Two semi circular slots shall be provided on each face. Provision to pass out hot air from heat sink should be made. Four pins shall be moulded on four corners on both the faces of Heat Sink connectors to be press fitted in Heat Sink profile.</p>
Elliptical Glow Board end cap	<p>End caps full / half with elliptical and parabolic shape shall be made from injection moulded polycarbonate granules 2 mm thick / SS 304 1.2 mm thick / aluminium die casted 8 mm thick having curve on top side and internal hollow and elliptical base at bottom side with reflective internal surface. The End caps shall be perfectly opaque. Size of end caps may vary as per the site requirement.</p> <p>The boards shall be such that the text & Graphics displayed on the Polycarbonate sheet held in these end caps should be completely visible even if it is viewed directly from the bottom or any direction; the text is very much legible.</p> <p>Polycarbonate cap Internal face shall be cross ribbed to increase the strength of the end cap. Eight nos. locating pins tapering towards collar of the end cap shall be provided near the internal periphery of the end cap. These pins shall firmly hold the 3mm translucent polycarbonate sheet in elliptical / parabolic curvature.</p> <p>Circular cutout of suitable dia shall be provided for illuminated branding or opaque cap shall be provided in case of none branding. For branding translucent material fitting provision should provide without shadow on branding. Oblong cutout with collar shall be provided for projecting image of desired text & graphics on the floor below or opaque cap shall be provided in case of non-projecting. Suitable Ribs inside and parallel to the external periphery shall be provided for additional strength. Riser buttons shall be provided along the internal ribs to block the cutouts using opaque sheet screwed through these buttons. These buttons may also be used to mount the LED projector when required.</p> <p>Projector fitting bracket shall be fix to end cap to align with oval slot.</p> <p>Three nos. cap holding sockets shall be moulded at three corners of the End Cap. Two nos. locating pins shall be provided on each cap holding sockets and shall be provided at the bottom of these pins for additional strength. This pin shall locate in the top and bottom Aluminum profile.</p> <p>Two tapering ribs shall be provided to cap holding brackets for additional strength.</p> <p>Three through slots shall be provided near the top of end cap for heat ventilation.</p> <p>Moulded Screw caps shall be provided to externally press fit in the cap holding sockets. The end cap Shall be Moulded Shatter proof opaque polycarbonate as per IS 14443 or latest amended with thickness not less than 1mm and of reputed Indian make using Bayer granules.</p> <p>SS 304 elliptical or parabolic cap should have vertical collar at corners of suitable dia hole to interlock with profile and structure, square bracket at bottom cap should provide to interlock vertical square structure pipe and top cap should have cut out to thorough pass the structure pipe with the provision of ventilation.</p> <p>Aluminium die Casted cap top should have curvature of suitable radius and internal hollow with wall thickness of 6-8mm with polished and premiered with metallic PU gloss lacquer coated. Internal 2 nos. cap holding socket shall be casted at both corners of cap to interlock with side profile,</p> <p>Bottom casted cap should have side curvature of suitable radius and hollow with internal 2 nos. cap holding socket shall be casted at both the corners of cap to interlock with side profile. Vertical rib should provide to interlock polycarbonate sheet with inner pins support should flushed with side aluminium profile. Cap should have a hole with die moulded grommet to pass main supply wire.</p>

Cue Beam	<p>Cue beam holding bracket die-moulded with triangular parabolic base of suitable size, 2 mm thick. Hollow cylindrical die-moulded cover of suitable dia and height attached to side legs with provision of hinge for 360 degree rotation and angle adjustment with oblong cut out of bottom cap. It should fix with bottom cap with 3 nos. holes.</p> <p>The Elliptical Glow Board shall have the slot for provision of Cue Beam projector wherever required with provision of cue beam holding bracket. Cue beam projector should project the given sign image and text on floor or wall from max distance with maximum brightness than ambient light.</p> <p>2 nos. Plano convex and 1no. Biconvex lenses should fix at given slots.</p> <p>Projector lens with engraved image should create maximum projection on surface</p> <p>The CUE BEAM should incorporate in Elliptical Glow Board.</p> <p>Technical specification of CUE BEAM</p> <p>Voltage - AC 110V~220V</p> <p>Built in LED Driver - 12 V</p> <p>Power - 5W</p> <p>Luminosity - 150~ 200LM</p> <p>Image Projected distance -1~ 3 meters</p> <p>External Dimensions approx. - Ø26mm X 76 mm</p>
Podium	<p>Elliptical shape one piece cut, top & bottom 3mm thick with suitable size & suitable radius at corner of SS 304 with parabolic shape cut at center having suitable dia, 2 hole on top for matching with bottom cap of Elliptical Glow Board for fixing and interlocking without welding and bottom suitable dia 4 hole for foundation fitting should be provided.</p> <p>Provide approx. 4 mm 9 holes for ventilation at top and Backside open able door system with lock & key.</p> <p>SS 304 grade frame structure of suitable size 1.2mm thick square with vertical and horizontal supports covered with SS 304 sheet of 1.2mm thick with powder coated in elliptical shape machine formed matching with top of podium should provide Anchor fastener fitting provision has to be made for ground fixing.</p>
ACP Cladding	<p>Design, fabrication & installation of 3mm thick exterior grade PVDF coated Aluminium composite panels (Timex, Alucobond) of having 0.5 mm thick aluminium PVDF coated sheet with specific standard colour +3 mm core material +0.5 mm aluminium sheet chemically treated (back sheet) bent with 5mm uniform machine grooved as per requirement, fitted on anodised aluminium/ anodized aluminium angle Primer with PU coated MS rectangular grid work. Grid for supporting ACP shall be of suitable size 1.5mm thick at a distance of Heat sink fixed in Elliptical Glow Board should accurately match Horizontally & Vertically along with existing structure on site. Hardware, fixtures, brackets, anchor, fasteners of SS 304 grade etc. complete duly sealed with weathering silicon (DOW / GE) for circular columns and curved beams etc. Provision of MS clamp/ bracket for fixing with existing structure vertically, horizontally or slanted without welding and with level size alignment adjustment and interlocking provision without compromising strength and structural stability of frame should provide.</p>
Text /Graphics	<p>Shall be computer cut/printed on 80-100 µm Monomeric calendared Vinyl matt sheet of reputed make (Metamark / 3M)</p>
Led ribbon light Illumination	<p>Ribbon light shall be of waterproof SMD 2835. The width of Ribbon light shall be 12 +/- 1mm. This shall be slide into the dovetail grooves of the heat sink & firmly pasted on all four sides of the heat sink. The light emitted from LED ribbon light should be partially reflected from the elliptical and parabolic curvature of white glossy polycarbonate sheet multiple times. Any obstruction or low brightness at the edges of the beam should be taken care of Uniform illumination Average 6W-8W/ Sq. ft.</p>

LED & Driver	Linear LED of density 120 LEDs per meter of quality of proven make such as Nichia, Osram, Seoul, Philips Lumileds, Cree and Lednium. OEM certificate of LED should be provided.	
	LED Wattage	0.08 W to 0.1W per LED
	LED Driver	Constant current waterproof LED driver of Mean Well / Philips / OSRAM or reputed make with short circuit protection, separate surge protection, etc.
	LED Colour	Cool White
	Colour temperature	5500 K/6500 K
	Viewing angle	Text/Graphics/matter visibility shall not be less than 160°
	Nominal Voltage	230V, AC, 50 Hz
	Operating Voltage Range	150V-260V AC With SMPS power supply.
	Ingress of protection	IP 54
Sizes of Boards	The size of board shall of different sizes, as per the site requirement.	
Sign substrate	Shall be of Eco Friendly, High impact strength, shatter proof, UV resistant, Translucent, non-flammable White polycarbonate solid sheet as per IS 14448 of not less than 3mm of reputed make Bayer / Lexan / Polymac. Light transmission shall be in the range of 60% - 90%. Provide U shaped 7mm x 1mm / 4mm x 1mm / 8 mm x 2mm gasket for tight holding and interlocking polycarbonate sheet in aluminum profile.	
<u>Note:</u> 1. All dimensions should be as per site requirements without compromising structural strength and causing any obstruction to the light while giving maximum viewing area. 2. The successful contractor shall arrange of all equipment, tools, consumables, testing meters, Hydra scaffolding, crane, forklift etc. and other required materials for successful completion of the work. Any work not specifically mentioned, but required for successful completion of work is deemed to be included in the work. If any activity required to be included later on due to reliability and safety shall be carried out by contractor without any extra cost.		

