



ELECTRICAL (CONSTRUCTION)

TRD TENDER DOCUMENT

Tender No - DYCE-C-JAM-RANAVAV-01

Name of Work :Design, Supply,Testing& Commissioning of 25 kv, AC OHE, construction of ICD maintenance facilities including Vande Bharat Trainsat in connection with Ranavav (RWO) Yard Remodelling and Develop Coaching Depot Terminal.

SPECIAL CONDITIONS OF ELECTRICAL DEPTT**1- Electrical Contractor License :-**

For participating in tenders for a work in any state the Contractors shall have to possess electrical license of appropriate voltage issued by any State Govt. under Clause 45 of compilation of rule of Indian Electricity Rules 1956 or as amended from time to time and a copy of the same should be submitted along with the offer. They shall keep valid license throughout the period of execution of work by getting it renewed at suitable intervals and submit an attested copy of the same to the Railways after each renewal. In the event of any discontinuity in validity of electrical license of the contractor, its authority to work with Railways will also automatically cease to be valid.

- i) The Tenderer should have valid license in the name of proprietor/partner/firm. Tenderer should enclose attested copy of valid Electrical Contractor License with tender.
- ii) In case, the license is under renewal, copy of challan (receipt of renewal fee) to be submitted along with the tender and attested copy of the valid electrical contractor license to be submitted within one month from the date of opening of tender. Otherwise the tender will not be considered.
- iii) If the attested copy of valid electrical contractor license or license under renewal with challan (receipt of renewal fee) is not enclosed with tender the tender will not be considered.

2-TENDEREER'S ELIGIBILITY CRITERIA AND CREDENTIALS**i-As per GCC Part –I Annexure-I (Contd.) para 10 & 11**

Similar Nature of Work means:- "Execution of any 1500 V DC or 25 KV AC OHE work"

ii-Qualification and Eligibility Criteria-

As per GCC Part –I Annexure-I (Contd.) para 10 & 11**As per GCC Part –I para-6****3-GUARANTEE CLAUSE:**

- (a) The work done by the contractor shall be guaranteed for satisfactory working of all the equipment and the installations provided by him, for a minimum period of **one year** from the date of completion of entire work unless it is mentioned in the chapter 'Technical Specification'. The guarantee for the spare parts should be coincident with the guarantee for entire work.
- (b) During this period of guarantee, the contractor shall keep available an experienced engineer and necessary equipment's to attend to any defective installations. The contractor shall bear the cost of all modifications, additions or substitutions that may be considered necessary due to faulty material, design or workmanship for the satisfactory working of the equipment's. The final decision shall rest with the Chief Electrical Engineer (construction) or his (their) successor(s).
- (c) During the period of guarantee the contractor shall be liable for the replacement of any equipment & any parts which may be found defective whether such equipments be of his own manufacture or those of his sub contract, whether arising from faulty design, material, workmanship or negligence in any manner on the part of the contractor at his (contractor's) own expenses. In case of type defect in the contractor's equipment and components detected during the guarantee period, the contractor should replace all such items irrespective of the fact that whether all such items have failed or not. The contractor shall bear the cost of the repairs carried out on his behalf by the contractor at site. In such a case, the contractor shall be informed in advance of the works proposed to be carried out by the contractor.
- (d) It becomes necessary for the contractor to replace or renew any defective portions of the installation under the Para aforesaid then the provisions of the said Para shall also apply to the portion of the installation so replaced or renewed until the expiration of six months from the date of such replacement or renewal or until the end of above mentioned period (see sub Para (a) above whichever is later. If any defect be not remedied within a reasonable time during the aforesaid period, the contractor may proceed to do the work at the contractor's risk and expense, but without prejudice to any other rights and remedies which the contractor may have against the contract in respect of such defects or faults.
- (e) The contractor will be responsible for any damage / theft for part of the work completed & paid in running bills till entire work is taken over by the Railway.
- (f) The repaired or renewed parts shall be delivered and erected on site free of charge to the contractor.

The contractor guarantees that the stores which he supplies will be fully in accordance with specifications and will be operate properly. In all cases, the contractor guarantees that his designs would strictly follow the 'as made' detailed drawings with such modification as are modified in respect of each type. The contractor further guarantees that the store will be free from defects in materials and workmanship provided that the

contractor's liability in this respect shall be limited to furnishing and installation of replacement parts free of any charge or the repair of defective parts only to the extent that such replacements or repairs are attributable to or arise from faulty workmanship or material or design in the manufacture of stores.

It shall be a condition of the guarantee hereunder that any defects complaint of shall be brought to the contractor's attention within a reasonable time of their being first discovered. The guarantee therein contains shall not apply to any material which shall have been repaired or altered by the contractor or on behalf in any way to misuse, negligence or incidents.