SCOPE, GENERAL REQUIREMENT, DESIGN, CONSTRUCTION, TECHNICAL DETAILS OF UPS

- (1) The UPS shall comply with the requirements of latest issue of relevant Indian Standard / IEC. Some of the applicable IS/IEC standards are listed below:

IEC:62040-1 Ed. 1.0 b	Specification for UPS- General and Safety requirements
IEC:62040-2	Specification for UPS-EMC requirement
IEC:62040-3	Method of specifying the performance and test requirements of UPS
IS : 9000	Surge Protection Devices

- (2) The specification lays down the requirement of design, manufacturing, service, packing and forwarding of fault tolerant static Uninterrupted Power Supply (UPS) system (1+1 configuration) for PRS, EDP centers and other similar requirements of online UPS system. Basically, the spec. addresses the requirement of applications requiring UPS of high fault tolerance/ reliability.
- (3) The equipment shall also conform to the provisions of Indian Electricity rules and other statutory regulations currently in force.
- (4) The UPS system shall be an integrated system comprising of input rectifier, charger, inverter, static bypass switch and manual bypass switch. The charger shall be designed such that it shall be able to charge the battery in constant voltage, constant current mode. Charging capacity shall be at the rate of 0.1C ('C' is the AH capacity of the Battery).
- (5) The UPS system shall be of 1+1 configuration and shall be able to configure in hot standby with bypass. The configuration of the UPS shall be such that the bypass line of the primary UPS shall be connected to the inverter of the secondary UPS. The bypass line of secondary UPS shall be connected to the bypass main source. Both the UPS shall use a common battery bank. At any given point of time, only one UPS shall carry the load. In the event of failure of working UPS, the load shall be automatically transferred to the standby UPS (through static switch) without causing a spurious load trip. In case of category 'C', if both the UPS fail, the supply shall be transferred automatically to the (stabilized) mains source through the static bypass switch. In category 'A' and 'B', if both the UPS fail, the supply shall not be automatically transferred to the main source and the load will face power outage.
- (6) The UPS system shall be of true double conversion with an in-built isolation transformer (copper wound) and shall be based on latest generation technology having proven performance of satisfactory operation for similar applications.
- (7) The UPS system shall be suitable to feed all loads primarily connected to output.
- (8) The design of UPS shall be such as to withstand short circuit at load without causing an adverse effect on the UPS.
- (9) The manufacturer shall be responsible for design, engineering and manufacturing of the complete system to fully meet the intent and requirements of this specification.
- (10) Incoming AC supplies shall be converted to DC through input rectifier. The rectifier/charger shall operate according to the constant voltage current limiting principle and shall incorporate a "Soft Start" feature to gradually accept load on initial energizing.
- (11) The rectifier section/battery charger of the UPS system shall be capable of precise regulation to prevent damage to the battery. The output voltage of rectifier's DC bus without the battery shall be stabilized to within 2% of set value during load variation between 0 to 100% of the rectifiers and specified mains input supply voltage variation. Current ripple shall be less than 3%.
- (12) Transient/surge protection shall be provided in the input circuit to rectifiers to protect the UPS from surges & voltage spikes. Class C type SPD of appropriate rating with indication should be used.
- (13) The UPS shall have capacity to deliver a minimum overload of 125% for 10 minutes and 150% for 60 sec. UPS shall be provided with current limit circuit to avoid excessive loading beyond its permissible overload withstand capability.
- (14) UPS shall be designed to operate satisfactorily while deriving power from an emergency diesel generating set. Suitable protection shall be provided in the control circuits to guard against electrical oscillations which may be present in the input supply as caused by emergency DG sets.
- (15) The UPS shall be provided with automatic sequence and power walk/ soft start in circuit(s) with appropriate time delay such that the rectifiers and inverters can start operating automatically when incoming AC power is restored allowing the UPS to be loaded automatically.

- (16) Remote Emergency Power off (REPO) – Provision shall be available in category B & C for a wired REPO switch which shall electronically shut down the UPS by turning off the rectifier, inverter switch and battery circuit breaker.
- (17) Maintenance bypass isolator – Provision shall be available for manually operated maintenance bypass isolator which shall be incorporated into the UPS cabinet to directly connect the critical load to the input AC power source bypassing the rectifier, inverter and static transfer switch.
- (18) Load shall be transferred between UPS 1 and UPS 2 at appropriate pre-set time intervals (the interval is to be decided by railway's site engineer). In UPS of Category 'A', the changeover shall be carried out manually by railway staff. However, in UPS of Category 'B' and 'C', the manufacturer will supply the necessary electronics and render the changeover an automatic process. Load shall be transferred to the other UPS after the time interval as aforementioned, even if the UPS supplying the load is healthy.
- (19) In Category 'C' UPS, bypass supply shall be stabilized (through servo controlled voltage stabilizer) so as to regulate the output voltage within $\pm 2\%$ of the rated voltage over complete range of load from no load to full load and for specified input supply voltage variation. The said servo controlled voltage stabilizer can be of the UPS manufacturer's own make or an alternate make, if the latter is found to be acceptable at design scrutiny stage. In UPS category 'A' and 'B', no voltage stabilizer shall be provided for the bypass mains supply.
- (20) Rectifier/charger, inverter and static switch sections shall be suitably housed in sheet steel panels complete with all interconnections. The panels shall be fabricated with cold rolled sheet steel/ structural steel min. 1.2 mm thick for Cat A and 1.6 mm thick for Cat B & C. The panels shall be free standing, fitted with suitable louvers for ventilation and cooling fans as required. The enclosure shall provide minimum IP-20 degree of protection. The cabinet of UPS should have heavy duty wheel arrangement for easy movement as per Railway requirements.
- (21) UPS system shall be suitable for either floating output or earthed neutral, or earthing of star point, in case of single phase/three phase system respectively.
- (22) A suitable sized earthing point shall be provided either at the bottom of the panels or at the back side of the panels.
- (23) All control wiring shall preferably be enclosed in plastic channel or otherwise neatly bunched together.
- (24) Batteries if provided outside the UPS system, shall be in a formation which is commensurate with the available space. The stand shall be made of standard L angle channel and duly spray painted with two coats of epoxy based panel paint or powder coated.
- (25) The contractor should provided data, technical information, installation procedure, operation & maintenance manuals of UPS Manufacture's.

In addition to above Technical details of UPS furnished below:

SN	PARAMETER	DETAILS
1	Category / Capacity of UPS	Cat. (A) - 1KVA to 7.5KVA with single-phase input & single phase output. Cat. (B) - 7.5KVA to 30KVA with three phase input & single phase output. Cat. (C) - 10KVA and above with three phase input & three phase output
2	TYPE / Technology	(i) Up to 5 KVA - Online UPS with Microcontroller base dual conversion with PWM MOSFET / PWM IGBT technology. (ii) Above 5 KVA - Online UPS with Microcontroller base dual conversion with PWM IGBT technology only.
3	Input Voltage & Frequency	1. For single phase 160 V-280V, 50 Hz $\pm 8\%$ 2. For three phase 350 V - 475V, 50 Hz $\pm 8\%$
4	Input Power Factor	Power factor measured at input terminal shall be more than 0.8 at full load (rectifier/ charger is to be designed accordingly)
5	Output Voltage & Frequency	1. For single phase 230 V $\pm 1\%$, 50 Hz $\pm 0.5\%$ 2. For three phase 400 V $\pm 1\%$, 50Hz $\pm 0.5\%$
6	Waveform	Pure sine wave
7	Output Voltage THD (at full load and rated p.f.)	(i) Not exceed 3% for linear load. (ii) Not exceed 15% for non-linear load.

8	Crest Factor	3:1
9	Overall Efficiency	The UPS system shall be able to operate satisfactorily on rated loads (in kVA) with power factors in the range of 0.65 lag to 1.0. The overall efficiency of 'B' and 'C' category UPS at rated load at 0.8 P.F. and at nominal input voltage shall be minimum 85%. In respect of 'A' category UPS, under the aforesaid load, load P.F. and input voltage, the minimum efficiency requirement shall be as follows: 75% for ≤ 3 kVA and 80% for > 3 kVA
10	Charging Capacity	Charging capacity shall be at the rate of 0.1C ('C' is the AH capacity of the Battery).
11	Compatibility	UPS to be compatible with DG Set supply and Mains supply
12	Protection	Over Voltage & Under Voltage at output, short Circuit / Over Current at output, Over voltage and Under voltage at battery terminals, Over load, Over temperature, Input surge protection (Class C type SPD of appropriate rating with indication)
13	LCD Display	AC input voltage, AC output voltage, AC output current, Battery voltage, Battery charging and discharging current, output frequency, Bypass mode, Fault indicators
14	Indication & Alarm	Charger On / Mains presence, Mains Normal / Abnormal, Low Battery, Battery mode, Overload & Fault, Load on bypass, UPS On, UPS Trip, Audible alarm for mains failure, battery low pre-alarm, battery low trip and inverter trip, Visual indication and audio alarm near working place of operators, Indication for SPD failure.
15	Back-up Time & Battery	2 Hours backup time (VAH mention in Explanatory note) Sealed Maintenance Free (SMF) lead acid Batteries, having testing reports of NABL approved laboratory.
16	Ports	The UPS shall have a data logging facility, with USB download capability.
17	Communication	UPS shall be provided with capability to support SNMP (Smart Network Management Protocol) communication port with hardware and software for remote monitoring.
18	Ingress Protection	IP-20
19	Noise (at 1 meter distance)	(i) 55 dB for Category-A, (ii) 65 dB for Category-B, (iii) 75 dB for Category-C
20	Site Condition	The UPS shall perform satisfactorily in a room at: ambient temperature in the range 0°C to 40°C, altitude not exceeding 1000M above MSL and Relative Humidity 95% RH non-condensing
21	ISO Certificate	The manufacturer(s) shall possess ISO 9001 certification.
22	Testing and reports	Tests of UPS shall be conducted. (1) A certificate from NABL approved test laboratory shall be provided for compliance to EMI/EMC requirements for UPS. (2) The contractor shall submit original test report from Central Govt./NABL/ILAC Accredited lab with covering all technical requirements.