All replacement and repairs that the contractor shall take up on the contractor to delivery of the firm under this guarantee shall be delivered and perform by the contractor promptly and satisfactorily.

Any approval or acceptance by the contractor of the stores or of the materials incorporated therein shall not in any way limit the contractor's liabilities hereunder. The decision of the contractor in regard the contractor's liability under guarantee shall be final and conclusive.

(g) Guarantee for LED lights shall be as per Latest WR specification for LED Lights.

4-SPECIAL CONDITIONS

For other Railway Stores-

If any material other than specified material is supplied by the Railway either at the contractors request or sue moto in order to prevent any possible delay in the execution of the work likely to occur due to the contractors inability to make adequate arrangement for supply thereof or otherwise, recovery will be made from contractor's bill at the book rate or last purchase rate whichever is higher plus 5%on account of initial freight and 2% on account of incidental charges together with supervision charges at 12.5 % of the total cost inclusive of material, freight and incidental charges, freight between the punchers source of supply and the contractors depot or rail head shall be to the contractors account.

If however, the material required by the contractor is not available in Railway's stock or the Railway decide not to the same be that for whatever reason, the Railway shall not be bound to arrange for the supply at cost quoted above or at any other cost nor will this fact be accepted as any other cost nor will this fact be accepted as an excuse for delay in execution of works.

5-PRICE VARIATION CLAUSE:

PRICE VARIATION: STANDARD PRICE VARIATION CLAUSE:

As per GCC Part –II para 46 A

6-FURNISHING WRONG INFORMATION:

If the Tenderer deliberately gives wrong information in his/their tender, creates/create circumstances for the acceptance of his/their tender, the Railway Administration reserve the right to reject such tender at any stage.

7-PERFORMANCE GUARANTEE:

As per GCC Part –II para 16 (4)**8-INSPECTION OF SITE BEFORE TENDERING:**

The tenderer(s) shall inspect the proposed site of work and acquaint himself/themselves with the site conditions

9-TERMS OF PAYMENT:-

- a) 70% of price of supply of material on receipt and acceptance of material at site.
- b) Balance 20% of price of supply and 90% of price of erection after erection of equipment and material at site.
- c) Balance 10% of price of supply & 10% price of erection after commissioning and completion of entire work **(for General Service work).**

OR

- i. Balance 10% of price of supply & 10% price of erection after the portion of OHE charged, goods/passenger train operation has started on regular basis **(for TRD work).**
- ii. All payment shall be made on certificate of Dy. Chief Electrical Engineer (Construction), Western Railway or his authorized representative.

10-PREVAILING CONDITIONS:

- **Railway's General condition of contract (GCC) will be applicable along with special conditions of contract**
- In case of any conflict between special conditions of contract and the General conditions of contract (GCC), the special conditions of contract will prevail.

11-SUPPLY OF ELECTRICITY:-

As per GCC Part –II para 31.(4)

12- CARE OF STAFF:

No quarters will be provided by the Railway for the accommodation of the Contractor or any of his staff employed on the work. The contractor may be allowed to erect any labour camps for housing the labour at or near the site of work on available Railway land subject to payment of cess and water charges. The Contractor shall at his own cost make all necessary and adequate arrangement for the importation, feeding and preservation of the hygiene of his staff. The Contractor shall permit inspection at all times of all sanitary arrangements made by him, by the Engineer or his assistant or medical staff of the railway. If the Contractor fails to make adequate medical, sanitary

arrangements, these will be provided by the Railway, the cost thereof being recovered from the Contractor. In case some accommodation is available, it can be given on license fee.

13-DAMAGE BY ACCIDENT, FLOODS OR TIDES:

- (a) The Contractor shall take all precautions against damage from accident, floods or tides. No compensation will be allowed to the contractor for his plant or part or material lost or damaged by any cause whatsoever. The contractor shall be liable to make good the damages to any structure or part of structure, plant or material of every description belonging to the administration lost or damaged by any cause during the course of the Contractor's work.
- (b) The administration will not be liable to pay to the contractor any charges for rectification or repairs to any damage which may have occurred from any cause, whatsoever, to any part of the new/existing structure, during construction.

14-FIRST AID:

The Contractor shall maintain in a readily accessible place first aid appliances including an adequate supply of sterilized + cotton wool. The appliance shall be placed under the charge of a responsible person who shall be readily available during working hours.

15-INSPECTION REGISTER AND RECORDS:

The Contractor/s shall maintain accurate records, plans and charts showing the dates and progress of all main operations and the Engineer shall have access to this information at all reasonable times. Records of tests made shall be handed over to the Engineer's representative after carrying out the tests. The following registers will be maintained at site by the Contractor/s.