CHAPTER-VI

SCHEDULE OF QUANTITY

AND

RATES

SCHEDULE OF QUANTITY AND RATES

Tender No: - BB.LG.W.THK.2026.01

Name of work: - “(A) Electrification for upgradation of SM office, other utility offices, construction and improvement of toilet, beautification of FOBs and allied works at Thakurli station. (B) Rewiring for renovation and improvement of service buildings in between Kanjurmarg-Kopar Section. (C) Rewiring for renovation and improvement of service building at Thakurli, Dombivli and Kalyan Station. (D) Electrification for Provision of extension of platform at Vikhroli, Kalva, Mumbra & Diva of through lines for running of 15 car EMU services. ”

PROFORMA OF SCHEDULE OF PRICES

SN	BRIEF DESCRIPTION OF WORK	QTY	UNIT	UNIT RATE		TOTAL
				SUPPLY	ERECTION	
A	Schedule-A: Electrification for upgradation of SM office, other utility offices, construction and improvement of toilet, beautification of FOBs and allied works at Thakurli station.					
1	Supply, erection, testing and commissioning of 2 x 18 W LED fitting complete with connection and necessary fixing arrangements as per site requirement.	350	nos	1901.16	76.26	692097.00
2	Supply, erection, testing and commissioning of 18-20 W 4 feet LED slim fitting complete with connection as per site requirement	200	nos	964.35	103.46	213562.00
3	Supply, erection, testing and commissioning of 9-10 W LED (2 ft) slim fitting complete with fixing arrangement, etc.	30	nos	800.00	80.00	26400.00
4	Supply, erection, testing and commissioning of 2 x 2 36 W LED fitting with IP 20 complete with connection and necessary fixing arrangements as per site requirement.	60	nos	3751.78	416.86	250118.40
5	Supplying and erecting integrated LED flood light fitting Max. 70-80W including driver with U shaped bracket as per specification	20	nos	5812.73	581.27	127880.00
6	Supply and fixing of 18-20 watts LED round recessed/surface mounted downlighter with a pressure die-cast aluminum heat sink luminaire of, with a supply connection using a 3-core x 1.5 sq.mm PVC insulated copper cable fittings complete with fixing.	60	nos	1491.30	165.70	99420.00
7	Supply, fixing, testing & commissioning of LED 15-20W, spot light fitting, Effective heat dissipation with extruded aluminum heat sink, inbuilt protection, protected from dust and insects, complete with cover/ other accessories etc. with aluminum housing powder coated with white reflector, and necessary fixing arrangements as per site requirement.	60	nos	1036.22	115.14	69081.60
8	Supply, erection, testing and commissioning of timer panel board as per railway's requirement	8	nos	19073.27	699.56	158182.64
9	Supply, erection, testing and commissioning of LED mirror light for washing basin, complete with accessories	30	nos	2315.70	257.30	77190.00

10	Supply, erection, testing and commissioning of LED strip 5 meters light complete with all fixing arrangements. (1 no. = 5 meter length LED strip)	80	nos	1369.43	136.94	120509.60
11	Supply, erection, testing and commissioning of Aluminium LED profile complete with all fixing arrangements.	400	mtr	184.00	18.40	80960.00
12	Supply, erection, testing and commissioning of 85-90W LED outdoor lighting fitting complete with all fixing arrangements.	60	nos	6114.55	611.45	403560.00
13	Supply, fixing, testing and commissioning of heritage type pole with post top weather proof LED light fitting complete with all accessories and cement concrete foundation	20	nos	24363.11	2436.31	535988.40
14	Supply, erection, testing & commissioning of LED Bollard 10-15W fitting complete with connection and necessary fixing arrangements as per site requirement.	40	nos	10839.79	1083.98	476950.80
15	Supply, erection, testing and commissioning of LED decorative wall light fitting complete with all fixing arrangements.	30	nos	2881.06	320.12	96035.40
16	Supply, erection, testing and commissioning of 48" sweep energy efficient BLDC ceiling fan with down rod, motor, etc. with necessary connection.	100	nos	2790.99	170.58	296157.00
17	Supply, erection, testing and commissioning of exhaust fans 9" metal body with motor guard, cover, etc	28	nos	1546.36	154.64	47628.00
18	Supply, erection, testing and commissioning of 12" metal body type exhaust fan complete with motor guard, cover, etc.	12	nos	2028.38	202.48	26770.32
19	Supply, erection, testing and commissioning of Air circulator (BLDC) wall mounted 24" sweep fan with necessary connection	40	nos	15044.71	1504.47	661967.20
20	Supply, erection, testing and commissioning of 16" sweep wall bracket fan complete with necessary fixing arrangement	25	nos	1151.31	115.13	31661.00
21	Wiring of the concealed Light / fan / call bell point with all accessories. The switches shall be of modular type.	225	nos	992.69	147.81	256612.50
22	Wiring of the Universal plug point on switch board with all accessories and running earthing copper conductor as per standard practice. The switches shall be of modular type.	150	nos	90.87	10.10	15145.50
23	Wiring of the concealed Universal plug point on separate switch board with all accessories. The switches shall be of modular type.	70	nos	311.44	15.79	22906.10
24	Wiring of the concealed 5A/ 5-Pin Universal plug point (4 plug & 4 switch on separate board) with all accessories. The switches shall be of modular type.	60	nos	1015.12	112.80	67675.20
25	Wiring of concealed 15 Amps 6 pin wall socket point complete on separate switch board with 20 Amp DP MCB & all accessories and running earthing copper conductor as per standard practice. The switches shall be of modular type.	30	nos	940.15	86.34	30794.70

26	Supply, laying, running fixing of following sizes of XLPE insulated, PVC sheathed, 1.1 KV grade cables as per IS.					
a	4 core 50 sq.mm AL conductor, armoured	950	mtr	376.36	37.64	393300.00
b	4 core 16 sq.mm AL conductor armoured	780	mtr	195.45	19.55	167700.00
c	4 core 10 sq.mm AL conductor armoured	550	mtr	166.36	16.64	100650.00
d	3 core 06 sq.mm AL conductor, armoured	850	mtr	126.36	12.64	118150.00
e	4 core 10 sq.mm CU conductor, armoured	1780	mtr	550.00	55.00	1076900.00
27	Excavation of cable trench in soil & filling the trench with sand, pebbles etc. after laying of the cable complete with RCC warning cover & cable markers, sand etc. as per railways requirement	650	mtr	0.00	68.83	44739.50
28	Excavation of cable trench on CC flooring / Hard / rocky soil & making of trench & recasting of flooring/pit after lying of cable as per railways requirement.	250	mtr	0.00	265.78	66445.00
29	Supply, erection, testing and commissioning of 2 KVA UPS with battery backup as per Railway specification	2	set	82551.15	9172.35	183447.00
30	Supply, erection, testing and commissioning of LT Distribution Panel Board comprising of 100-125 Amp FP MCCB 36kA Microprocessor based release 02 nos, RCBO 4 Pole, 32 Amp 415V 50Hz 10kA Sensitivity-300 mA - 4 nos, RCBO 4Pole 63 Amp 415V 50Hz 10kA Sensitivities- 300 mA - 6 nos. as outgoing complete with busbars, neutral link, etc. as per site requirement	2	nos	132541.41	14726.82	294536.46
31	Supply, erection, testing and commissioning of maintenance free earthing	5	nos	11380.53	1264.50	63225.15
32	Supply, erection, testing and commissioning of FRP junction box as per Railway's requirement.	225	nos	1485.07	158.62	369830.25
33	Supply and laying of HDPE pipe of size 4" dia	350	mtr	258.00	25.80	99330.00
34	Supply and fixing of GRP / FRP cable tray made of glass fiber reinforced polyester moulding composite material, size 200mm width x 75mm depth min., 04mm thick min., including horizontal and vertical reducers, tees, cross members and other accessories as required and duly suspended from the ceiling with GI suspenders etc	600	mtr	668.80	74.31	445866.00
35	Design, fabrication, Supply, multiple loading/unloading, storing installation, fixing, testing & commissioning LT Distribution / Panel board having thermal magnetic MCCB's 250A 4P 36 kA breaking capacity – 1 No. a incomer and 100 A 4P 16 kA break in capacity – 1 Nos, 63A 4P 16kA breaking capacity - 4 Nos. as outgoing with, Rotary Handle vary Depth, Padlock support for operating Handle, Phase barrier, DPX spreader Links, etc. as required and complete in all respect.	3	nos	150581.81	37645.03	564680.52