- a. Bar chart & Drawings
- b. Insulation Resistance Register
- c. Earth Resistance & Earth continuity Register
- d. Material Receipt from Railway & used at site Register

16-ENGAGEMENT OF QUALIFIED ENGINEER:

- 1- In terms of provisions of new Clause 26A.1 to the General Conditions of Contract (GCC), contractor shall also employ following Qualified Engineers during execution of the allotted work:
 - a. One Qualified Graduate Engineer when cost of work to be executed is Rs.200 lakh and above, and
 - b. One Qualified Diploma Holder Engineer when cost of work to be executed is more than Rs.25 lakh, but less than Rs.200 lakh.
- 02(a) The tenderer/s shall also give a declaration along with his/their tender to the effect that he/they shall engage and continue in service for the period of the contract, One Electrical Engineer Degree Holder and also one Electrical Engineers Diploma Holder. If they are without experience of any kind, they will be given

training by the contractor on stipend basis at the rate of not less than Rs.1000/- per month for a period of six months. Those who have gained experience and have completed the period of six months will thereafter be paid as under:

Electrical Engineering: Degree Holder	Not less than Rs.10000/- per month for the duration of the contract.
Electrical Engineering: Diploma Holder	Not less than Rs.6000/- per month for the duration of the contract.

If, the tenderer(s) fails/fail to comply the above declaration, his/their tender will be ignored. In case it is subsequently discovered that the declaration as aforesaid is in any way incorrect or the information furnished therein is wrong, the administration reserves the right to rescind the contract and to take action in accordance with clause 60 of the General Conditions of Contract.

(b) Declaration Form

I/We hereby declare that I/We shall engage and continue in service for the particular work for which tender is submitted one Civil Engineering Degree holder and one Civil Engineering Diploma holder. If they are without any experience of any kind they will be taken under training by us on stipend basis at the rate of not less than Rs.1000/-per month for a period of 12 months Those who have gained experience and have completed the period of 03 months will thereafter to paid as under :

- Electrical Engg. Degree Holders : Not less than Rs.10000/- p.m. for the duration of contract.
 - Electrical Engg. Diploma Holders : Not less than Rs.6000/-p.m. for the duration of contract.
- None of the Engineers will be related to me/us.

Date:

Signature of Tenderer/s

Further, in case the contractor fails to employ the Qualified Engineer, as aforesaid in Para 3.25.01 above, he, in terms of provisions of Clause 26A.2 to the General conditions of Contract, shall be liable to pay an amount of Rs. 40,000 &Rs. 25,000 for each month or part thereof for the default period for the provisions, as contained in Para 3.25.01 (a) & (b) above respectively.

Provision for deployment of Qualified Engineers (Graduate Engineer or Diploma Holder Engineer) shall be for the values as prescribed above. However, for the works contract tenders, if it is considered appropriate by the tender inviting authority, not to have the services of qualified engineer, the same shall be mentioned in the tender documents by the concerned Executive with the approval of Officer not below the level of SAG Officer, for reasons to be recorded in writing.

17-WATER:

The contractor(s) shall make his/their own arrangements for potable and other water supply required for the execution of the work as well as for his labour. However, if water is supplied by the Railway, the contractor(s) will have to pay water charges as laid down in the General Conditions of Contract and in addition, the Contractor(s) will have to pay charges as levied by the Corporation/municipality.

18-DRINKING WATER:

The tenderer shall provide and maintain at suitable places easily accessible to labour a sufficient supply of water fit for drinking.

19-ERRORS, OMISSIONS AND DISCREPANCIES:

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

20- TRESPASS:-

The Contractor shall at all times be fully responsible for any damage or trespass committed by his agents or workmen in carrying out the work, even if such trespass is authorized by the Engineer.

21-INFLAMMABLE ARTICLES:

Inflammable materials, such as petrol, oil, etc., shall be stored separately from other materials and all due precautions as required under the Indian Explosives Act, or any other act shall be taken by the Contractor(s) to prevent any fires, etc.

22-TAXES AND ROYALTIES:

All rates quoted in the tender shall be deemed to be inclusive of all taxes, royalties payable by the Contractor(s) to the government or public body or local authority and no additional amount will be paid or claim entertained on this account by the Railway.

23-CABLE LAYING:

- (i) Contractor is instructed to carry out laying of cable as per specified depth and quantity mentioned in schedule with cable route marker as per specification & drawing at specified interval, failing which no payment will be made.
- (ii) In case of minor nature of works where shifting of cable is not required, in order to prevent damage to the cable, contractor shall take out the S&T or optical fibre cable or Electrical cable carefully from the trench and place it properly alongside at a safe location before starting the earthwork under the supervision of SE/Sig. or SE/Tele or SE/Electrical (TRD or G). The cable shall be reburied soon after completion of excavation with proper care including placement of the brick over the cable under the supervision of S&T or Electrical supervisors. The contractor will go ahead with the shifting of cables as per the program decided.

- (iii) In case the cable are not executed as per approved plan, the penalty will be imposed for damages as under :

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

Necessary debit in this regard shall be raised on the department undertaking the work who shall in turn levy the penalty on the defaulting contractor. S&T department shall raise the debits in case of damage to OFC or Quad or Signaling cable and Electrical department shall raise the debits in case of damage to Electrical cable. (Authority: Railway Board's letter No. 2003/Tele/RCIL/1 Pt. IX dt. 24.06.13)



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CHAPTER –II

TECHNICAL SPECIFICATION & EXPLANATORY NOTES

Tender No.- **DYCE-C-JAM-RANAVAV-01**

Name of work: - Design, Supply, Testing & Commissioning of 25 kv, AC OHE, construction of ICD maintenance facilities including Vande Bharat Trainsat in connection with Ranavav (RWO) Yard Remodelling and Develop Coaching Depot Terminal.

Scope of Work- contractor has to carry out work of Design, Supply, Testing & Commissioning of 25 kv, AC OHE, construction of ICD maintenance facilities including Vande Bharat Trainsat in connection with Ranavav (RWO) Yard Remodelling and Develop Coaching Depot Terminal as per guidance of Site engineer.

1. GENERAL-

This chapter deals with the details and specifications of the equipment, components and materials.

The work shall conform to the specifications issued by various bodies, such as Bureau of Indian Standards, British Standard Institution, Specifications issued by the Contractor (RDSO/CORE). Such specification may be bought separately from the office of the Contractor.

2. COMPLIANCE WITH STANDARD SPECIFICATION

In the technical specifications of equipment's, components and materials, reference is made to the following standard specifications:

- (i) International electro Technical Commission (abbreviated as IEC) publications.
- (ii) British Standards (abbreviated as BS)
- (iii) Bureau of Indian Standards (abbreviated as IS)

Tenderers may, however, offer equipment in accordance with the appropriate national standard specifications of the country of manufacture, but such offers will be treated as deviations and should be quoted for in the manner specified in Para 1.1.7 (d) English rendering of the text and illustrations of the national standard specifications and explanatory notes on the specific deviations from IEC, British Bureau of Indian Standard in question, shall also be submitted in form-3. In case of doubt, the Contractor shall decide the clause and specification applicable and the contents of the specification and standard mentioned above shall guide such decisions.

3. TECHNICAL SPECIFICATIONS

The following specifications (as per version available as on date issue of LOA) will govern the supply and testing of important materials, components and equipment's: -

Structural Steel	IS: 2062-1992 or latest
	IS: 800-2007 or latest
	IS: 808-1989 or latest
Tensile Testing	IS:1731-1989 or latest
	IS:2004-1991 or latest
	IS:1608(Part-1) & (Part-3) or latest for steel products etc.
Welding	IS:816-1969 or latest
Dropper Wire	IS:282-1982 or latest
Annealed Copper jumper Wire	IS:9968(PT.I):1981
Al. jumper wire	IS:694-1990 or latest
Alt Aluminum conductor	IS:398(PT.I)-1976 or latest
Material for Aluminum tubular busbar	IS:5082-1998 or latest
Dimensions for Aluminum Tubular Busbar	IS:2673-1979 or latest
Galvannised stay strand	IS:2141-1992 or latest
PVC insulated cables	IS:1554(Part-I)1988 or latest
Tin bronze castings	IS:306-1983 or latest
Aluminum bronze castings	IS:3091-1965 or latest
Gray iron castings	IS:210-2009 or latest
Aluminum castings	IS:617-1994 or latest