36	Design, fabrication, Supply, multiple loading/unloading, storing, installation, fixing, testing nos. & commissioning of LT Distribution/ Panel board having thermal magnetic MCCB's 250A 4P 36kA breaking capacity-2 nos. as incomer and automatic change over switch 250 A 36 kA breaking capacity-1No with inbuilt time delay primary protection against single phasing & over voltage, and 200 A 4P MCCB 36 kA breaking capacity – 1 nos., 125 A 4P MCCB 16kA breaking capacity-2 Nos., 100 A 4P MCCB 16 kA breaking capacity-3 Nos. as outgoing with 250A Copper busbar, Rotary Handle vary Depth, Padlock support for operating Handle, Phase barrier, DPX spreader Links, etc. as required and complete in all respect.	1	nos	349984.10	87495.81	437479.91
37	Design, manufacture, display, installation of wall / hanging / floor mounting type LED illuminated sign / direction boards in elliptical/half elliptical /semi elliptical etc. shape. The display sheet shall be of unbreakable 040 translucent polycarbonate sheet of 2 mm thickness. The text / graphics matter visibility shall not be less than 160 deg. The approved colour text and graphics shall be printed / router cut on monomeric calendared vinyl of 70 µM thickness and shall be firmly pasted on display sheets. The mounting arrangement shall be hanging, wall mounting, ceiling mounting, pole mounting or floor mounting and as per site requirement. The signage shall have the integral mounting arrangements with sturdy structural frame and ACP cladding on the back side of the signage to avoid rusting and entry of dust. The LED board shall have uniform illumination with 6-8 W / sq. ft and with brightness more than ambient light. Suitable size end cap of 1.5 mm thick SS 304 should be provided.	750	sq.ft	2898.39	289.84	2391172.50
38	Supply of aluminum folding ladder 10 feet	1	nos	7250.00	0.00	7250.00
39	Design, supply, erection, testing and commissioning of LED station name board with Individual English letter	8	letter	3002.07	333.90	26687.76
40	Design, supply, erection, testing and commissioning of LED station name board with Individual Devnagari letter for Hindi & Marathi.	14	letter	3902.85	434.08	60717.02
41	Supply & erection of earthing G.I. pipe with cement concrete earth chamber, charcoal, salt, etc.	50	nos	1339.68	148.96	74432.00
42	Supply, erection, testing and commissioning of GI strip of 25 mm x 5mm	250	mtr	185.58	30.21	53947.50
	Total of Schedule (A)					1,19,25,739.93

B	Schedule-B: Rewiring for renovation and improvement of service buildings in between Kanjurmarg-Kopar Section.					
1	Supply, erection, testing and commissioning of 70-75W LED outdoor lighting fitting complete with all fixing arrangements.	50	nos	5230.00	523.00	287650.00
2	Supply, erection, testing and commissioning of 2 x 2 36 W LED fitting with IP 20 complete with connection and necessary fixing arrangements as per site requirement.	150	nos	3751.78	416.86	625296.00
3	Supply, erection, testing and commissioning of 18-20 W 4 feet LED slim fitting complete with connection as per site requirement	610	nos	1013.60	68.33	659977.30
4	Supply, erection, testing and commissioning of 9-10 W LED (2 ft) slim fitting complete with fixing arrangement, etc.	100	nos	800.00	80.00	88000.00
5	Supply, erection, testing and commissioning of decorative wall light fitting complete with all fixing arrangements.	20	nos	7252.96	805.89	161177.00
6	Supply, erection, testing and commissioning of 48" sweep energy efficient BLDC ceiling fan with down rod, motor, etc. with necessary connection.	250	nos	3160.27	193.19	838365.00
7	Supply, erection, testing and commissioning of exhaust fans 9" metal body with motor guard, cover, etc	25	nos	1546.36	154.64	42525.00
8	Supply, erection, testing and commissioning of 12" metal body type exhaust fan complete with motor guard, cover, etc.	25	nos	2028.38	202.48	55771.50
9	Wiring of the concealed Light / fan / call bell point with all accessories. The switches shall be of modular type.	326	nos	992.69	147.81	371803.00
10	Wiring of light point/fan point/exhaust fan point/call bell point with 1.5 sq.mm FRLS PVC insulated copper conductor single core cable in surface/recessed medium class PVC conduit, with modular switch, modular plate, suitable GI box and earthing the point with 1.5 sq.mm FRLS PVC insulated copper conductor single core etc.	600	nos	664.39	73.82	442926.00
11	Wiring of the 5A/ 5-Pin Universal plug point (4 plug & 4 switch on separate board) in PVC casing / capping. The switches shall be of modular type.	150	nos	872.90	87.28	144027.00
12	Wiring of 15 Amps 6 pin wall socket point complete all accessories and running earthing as per standard practice on separate board. The switches shall be of modular type	120	nos	639.36	45.94	82236.00
13	Supply, laying, running fixing of following sizes of XLPE insulated, PVC sheathed, 1.1 KV grade cables as per IS.					
a	4 core 50 sq.mm AL conductor, armoured	500	mtr	376.36	37.64	207000.00
b	4 core 25 sq.mm AL conductor, armoured	1000	mtr	240.91	24.09	265000.00
c	2 core 6 sq.mm Cu conductor armoured	1000	mtr	225.45	22.55	248000.00

14	Excavation of cable trench in soil & filling the trench with sand, pebbles etc. after laying of the cable complete with RCC warning cover & cable markers, sand etc. as per railways requirement	500	mtr	0.00	62.86	31430.00
15	Excavation of cable trench on CC flooring / Hard / rocky soil & making of trench & recasting of flooring/pit after lying of cable as per railways requirement.	300	mtr	0.00	290.21	87063.00
16	Supply, erection, testing and commissioning of 63 A MCCB 1 no. as incoming and 12 nos. 10/20/32 A DP MCB as outgoing complete with busbars, neutral link, etc. and other accessories housed in CRCA sheet enclosure.	20	nos	9815.48	34.57	197001.00
17	Supply, erection, testing and commissioning of One phase distribution board comprising of one no. 40 amps DP MCB as incoming & 10 nos. 16 amps DP MCB as outgoing complete with copper bus bars, neutral link and other accessories housed in CRCA sheet enclosure with double door type	35	nos	1742.93	157.27	66507.00
18	Supply and laying of 50 mm OD DWC/HDPE pipe	500	mtr	121.34	13.00	67170.00
19	Supplying and erecting G.I. pipe 'C' class ERW 75/80 mm dia	10	mtr	1058.18	105.82	11640.00
20	Supply and Erection of mini feeder pillar board outdoor type with 200 Amps TPN MCCB for incoming and suitable size Al. Busbar and 4 Nos. per phase 63 Amps HRC fuse base with fuse link, connectors, stand, etc. as per specification	5	nos	12751.25	1025.77	68885.10
21	Supply, erection, testing and commissioning of maintenance free earthing	30	nos	11054.96	3081.45	424092.30
22	Supply, erection, testing and commissioning of GI strip of 25 mm x 3 mm	204	mtr	169.48	27.59	40202.28
	Total of Schedule (B)					55,13,744.48
C	Schedule-C: Rewiring for renovation and improvement of service building at Thakurli, Dombivli and Kalyan Station.					
1	Supply, erection, testing and commissioning of 70-75W LED outdoor lighting fitting complete with all fixing arrangements.	50	nos	5230.00	523.00	287650.00
2	Supply, erection, testing and commissioning of 18-20 W 4 feet LED slim fitting complete with connection as per site requirement	400	nos	1013.60	68.33	432772.00
3	Supply, erection, testing and commissioning of 48" sweep energy efficient BLDC ceiling fan with down rod, motor, etc. with necessary connection.	80	nos	3160.27	193.19	268276.80
4	Wiring of the concealed Light / fan / call bell point with all accessories. The switches shall be of modular type.	250	nos	992.69	147.81	285125.00