Copper strip for formed fittings	IS:1897-1983 or latest
Cadmium copper conductor for overhead Rly. Traction	ETI/OHE/50(6/97) with A&C slip No.1 to 3 of (4/09) or latest.
Copper Busbar	RE/30/OHE/5(11/60) or latest.
Steel tubes	ETI/OHE/11(5/89) or latest.
Hot dip galvanization of steel masts (Rolled and fabricated) tubes and fittings used on	ETI/OHE/13(4/84) with A&C slip No.1 of (5/86) 2 of (4/90) & 3 of 25 KV A.C. OHE (4/90) or latest.
Stainless steel wire ropes	TI/SPC/OHE/WR/1060(06/06) or latest
25 KV solid core insulator	TI/SPC/PSI/SOLTR/0210 with A &C slip No. 1 or latest.
For polluted zones (Composite) 25 KV single and double pole isolator	TI/SPC/PSI/ISOLTR/0210 with A &C slip No. 1 or latest
Steel and stainless steel Bolts, Nuts and washer.	TI/SPC/OHE/FASTNERS/0120(03/13) or latest.
Aluminium Alloy Section and tube	ETI/OHE/21 (9/74) or latest
Enamelled steel plates	ETI/OHE/33 (8/85) or latest
Galvanised steel wire	ETI/OHE/36 (12/73) with A&C slip No.1 of (5/98) or latest
Fittings for 25 KV 50 Hz AC traction equipment.	ETI/OHE/49 (9/95) with A&C slip No.1 of (6/97) & 2 of (4/2000)-CORE-1 & 3 of (10/2010) or latest
25 KV AC 50 Hz Single pole outdoor Vacuum Interrupter.	TI/SPC/PSI/LVCBIN/0121/(05/23) or Latest
25 KV Potential Transformer	TI/SPC/PSI/PTs/0990 with A&C slip No. 1 to 5 or latest
25 KV drop out fuse switch & operating pole for use with	ETI/PSI/14 (1/86) with A&C slip No. 10 KVA 1 of (4/87) or latest
25 KV/230 V LT supply transformer	ETI/PSI/15(8/2003) or latest
25 KV/240 V, 10 KVA LT supply Transformer	ETI/PSI/15(8/2003) or latest
Metal Oxide Gapless Type Lightning Arrestor use on 25 KV side or latest	TI/SPC/PSI/MOGTLA/0101 (02/15) or latest

110 V 40 AH battery charger

ETI/PSI/1 (6/81) or latest

Bimetallic (Al-Cu) strip

ETI/OHE/55 (4/90) or latest

NOMENCLATURE AND MARKING

(a) All components and fittings supplied by the Contractor's shall bear the respective identification number and a mark to identify the source of supply except in the case of galvanized tubes, bolts & nuts and/or any other fittings as may be agreed to by the Contractor.

(b) In case of insulators, galvanized steel tubes, stainless steel wire rope and conductors, name of manufacturer shall be specified in "As Erected" drawings for identification.

5. STEEL WORK AND PROTECTION AGAINST RUST

(a) GALVANISING

All ferrous materials and fittings shall be hot dip galvanized according to the specification ETI/OHE/13(4/84) with A&C slip No.1 of 5/86, 2 of (4/90) & 3 of (4/90).

(b) PAINTING

Some components or parts may, with the approval of the Contractor, be protected only by paint and parts so protected shall be given two coats of composite Aluminum primer and two coats of Aluminum paints. The second coat of Aluminum paint shall be applied after erection.

(c) RECTIFICATION AT SITE

In case of modification which would damage the protective coat, repairs to such damage would be allowed only in exceptional circumstance. the part damaged shall be protected in accordance with the method indicated in specification ETI/OHE/12 (4/84) with A&C slip No.1 of (5/86), 2 of (4/90) & 3 of (4/90) or any other method approved by the Contractor. The contractor shall in all such obtain prior permission from the Contractor before carrying out repairs.

6. BRACKET ASSEMBLY COMPONENTS

(a) BRACKET

Bracket tubes shall be of seamless cold drawn or electric resistance weld steel complying with ETI/OHE/11(5/89) with an insulator near the support. The length of the tubes shall be such that their use a free length of about 200 mm beyond the catenary suspension bracket. To facilitate adjustment during track maintenance.

(b) TUBULAR STAY ARM

Steel tubes with adjustable steel rods shall be used for tubular stay arm of all brackets assemblies.

(c) REGISTER ARM

The register arm shall also be electrical resistance weld or cold drawn steel tubes or proper dimensions duly formed. It shall be suspended by a dropper from the catenary suspension clamp/bracket tube. A hook and eye arrangement shall be used at the bracket end to permit free movement in every direction.

(d) STEADY ARM

Steady arm shall normally be fitted in all assembly for overhead equipment in running. The steady arm shall be of light alloy BFB section arranged to work always in tension in accordance

with ETI/OHE/21(9/74). Steady arms of secondary tracks may be off solid galvanized steel rodding. The contact wire shall be fixed by a simple swivel clip without threaded parts. Steady arms shall normally be 1.0 m long but for special locations such as turnouts, diamond crossing etc.

7. DROPPERS

(a) GENERALS DESIGNS

The droppers shall generally be designed as shown in standard drawings and made of copper wire about 5mm diameter conforming to IS: 282:1982 and shall be attached to the catenary wire by a copper dropper clip. The contact wire shall be held by a clip of aluminium bronze as shown in the standard drawings. The distribution of dropper shall be in accordance with standard design.

(b) LOADING

The droppers shall be able to withstand a vertical load of 200 kg at the point of attachment to the contact wire and the clip shall not slide under a horizontal load of 120 Kgf.

(c) The permissible tolerance in the overall length of a dropper will be +/- 5 mm.

8. INSULATORS

(a) All insulators except those on return conductors and earth wires shall be of the solid core type. Disc insulators shall be used on return conductors and earth wires or other locations as desired by the Contractor. All solid core insulators shall conform to TI/SPC/OHE/INS/0070(04/07). Before erection all types of insulators to be tested jointly with open line staff.

(b) INTER-CHANGEABILITY

For free inter-changeability only the following types of insulators shall be used. While the shapes of the insulators may vary slightly from those shown in the drawings, the essential dimension of the galvanized malleable cast iron caps as given in standard drawings shall be adopted.

(i) Stay arm Insulators: These insulators will be used in connection with the tubular stay arm of all bracket assemblies.

(ii) Bracket Insulators: These will be used at the base of each bracket assembly in conjunction with bracket tubes.

(iii) 9-Tonne Insulators: These will be used at all places for cut-in and terminal insulation including those in return conductors, but excluding those in earth wire.

(iv) Solid core post: These will be used at all places for supporting Insulators isolators mechanisms, bus-bars, jumpers etc of 25 KV.

9. ENDING FITTINGS AND SPLICE

(a) GENERAL DESIGNS

Terminating or ending fittings and splices on copper conductor shall be of the cone type clamping on both the inner and outer strands of conductor except for contract wire ending clamps which may be wedge type. The arrangement shall be easy to install and also be such as would apply the clamping pressure gradually without shock (See ETI/OHE/49 (9/95) with A&C slip No.1 of (3/97), 2 of (10/10) for aluminum Alloy/conductor, the end fittings shall be either cone type, strain clamp type or any other type as approved by the Contractor.

(b) LOADING

All the parts shall be capable of withstanding without damage, a load greater than the ultimate strength of the wires to which they are fitted. In the case of thread, no damage shall occur when they are subjected to a load equal to two third of the ultimate strength of the wires.

(c) STRENGTH OF ASSEMBLED FITTINGS

The strength of fittings assembled with appropriate conductors or wire shall be not less than that of the conductor or wire itself.

(e) ADDITIONAL TERMINATING WIRES

Cadmium copper stranded wire of 65 sq mm nominal section or 37/2.1 mm (as used head span construction) may be used as additional terminating wires for extending single and double conductors respectively, if termination at the nearest structure is not feasible.

10. ELECTRICAL CONNECTIONS FOR OHE**(a) GENERAL DESIGNS**

All electrical connections between conductors shall be made by parallel clamps. The general arrangement of connections is shown in the standard drawings,

(b) JUMPERS

Copper jumpers shall be of any of the followings:

(i) Large jumpers of annealed copper in accordance with specification ETI/OHE/3 (2/94) with A&C slip No.1 of (4/95).

(ii) Small jumper of annealed copper in accordance with the specification IS:9968(PT:2)-1981. Aluminum jumpers wherever used, shall be of all Aluminum stranded conductor 19/7/1.4 mm bare 3/4.11 H generally conforming to IS:8130:1984.

(c) FEEDERS

Feeders shall be of all 37/2.25mm HDBC(150sq.mm)

11. TERMINAL CONNECTORS FOR EQUIPMENTS

Interruption and L.T. Supply Transformer shall be supplied by the Contractor along with the terminal connectors suitable for taking jumper/bus-bar as required including ALCU strips for bimetallic connections wherever required. The ALCU strips required for the connection of Booster Transformers shall also be provided by the Contractor.

12. REGULATING EQUIPMENT**(a) GENERAL**

The regulating equipment should have a minimum adjustment range of 950 mm. Stainless steel wire rope in accordance with TI/SPC/OHE/WR/1060(06/06 A&C slip No.1 of (5/07) shall be used in these equipment's and these shall be sufficiently.

(b) COUNTER WEIGHT

Counter weights and arrangements used shall be such that these could be accommodated within 330 mm (13 inches) measured transverse to the track under the worst conditions of wind. The vertical upward movement shall be limited with affixed top.

(c) REDUCTION RATIO

Reduction ratio in the arrangement used shall be five for winch type and three in case of three pulley type.

13. HEADSPAN CONSTRUCTION**(a) SIZE AND FACTORS OF SAFETY**

All span wires used in head-span construction shall be of stranded cadmium copper conductor 125 mm² cross section. All the wires shall be designed with a factor of safety of not less than 4 under the most un-favorable conditions.

(b) TURN BUCKLES

Each span wire shall be equipped with a turn buckle at each end of the span.