5	Wiring of light point/fan point/exhaust fan point/call bell point with 1.5 sq.mm FRLS PVC insulated copper conductor single core cable in surface/recessed medium class PVC conduit, with modular switch, modular plate, suitable GI box and earthing the point with 1.5 sq.mm FRLS PVC insulated copper conductor single core etc.	500	nos	664.39	73.82	369105.00
6	Wiring of the 5A Universal plug point on switch board with all accessories and running earthing copper conductor as per standard practice. The switches shall be of modular type.	200	nos	64.33	16.87	16240.00
7	Supply, installation, testing & commissioning of surface wiring of modular plug point 16/6 Amps with modular switch on separate board by 3 nos. 4.0 sq.mm FRLS PVC insulated copper conductor multi strand single core in PVC casing capping and accessories	120	nos	664.39	73.82	88585.20
8	Wiring of 15 Amps 6 pin wall socket point complete all accessories and running earthing as per standard practice on separate board. The switches shall be of modular type	80	nos	639.36	45.94	54824.00
9	Supply, laying, running fixing of following sizes of XLPE insulated, PVC sheathed, 1.1 KV grade cables as per IS.					
a	4 core 16 sq.mm AL conductor armoured	500	mtr	158.03	15.80	86915.00
10	Supply, erection, testing & commissioning of distribution board 12 way 63 A DP RCBO as I/C and 10/20/32 A SP MCB as outgoing complete with busbars, neutral link, etc. and other accessories housed in CRCA sheet enclosure.	120	nos	9516.17	2200.00	1405940.40
11	Supply, erection, testing and commissioning of maintenance free earthing	25	nos	11054.96	3081.45	353410.25
12	Supply, erection, testing and commissioning of GI strip of 25 mm x 3 mm	140	mtr	169.48	27.59	27589.80
	Total of Schedule (C)					36,76,433.45
D	Schedule-D: Electrification for Provision of extension of platform at Vikhroli, Kalva, Mumbra & Diva of through lines for running of 15 car EMU services.					
D-1	(D-1) : Electrification for Provision of extension of platform at <u>Vikhroli</u> of through lines for running of 15 car EMU services.					
1	Supply, erection, testing and commissioning of 2 x 18 W LED fitting with IP 66 complete with connection and necessary fixing arrangements as per site requirement.	105	nos	1711.05	69.18	186924.15
2	Supply, erection, testing and commissioning of 1 x 18 W LED fitting with IP 66 complete with connection and necessary fixing arrangements as per site requirement.	20	nos	1070.56	72.17	22854.60
3	Supply, erection, testing and commissioning of 40-45 W LED outdoor lighting fitting complete with all fixing arrangements.	2	nos	3413.55	341.56	7510.22

4	Supply, erection, testing and commissioning of 48" sweep energy efficient BLDC ceiling fan with down rod, motor, etc. with necessary connection.	45	nos	3160.27	193.19	150905.70
5	Supply, erection, testing and commissioning of BLDC Air circulator wall mounted 24" sweep fan with necessary connection.	15	nos	15044.71	1504.47	248237.70
6	Supply, erection, testing and commissioning of 9" metal body type exhaust fan complete with motor guard, cover, etc.	11	nos	1847.27	184.73	22352.00
7	Supply, erection, testing and commissioning of astronomical timer panel board for high mast with all fixing arrangement as per Railway's requirement	3	nos	18105.03	1258.20	58089.69
8	Supply, running, fixing and stringing of OHE mains of 5 line wire	400	ckt-mtr	127.91	9.13	54816.00
9	Wiring of the concealed Light / fan point with all accessories. The switches shall be of modular type.	40	nos	714.79	127.22	33680.40
10	Wiring of concealed 5A/ 5-Pin Universal plug point on switch board with all accessories and running earthing copper conductor as per standard practice. The switches shall be of modular type.	12	nos	64.33	16.87	974.40
11	Supply, erection, testing and commissioning of water cooler with all accessories and necessary connection.	1	nos	49860.00	0.00	49860.00
12	Supply, laying, running fixing of following sizes of XLPE insulated, PVC sheathed, 1.1 KV grade cables as per IS.					
a	4 core 25 sq.mm AL conductor armoured	500	mtr	240.91	24.09	132500.00
b	4 core 16 sq.mm AL conductor armoured	300	mtr	195.45	19.55	64500.00
c	2 core 6 sq.mm CU conductor armoured	300	mtr	225.45	22.55	74400.00
13	Supply, erection, testing and commissioning of FRP junction box as per Railway's requirement.	6	nos	671.68	47.88	4317.36
14	Fabrication, supply, erection, testing and commissioning of double sided glow sign board of different sizes made out of Poly Carbonate sheets as per detail specification.	18	sq.mtr	3745.00	415.00	74880.00
15	Supply, erection, testing and commissioning of One phase distribution board comprising of 8 ways 16 A DP MCB as incoming and 06 nos 10 A SP MCB as outgoing complete with bus bars neutral link and as per Railway's requirement	1	nos	1718.87	154.99	1873.86
16	Supply, erection, testing and commissioning of maintenance free earthing	4	nos	8580.84	2391.81	43890.60
17	Supply, erection, testing and commissioning of GI strip of 25 mm x 3 mm	20	mtr	160.87	26.19	3741.20
	Total of Schedule (D-1)					12,36,307.88

D-2	(D-2): Electrification for Provision of extension of platform at <u>Mumbra</u> of through lines for running of 15 car EMU services.					
1	Supply, erection, testing and commissioning of 2 x 18 W LED fitting with IP 66 complete with connection and necessary fixing arrangements as per site requirement.	150	nos	1711.05	69.18	267034.50
2	Supply, erection, testing and commissioning of BLDC Air circulator wall mounted 24" sweep fan with necessary connection.	28	nos	15044.71	1504.47	463377.04
3	Supply, erection, testing and commissioning of 56" sweep energy efficient BLDC ceiling fan with down rod, motor, etc. with necessary connection.	25	nos	4386.36	438.64	120625.00
4	Supply, erection, testing and commissioning of water cooler with all accessories and necessary connection.	1	nos	49860.00	0.00	49860.00
5	Supply, running, fixing and stringing of OHE mains of 5 line wire	440	ckt-mtr	127.91	9.13	60297.60
6	Supply, running, fixing and stringing of OHE mains of 3 line wire	420	ckt-mtr	53.54	5.94	24981.60
7	Supply, laying, running fixing of following sizes of XLPE insulated, PVC sheathed, 1.1 KV grade cables as per IS.					
a	4 core 50 sq.mm AL conductor, armoured	250	mtr	376.36	37.64	103500.00
b	4 core 35 sq.mm AL conductor, armoured	650	mtr	298.18	29.82	213200.00
8	Supply and fixing of GRP / FRP cable tray made of glass fiber reinforced polyester moulding composite material, size 200mm width x 50mm depth min., 04mm thick min., including horizontal and vertical reducers, tees, cross members and other accessories as required and duly suspended from the ceiling with GI suspenders etc., as per specifications	150	mtr	737.10	73.72	121623.00
9	Supply and laying of DWC pipe of size 4" dia	20	mtr	242.66	29.01	5433.40
10	Supply, erection, testing and commissioning of 125 A MCCB 1 no. as incoming and 02 nos 63 FP MCB, 32A FP MCB: 02Nos, 10 nos 20A DP MCB as outgoing complete with busbars, neutral link, etc.	2	nos	26252.51	4351.98	61208.98
11	Fabrication, supply, erection, testing and commissioning of single sided glow sign board of different sizes made out of Poly Carbonate sheets as per detail specification.	13	sq.mtr	2637.37	292.93	38093.90
12	Fabrication, supply, erection, testing and commissioning of double sided glow sign board of different sizes made out of Poly Carbonate sheets as per detail specification.	19	sq.mtr	3745.00	415.00	79040.00
13	Supply, erection, testing and commissioning of maintenance free earthing	3	nos	8580.84	2391.81	32917.95
	Total of Schedule (D-2)					16,41,192.97

D-3	(D-3): Electrification for Provision of extension of platform at Kalva of through lines for running of 15 car EMU services.					
1	Supply, erection, testing and commissioning of 2 x 18 W LED fitting with IP 66 complete with connection and necessary fixing arrangements as per site requirement.	180	nos	1711.05	69.18	320441.40
2	Supply, erection, testing and commissioning of BLDC Air circulator wall mounted 24" sweep fan with necessary connection.	28	nos	15044.71	1504.47	463377.04
3	Supply, erection, testing and commissioning of 56" sweep energy efficient BLDC ceiling fan with down rod, motor, etc. with necessary connection.	12	nos	4386.36	438.64	57900.00
4	Supply, running, fixing and stringing of OHE mains of 5 line wire	450	ckt-mtr	127.91	9.13	61668.00
5	Supply, running, fixing and stringing of OHE mains of 3 line wire	450	ckt-mtr	53.54	5.94	26766.00
6	Wiring of the conduit Light /fan point with all accessories.	150	nos	304.40	30.44	50226.00
7	Supply, erection, testing and commissioning of water cooler with all accessories and necessary connection.	1	nos	49860.00	0.00	49860.00
8	Supply, laying, running fixing of following sizes of XLPE insulated, PVC sheathed, 1.1 KV grade cables as per IS.					
a	4 core 50 sq.mm AL conductor, armoured	250	mtr	376.36	37.64	103500.00
b	4 core 35 sq.mm AL conductor, armoured	650	mtr	298.18	29.82	213200.00
9	Supply and fixing of GRP / FRP cable tray made of glass fiber reinforced polyester moulding composite material, size 200mm width x 50mm depth min., 04mm thick min., including horizontal and vertical reducers, tees, cross members and other accessories as required and duly suspended from the ceiling with GI suspenders etc., as per specifications	150	mtr	737.10	73.72	121623.00
10	Supply and laying of DWC pipe of size 4" dia	20	mtr	242.66	29.01	5433.40
11	Supply, erection, testing and commissioning of 125 A MCCB 1 no. as incoming and 02 nos 63 FP MCB, 32A FP MCB: 02Nos, 10 nos 20A DP MCB as outgoing complete with busbars, neutral link, etc.	2	nos	26252.51	4351.98	61208.98
12	Fabrication, supply, erection, testing and commissioning of single sided glow sign board of different sizes made out of Poly Carbonate sheets as per detail specification.	7	sq.mtr	2637.37	292.93	20512.10
13	Fabrication, supply, erection, testing and commissioning of double sided glow sign board of different sizes made out of Poly Carbonate sheets as per detail specification.	7	sq.mtr	3745.00	415.00	29120.00
14	Supply, erection, testing and commissioning of maintenance free earthing	3	nos	8580.84	2391.81	32917.95
	Total of Schedule (D-3)					16,17,753.87

D-4	(D-4): Electrification for extension of platform no 3&4 of through line at Diva Station for running of 15 car EMU service.					
1	Supply, erection, testing and commissioning of 2 x 18 W LED fitting with IP 66 complete with connection and necessary fixing arrangements as per site requirement	150	nos	1839.81	73.80	287041.50
2	Supply, erection, testing and commissioning of 24" sweep 3 blade type air circulators complete with necessary fixing arrangement	28	nos	11762.41	1176.24	362282.20
3	Supply, erection, testing and commissioning of astronomical timer panel board for high mast with all fixing arrangement as per Railway's requirement	4	nos	19073.27	699.56	79091.32
4	Supply, laying, running fixing of following sizes of XLPE insulated, PVC sheathed, 1.1 KV grade cables as per IS.					
a	4 core 50 sq.mm AL conductor, armoured	750	mtr	376.36	37.64	310500.00
b	4 core 10 sq.mm CU conductor , armoured	1478	mtr	550.00	55.00	894190.00
5	Excavation of cable trench in soil & filling the trench with sand, pebbles etc. after laying of the cable complete with RCC warning cover & cable markers, sand etc. as per railways requirement	100	mtr	0.00	64.36	6436.00
6	Excavation of cable trench on CC flooring / Hard / rocky soil & making of trench & recasting of flooring/pit after lying of cable as per railways requirement.	80	mtr	0.00	242.73	19418.40
7	Supply and laying of GI perforated cable tray of size 150 mm x 50 mm x 2 mm Thick	350	mtr	554.23	55.42	213377.50
8	Supply and laying of DWC pipe of size 4" dia	50	mtr	242.66	29.01	13583.50
9	Supply, erection, testing and commissioning of FRP junction box as per Railway's requirement.	80	nos	1485.07	148.51	130686.40
10	Supply, erection, testing and commissioning of LT Distribution Panel Board comprising of 100-125 Amp FP MCCB 36kA Microprocessor based release 02 nos, 160 A FP MCCB buscoupler 1 no., RCBO 4 Pole, 32 Amp 415V 50Hz 10kA Sensitivity -300 mA - 4 nos, RCBO 4Pole 63 Amp 415V 50Hz 10kA Sensitivities-300 mA - 6 nos. as outgoing complete with busbars, neutral link, etc. as per site requirement	2	nos	132541.41	14726.82	294536.46
11	Design, manufacture, display, installation of wall / hanging / floor mounting type LED illuminated sign / direction boards in elliptical/half elliptical /semi elliptical etc. shape. The display sheet shall be of unbreakable 040 translucent polycarbonate sheet of 2 mm thickness. The text / graphics matter visibility shall not be less than 160 deg. The approved colour text and graphics shall be printed / router cut on monomeric calendared vinyl of 70 µM thickness and shall be firmly pasted on display sheets. The mounting arrangement shall be hanging, wall mounting,	305	sq.ft	2898.39	289.84	972410.15

	ceiling mounting, pole mounting or floor mounting and as per site requirement. The signage shall have the integral mounting arrangements with sturdy structural frame and ACP cladding on the back side of the signage to avoid rusting and entry of dust. The LED board shall have uniform illumination with 6-8 W/sq.ft and with brightness more than ambient light. Suitable size end cap of 1.5 mm thick SS 304 should be provided.					
12	Supply, erection, testing and commissioning of maintenance free earthing	4	nos	8580.84	2391.81	43890.60
13	Supply, erection, testing and commissioning of GI strip of 25 mm x 3 mm	20	mtr	160.87	26.19	3741.20
	Total of Schedule (D-3)					36,31,185.23
	Total of Schedule - D(1+2+3+4)					81,26,439.95
	Total of Schedule (A+B+C+D) (in Rs.) (All inclusive)					2,92,42,357.81

TOTAL in words: (Rupees Two Crore Ninety Two Lakh Forty Two Thousand Three Hundred Fifty Seven and Eighty One Paise only)

Note:

1. The above rates shall be firm, inclusive of all taxes, GST, duties, freight and other incidental charges.
2. Before quoting the rates the tenderer should read explanatory note. In case of any discrepancy between description of price schedule items and explanatory notes of each item, the details specified in explanatory notes shall be applicable.
3. All the bidders / tenders should ensure that they are GST compliant and their quoted tax structure / rates are as per GST Law.
4. Tenderer shall quote percentage above /at par /below the Railway's estimated cost, as far as possible.
5. The quantities mentioned above are tentative, however these may change as per site conditions for improving aesthetic appearance.

CHAPTER - VII

FORMS FOR TENDER ETC

LIST OF WORKS COMPLETED IN **QUALIFYING PERIOD**

S N	Description of work	Organizatio n for whom executed	Approximate value of contract at the time of award.	Payment received in the qualifying period	Date of award	Date of scheduled completion of work	Date of actual start	Actual completion	Final value of contract

Signature of the Contractor

Proforma B

LIST OF WORKS ON HAND

SN	Description of work	Contract value	Approximate value of balanced work yet to be done	Date of award

Signature of the Contractor

DECLARATION FORMAT

As per GCC April 2022, Clause No 16 Employment/Partnership etc. of Retired Railway Employees

Clause	CONDITIONS	WRITE YES/NO WHICH IS APPLICABLE
16 (a)	(i) Should a tenderer be a retired Engineer of the gazetted rank or any other gazetted officer working before his retirement, whether in the executive or administrative capacity or whether holding a pensionable post or not, in the Engineering or any other department of any of the railways owned and administered by the President of India for the time being, OR	YES / NO In case where such Engineer or officer had not retired from government service at least 1 year prior to the date of submission of the Tender. THEN The tenderer will give full information as to the date of retirement of such Engineer or gazetted officer from the said service and as to whether permission for taking such contract, or if the Contractor be a partnership firm or an incorporated company, to become a partner or director as the case may be, has been obtained by the tenderer or the Engineer or officer, as the case may be from the President of India or any officer, duly authorized by him in this behalf, shall be clearly stated in writing at the time of submitting the tender.
	(ii) Should a tenderer being partnership firm / joint venture (JV) / registered society / registered trust etc. have as one of its partners/members a retired Engineer of the gazetted rank or any other gazetted officer working before his retirement, OR	
	(iii) Should a tenderer being an incorporated company have any such retired Engineer of the gazetted rank or any other gazetted officer working before his retirement as one of its directors	
16 (b)	In case, upon successful award of contract, should a tenderer depute for execution of the works under or to deal matters related with this contract, any retired Engineer of gazetted rank or retired gazetted officer working before his retirement in the Engineering or any other department of any of the railways owned and administered by the President of India for the time being, and now in his employment.	YES/NO If yes then the tenderer will ensure that retired Engineer or retired gazetted officer had retired from government service at least 1 year prior to the date of his employment with tenderer and in case he had retired from service within a year then he possesses the requisite permission from the President of India or any officer, duly authorized by him in this behalf, to get associated with the tenderer.
16 (c)	Should a tenderer or Contractor being an individual, have member(s) of his family or in the case of partnership firm/ company / joint venture (JV) / registered society / registered trust etc. one or more of his partner(s) / shareholder(s) or member(s) of the family of partner(s)/shareholder(s) having share of more than 1% in the tendering entity employed in gazetted capacity in the Engineering or any other department of the railway	YES/NO If yes then the tenderer at the time of submission of tender, will inform the Authority inviting tenders the details of such persons.
Note: - If information as required as per 16. a), b), c) above has not been furnished; contract is liable to be dealt in accordance with provision of clause 62 of Standard General Condition of contract.		