(c) ADDITIONAL INSULATORS

Additional insulators shall be provided as necessary in head span, cross span and stay span, wires to ensure electrical independence between the equipment in different elementary electrical sections.

14. ISOLATORS

25 KV Isolators switches shall comply with relevant specifications.

15. INSULATION LEVEL

Interruptioners, Potential Transformers line indication type, 42 KV Lightning Arrestors and other equipment's shall be suitable for insulation levels indicated in the relevant specifications.

16. BUSBARS

(a) No splicing will normally be allowed in the tubular bus-bar unless the length of the bus-bar exceeds 6m.

(b) GENERAL

The bus-bar shall be clean, smooth, mechanically sound and free from surface and other defects. Provisions shall be made where necessary to allow for expansion and contraction of bus-bars caused by temperature variation. The open ends of bus-bars shall be covered by suitable tube caps, wherever the tubular bus-bars are required to be bent, the radius of the bend shall be not less than 200 mm.

(c) JOINTS

The joints in bus-bars shall be mechanically and electrically sound so that the temperature under normal working condition does not exceed 40-degree C for an ambient temperature of 65-degree C.

(d) All Aluminum joints shall be thoroughly cleaned and smeared with suitable oxidation inhibiting joint compound before and after assembling the joint similar procedure shall be followed for connecting the equipment terminals to the Aluminum bus-bars with bi-metallic connectors.

17. CABLING

(a) CABLE FOR L.T. SUPPLY

240 V A.C. supply from L.T. supply transformer at switching stations shall be brought and terminated on the I.T.A.C. distribution board in the remote control cubicles at the switching stations by 1100 Volt 25 sq mm aluminium two-core PVC insulated PVC sheathed and steel armored heavy duty cable conforming to IS:1554 (Part-I):1998.

(b) CONTROL AND INDICATIONS CIRCUITS

All other cables for control and indication at switching stations shall be 110 V grade PVC insulated and sheathed un-armored (heavy duty) complying with IS:1554 (Part-I)-1988. The cables shall be provided as indicated in the Table below: -

PURPOSE	RUN	CIRCUIT VOLTAGE	CORE SIZE & MATERIAL	No. OF CORES
Control and Indication of Interruptioners.	From each Interruptioner to terminal board	110V/D.C	2.5 sq mm copper	7 or 10

Catenary indication	From each PT line indication type to terminal Board	100 V/ A.C	2.5 sq mm copper	2
Heater supply for interrupter control Mechanism cabinet.	i) From interrupter to interrupter	240 V/ A.C	4.0 sq mm Aluminum	2
	ii) From each interrupter to fuse box.	240 V/ A.C	4.0 sq mm Aluminum	2
	iii) From fuse box to Distribution Board.	240 V/ A.C	4.0 sq mm Aluminum	2
Battery supply 110 V	i) 110 V Battery charger to Battery.	110V D.C	2.5 sq mm copper	2
	ii) 110 V Battery to D.C. fuse box.	110V D.C		2
	iii) 15 a DC fuse box to terminal board.	110V D.C		2

SPECIFICATION

The cables shall be resistance to delay, abrasion, acids, alkalies and other corrosive materials All indoor wiring on walls shall be clamped neatly on teak wood battens fixed to the wall by means of wall plugs/wooden pegs. The cable run layout at typical switching stations is shown in the relevant drawing.

18. LITERATURE FOR EQUIPMENT

The Contractor shall within six months of issue of Letter of Acceptance of Tender, supply 25 copies of detailed schedule, catalogues and drawings of all parts of the equipment.

SPECIAL CONDITION OF CONTRACT

(1) The cable shall have to be laid in the ground as well as through the spun concrete pipe as per track crossings regulation s 1987. IE Rules IE - Act wherever applicable. Specification of cable laying enclosed.

(2) The overhead crossings shall have to be modified by laying underground cable. Two lengths of cable for each crossing shall have to be laid and the cable shall be terminated by cable end termination and the connection with the overhead shall be done by the contract. The locations of the crossings indicating KM have been enclosed.

(3) The tenderer should inspect the site of various locations before quoting the rates and should acquaint himself with the scope of work, method of execution and approach roads which are leading to the locations so that no difficulty is experienced at the time of execution of the work.

(4) No joints shall be permitted in the cable of the crossings span.

(5) Tenderer should have his own permanent establishment/ independent office and should have experience in executing similar type of works, in any of the Government organization, for which he should submit his credentials, certificate of completion of work.

(6) During the execution of the work, the contractor shall have to observe utmost safety while carrying out digging and laying work of the cable, all the work shall be executed in the presence of Railway Representative. If any damages are done by the contractor's labour during digging, then the loss shall be borne by the contractor.