Date:

Signature

Place:

(Name of contractor/firm)

Annexure - V (A) of GCC April 2022

(THIS CERTIFICATE IS TO BE GIVEN BY ATTORNEY/AUTHORIZED SIGNATORY/EACH MEMBER OF PARTNERSHIP FIRM/JOINT VENTURE (JV) / HINDU UNDIVIDED FAMILY (HUF) / LIMITED LIABILITY PARTNERSHIP (LLP) ETC.)

I/We..... (Name), attorney/authorized signatory of the
(constituent firm/constituent partner) and member/partner of the
(tendering firm) hereby solemnly affirm and state as under:

1. I/we certify that (constituent firm/constituent partner) is/are not blacklisted or debarred by Railways or any other Ministry / Department of Govt. of India from participation in tender on the date of submission of bids, either in individual capacity or as a HUF/ member of the partnership firm/LLP/JV/Society/Trust.
2. I/We have read the clause regarding restriction on procurement from a bidder of a country which shares a land border with India and certify that I am/We are not from such a country or, if from such a country, have been registered with the competent Authority. I/We hereby certify that I/we fulfil all the requirements in this regard and am/are eligible to be considered (evidence of valid registration by the competent authority is enclosed).

SEAL AND SIGNATURE OF
THE CONSTITUENT FIRM/CONSTITUENT PARTNER

Place:

Dated:

Annexure VI A of GCC April 2022

(BID SECURITY)

Bank Guarantee Bond from any scheduled commercial bank of India
(On non-judicial stamp paper, which should be in the name of the Executing Bank).

Name of the Bank: -----

President of India,
 Acting through Senior Divisional Electrical Engineer,
 (General Service) Mumbai CSMT, Central Railway.

Beneficiary: **Senior Divisional Finance Manager, Mumbai CSMT, Central Railway**

Date:

Bank Guarantee Bond No.:

Date: -----

In consideration of the President of India acting through Senior Divisional Electrical Engineer, (General Service) Mumbai CSMT, Central Railway (hereinafter called "The Railway") having invited the bid for **"(A) Electrification for upgradation of SM office, other utility offices, construction and improvement of toilet, beautification of FOBs and allied works at Thakurli station. (B) Rewiring for renovation and improvement of service buildings in between Kanjurmarg-Kopar Section. (C) Rewiring for renovation and improvement of service building at Thakurli, Dombivli and Kalyan Station. (D) Electrification for Provision of extension of platform at Vikhroli, Kalva, Mumbra & Diva of through lines for running of 15 car EMU services."** through Notice inviting tender (NIT) No. **BB.LG.W.THK.2026.01**, we have been informed that..... *[Insert name of the Bidder]* (hereinafter called "**the Bidder**") intends to submit its bid (hereinafter called "**the Bid**"). WHEREAS, the Bidder is required to furnish Bid Security for the sum of **Rs. 5,84,900/-** in the form of Bank Guarantee, according to conditions of Bid.

AND

WHEREAS, *[Insert Name of the Bank]*, with its Branch*[Insert Address]* having its Headquarters office at..... *[Insert Address]*, hereinafter called the **Bank**, acting through*[Insert Name and Designation of the authorised persons of the Bank]*, have, at the request of the Bidder, agreed to give guarantee for Bid Security as hereinafter contained, in favour of the Railway:

1. KNOW ALL MEN that by these present that I/We the undersigned *[Insert name(s) of authorized representatives of the Bank]*, being fully authorized to sign and incur obligations for and on behalf of the Bank, confirm that the Bank, hereby, unconditionally and irrevocably guarantee to pay to the Railway full amount in the sum of **Rs. 5,84,900/-** as above stated.
2. The Bank undertakes to immediately pay on presentation of demand by the Railway any amount up to and including aforementioned full amount without any demur, reservation or recourse. Any such demand made by the Railway on the Bank shall be final, conclusive and binding, absolute and unequivocal on the Bank notwithstanding any disputes raised/ pending before any Court, Tribunal, Arbitration or any Authority or any threatened litigation by the Bidder or Bank.
3. The Bank shall pay the amount as demanded immediately on presentation of the demand by Railway without any reference to the Bidder and without the Railway being required to show grounds or give reasons for its demand of the amount so demanded.
4. The guarantee hereinbefore shall not be affected by any change in the constitution of the Bank or in the constitution of the Bidder.

5. The Bank agrees that no change, addition, modifications to the terms of the Bid document or to any documents, which have been or may be made between the Railway and the Bidder, will in any way absolve the Bank from the liability under this guarantee; and the Bank, hereby, waives any requirement for notice of any such change, addition or modification made by Railway at any time.
6. This guarantee will remain valid and effective from.....*[insert date of issue]* till*[insert date, which should be minimum 90 days beyond the expiry of validity of Bid]*. Any demand in respect of this Guarantee should reach the Bank within the validity period of Bid Security.
7. The Bank Guarantee is unconditional and irrevocable.
8. The expressions Bank and Railway herein before used shall include their respective successors and assigns.
9. The Bank hereby undertakes not to revoke the guarantee during its currency, except with the previous consent in writing of the Railway. This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No.758.
10. The Bank hereby confirms that it is on the SFMS (Structured Financial Messaging System) and shall invariably send the advice of this Bank Guarantee to the following bank details –

IFSC CODE	SBIN000RAIL
IFSC TYPE	BRANCH
BANK NAME	STATE BANK OF INDIA
BRANCH NAME	RAIL
CITY NAME	NAVI MUMBAI
ADDRESS	SECTOR-11, CBD BELAPUR, NAVI MUMBAI
DISTRICT	NAVI MUMBAI
STATE	MAHARASHTRA
BG ENABLED	YES

11. The Guarantee shall be valid in addition to and without prejudice to any other security Guarantee(s) of Bidder in favour of the Railway. The Bank, under this Guarantee, shall be deemed as Principal Debtor of the Railway.

Date

Place.....

.....

Bank's Seal and authorized signature(s)

[Name in Block letters]

[Designation with Code No.]

[P/Attorney] No.

Witness:

1. Signature, Name & Address & Seal

2. Signature, Name& address & Seal

Bank's Seal

*[P/Attorney]*No.

Note: All italicized text is for guidance on how to prepare this bank guarantee and shall be deleted from the final document.

Annexure VI B of GCC April 2022

Reference -Para 10.2 & 17.15.2 of Tender Form (Second Sheet) of Annexure I of ITT

Each Bidder or each member of a JV must fill in this form separately

NAME OF BIDDER/JV PARTNER:

Annual Contractual Turnover Data for the Previous 3/4 Years (Contractual Payment only)			
Year	Amount Currency	Exchange Rate	Indian National Rupees Equivalent
Average Annual Contractual Turnover for last 3 years			

1. The average annual contractual turnover shall be calculated as an average of “total contractual payments” in the previous three financial years. However, in case balance sheet of the previous year is yet to be prepared / audited, the audited balance sheet of the fourth previous year shall be considered for calculating average annual contractual turnover.
2. The information supplied shall be substantiated by data in the audited balance sheets and profit and loss accounts for the relevant years in respect of the bidder or all members constituting the bidder.
3. Contents of this form should be certified by a Chartered Accountant duly supported by Audited Balance Sheet duly certified by the Chartered Accountant.

SEAL AND SIGNATURE OF THE BIDDER

Certified that all figures and facts submitted in this form have been furnished after full consideration of all observations/notes in Auditor’s reports_____

(Signature of Chartered Accountant)

Name of CA: _____

Registration No: _____

(Seal)

AGREEMENT *

AN AGREEMENT made this.....day ofTwo Thousand and..... between the President of India, acting in the premises through the General Manager or his successor.....Railway..... of the Ministry of Railways, Railway Board (hereinafter referred to as "The Purchaser") of the one part and Messrs.....(hereinafter referred to as "The Contractor") of the other part.

Whereas in response to a call for (Name of the work) in section of Mumbai division of Central Railway as per Tender papers at Annexure 'A' hereto the Contractor has submitted a Tender as per Annexure 'B' hereto and whereas the said Tender of the Contractor has been accepted as per copy of Letter of Acceptance No.....dated..... complete with enclosures annexed hereto as Annexure-C indicating the accepted rates and agreed deviations against the Tender No. annexed hereto as Annexure-A at a total contract value of Rs.....(Rupees.....Only).

Now this agreement witnessed that in consideration of the premises and the payment to be made by the Purchaser to the Contractor provided for herein below the Contractor shall supply all equipments and materials and execute and perform all works for which the said Tender of the Contractor has been accepted strictly according to the various provisions in Annexure 'A' and 'C' hereto and upon such supply, execution and performance to the satisfaction of the Purchaser, the purchaser shall pay to the Contractor at the several rates accepted as per the said Annexure 'C' and in terms of the provisions therein. Completion period of the said work is months from the date of issue of Letter of Acceptance.

In witness where of the parties have hereunto set and subscribed there respective hands and/or seals the day and year respectively mentioned against their respective signature.

(Signature of the Contractor)

Signed and delivered at by Shri.....for and on behalf of M/s.....the Contractor within-named in the presence of :-

Witnesses of Contractor :

1. Signature

Date

Name in Block Letters

Address

2. Signature

Date

Name in Block Letters

Address

(Signature of the purchaser)

behalf of the President of India by Shri....., General Manager or his
successor.....Railway.....Ministry of Railways (Railway Board) in the presence of:-

Witnesses:

1. Signature
Date
Name in Block Letters
Address
2. Signature
Date
Name in Block Letters
Address

.....

Annexure 'A': Tender Papers No.

Annexure 'B': Firm's Offer No.

Annexure 'C': Letter of Acceptance No. complete
with enclosures.



BANK GUARANTEE BOND FOR PERFORMANCE GUARANTEE

In consideration of the President of India (hereinafter called "the Government") having agreed to exempt _____ (hereinafter called "the said contractor(s)") from the demand, under the terms and conditions of an Agreement No. _____ dated _____ made between M/s. _____ and The Chief _____, Central Railway, Mumbai – 400 001 for _____ (name of work) (hereinafter called "the said Agreement") of performance guarantee for the due fulfillment by the said Contractor(s) of the terms and conditions contained in the said Agreement, on production of an irrevocable bank guarantee for Rs. _____ (Rupees _____ only) i.e. 5% of the contract value. We _____ (hereinafter referred to as "the Bank") (indicate name of the Bank) at the request of _____ (contractor(s)) do hereby undertake to pay to the Government an amount not exceeding Rs. _____ against any loss or damage caused to or suffered or would be caused to or suffered by the Government by reason of any breach by the said contractor(s) of any of the terms or conditions in the said Agreement.

2. We _____ do hereby undertake.
(indicate the name of the Bank)

to pay the amounts due and payable under this guarantee without any demur, merely on a demand from Government stating that the amount claimed is due by way of loss or damage caused to or would caused to or suffered by the Government by reason of breach by the said contractor(s) of any of the terms or conditions contained in the said Agreement or by reason of the contractor(s) failure to perform the said agreement. Any such demand made on the bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. _____.

3. We under take to pay to the Government any money so demanded notwithstanding any dispute or disputes raised by contractor(s) supplier(s) in any suit or proceeding pending before any court or Tribunal relating thereto our liability under this present being absolute and unequivocal. The payment so made by us under this bond shall be a valid discharge of our liability for payment there under and the contractor(s) /supplier(s) shall have no claim against us for making such payment.

4. We _____ further agree that the guarantee (indicate the name of the Bank) herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Agreement and that period that would be taken for the performance of the said Agreement and that it shall continue to be enforceable till all the dues of the Government under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till _____ office/Department Ministry of _____ Certifies that the terms and conditions of the said Agreement have been fully and properly carried out by the said Contractor(s) and accordingly discharges this guarantee unless a demand or claim under this guarantee is made on us in writing on or before the _____ we shall be discharged from all liability under this guarantee thereafter.

5. We _____ further agree with the
(Indicate the name of the Bank)

the Government that the government shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Agreement or to extend time of performance by the said Contractor(s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Government against the said Contractor(s) to forbear or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by reasons of any such variation, or extension being granted to the said contractor(s) or for any forbearance, act or omission on the part of the Government or any indulgence by the Government to the said Contractor(s) or any such matter or thing whatsoever which under the law relating to sureties would but for this provision, have effect of so relieving us.

6. This guarantee will not be discharged due to the change in the constitution of the Bank or the contractor(s) supplier(s).

7. We _____lastly undertake not

(Indicate the name of Bank)

to revoke this guarantee during its currency except with the previous consent of the Government in writing.

Dated the _____ day of _____ 200

For _____
(indicate the name of Bank)

STANDING INDEMNITY BOND FOR 'ON ACCOUNT' PAYMENTS**(On paper of requisite stamp value)**

We, M/s..... hereby undertake that we hold at our stores Depot/s at for and on behalf of the President of India acting in the premises through the General Manager or his successor of Central Railway (hereinafter referred to as "The Purchaser") all materials for which 'On Account' payments have been made to us against the Contract for supply and erection of (Name of work) *.on the section/s of Central Railway also referred to as Group/s vide letter of Acceptance of Tender No..... dated..... and materials handed over to us by the purchaser for the purpose of execution of the said Contract, until such time the materials are duly erected or otherwise handed over to him.

We shall be entirely responsible for the safe custody and protection of the said materials against all risk till they are duly delivered as erected equipment to the purchaser or as he may direct otherwise and shall indemnify the purchaser against any loss damage or deterioration whatsoever in respect of the said materials while in our possession and against disposal of surplus materials. The said materials shall at all times be open to inspection by any officer authorised by the General Manager in charge of Railway Electrification (whose address will be intimated in due course).

Should any loss, damage or deterioration of materials occur or surplus materials disposed off and refund becomes due, the Purchaser shall be entitled to recover from us the full cost as per prices included in Schedule 3 to the Contract (as applicable) and in respect of other materials as indicated in, Chapter- IV, section 1 and also compensation for such loss or damage if any long with the amount to be refunded without prejudice to any other remedies available to him by deduction from any sum due or any sum which at any time hereafter becomes due to us under the said or any other Contract.

Dated this day..... day of..... 20

for and on behalf of

M/s.....(Contractor)

Signature of witness

Name of witness in Block Letters

Address.

* Strike out whichever is not applicable

(On Stamp Paper of Requisite Value)**GUARANTEE BOND AGAINST PROVISIONAL ACCEPTANCE PAYMENTS****(TO BE USED BY APPROVED SCHEDULE BANKS/NATIONALISED BANKS)**

1. In consideration of the President of India " hereinafter called "the Government" having agreed to exempt.....(hereinafter called "the said Contractor (s)" from the demand, under the terms and conditions of an Agreement dated.....made between.... and for (hereinafter called "the said Agreement") of Provisional Acceptance Payments for the due fulfillment by the said Contractor (s) of the terms and conditions contented in the said Agreement, on production of a Bank guarantee for Rs.....(Rupees.....only). We,..... hereinafter referred to as "the Bank" (indicate the name of Bank) at the request of (Contractor(s) do hereby undertake to pay to the Government an amount not exceeding Rs..... against any loss or damage caused to or suffered or would be caused to or suffered by the Government by reason of any breach by the said Contractor (s) of any of the terms or conditions contained in the said Agreement.
2. We..... (indicate the name of the Bank) do hereby undertake to Pay the amount due and payable under this guarantee without any demur, merely on a demand from the Government stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the Government by reason of breach by the said Contractor (s) of any of the terms or conditions contained in the said Agreement or by reason of the Contractor (s) failure to perform the said Agreement. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding.....
3. We undertake to pay to the Government any money so demanded notwithstanding any dispute or disputes raised by the Contractor (s), supplier (s) in any suit for proceeding pending before any court or Tribunal relating thereto our liability under this present contract being absolute and unequivocal.

The payment so made by us under this bond shall be a valid discharge of our liability for payment thereunder and the Contractor(s) / supplier (s) shall have no claim against us for making such payment.

4. We..... (indicate the name of the Bank) further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Agreement and that it shall continue to be enforceable till all the dues of the Government under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till..... office/Department Ministry of.....certifies that the terms and conditions of the said Agreement have been fully and properly carried out by the said contractor (s) and accordingly discharges this guarantee. Unless a Demand or claim under this guarantee is made on us in writing on or before the (b) we shall be discharged from all liability under this guarantee thereafter.
5. We..... (indicate the name of the Bank) further agree with the Government that the Government shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Agreement or to extend time of performance by the said Contractor(s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Government against the said Contractor (s) and to forbear or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by reason of any such variation or extension being granted to the said Contractor (s) or for any forbearance, act or omission on the part of the Government or any indulgence by the Government to the said Contractor (s) or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision, have effect of so relieving us.

6. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor (s)/ Supplier (s).
7. We..... (indicate the name of the Bank) lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Government in writing.

Dated: the day of 20
for.....
(indicate the name of Bank)