(7) The contractor should ensure that during the execution of work, either he himself is present at the site or his responsible engineer should always remain present at site Co-

ordination shall be maintained with this office for day to day planning and execution of the work, which is to be completed within the targeted period.

(8) The tenderer should fully understand that the 6th Line work is a targeted work. This work is to be completed well before the target as such every care shall have to be taken to maintain the completion period.

(9) The contractor shall have to make his own arrangement for transportation of materials and keep all materials safely at his own depot at site, tools, labour etc at site for the execution of the work. (10) Contractor shall have to execute all works in accordance with latest IE rules and Track crossing regulations.

(11) Applicability of PVC based on original contract value is illustrated as under – “If estimated value of a tender (N.I.Y value) is Rs.55 lakhs; but value of the contract as per Contract Agreement is Rs.45 lakhs, then PVC shall not apply, even if the actual final value is Rs.50 lakh or more due to variation in quantities during execution of the contract. Thus, variation in quantities after signing of Contract Agreement is not relevant for deciding whether PVC is applicable to a contract or not.”

(12) All materials should be complying with latest RDSO/CORE specifications and suitable for 65 sq.mm catenary and 107 sq.mm contact wire and SMI/MI&TCs.

(13) The contractor shall have to make his own arrangement for trimming of trees which infringing to OHE (Up to 4.0 Mtrs Clearance or as per site condition) at his own cost by arranging tools, labour etc at site for the execution of the work.

(14) ALLOHE foundations and structures shall be suitable for 2X25 kV OHE system.

Contractor has to fulfil following special conditions-

1. Time limit for drawing submission-15 days after issuing of LOA.
 2. Immediate issue material purchase order.
 3. Minimum Foundation 15/day to be ensured
 4. Minimum nos. labour deployment for execution of work.
 - 5-QAP Submission of all test reports.
 - 6-Withstart of wiring till charging, protection of OHE is sole responsibility of the firm. Any loss due to theft, it will be recovered as per standard rates.
 - 7- Contractor must have one Project Manager (B.Tech Electrical plus 8 yrs experience)& at least 2 site supervisor/ site engineer (B. Tech Electrical plus 5 yrs experience) depute at site for execution of work.
- Non-fulfilment of timelines and special conditions Contractor attract suitable penalty or even termination.

TECHNICAL SPECIFICATION-TRD WORK

SCHEDULE - A (Earth work & Foundation)

Item No. A-1 :Reinforced Concrete for foundation and trench

The price shall cover excavation and all reinforced concrete work for foundation including supply of steel for reinforcement and other materials Including bending

/binding laying of reinforcement shoring and shuttering where necessary, costing concrete including frame work where necessary, grouting and finishing the tops of foundation blocks with the required slope/muff. The price shall include dismantling of all connected temporary arrangement back filling as required and removal of soil. The price shall also cover all concrete work for cost in situ piles and pedestals /columns for mounting equipment. The volume of cast-in-situ piles and pedestals columns shall be added of the volume of foundation block for purposes of payment, Dowel bars will not be considered as reinforcement for the purpose of this item. The price shall include the cost of cement also. Cement will not be supplied by Rlys. The price shall include cost for paint with distemper on exposed portion of foundation. The price also covers cost of smooth plastering on exposed portion of foundation. Cement shall be used of 53 grade and of popular brand.

Item No. A-2 Reinforcement concrete for Cable trench cover

The price shall cover costing of cable trench covers in reinforced concrete as per drawing. The cable trench covers will be cashed in on angle iron frame of angle size 40x40x5. The price shall include the supply of steel for reinforcement angle iron for the frame work fabrication of angle iron frame etc. The price shall include Positioning and dressing up of the trench covers, if required. The price shall include the cost of cement, ballast and sand also. Cement will not be supplied by Rlys. Cement shall be used of OPC & 53 grade and of popular brand. Curing of concrete shall be carried out for 28 Days.

Item No. A-3: Supply, spreading and leveling of 20 mm downgraded ballast, padding 150mm

The price shall be per cum rate and shall cover supply and spreading of uniformly graded gravel/ballast of size 20 mm, in the outdoor switch yard after completing all the works and levelling the switch yard area, but before commissioning of the sub-station. The gravel/ballast shall be of good quality and free from any dust and dirt. Prior approval of ballast shall be taken from the Purchaser for the gravel samples. The gravel/ballast shall be spread out uniformly to a depth of 15cm. over the area indicated by the Purchaser's Engineer.

Note: for Schedule “A”

1. The prices under item shall be same for any shape of size of Concrete blocks, cable trenches & brick wall. In calculating the individual volume of concrete and brick wall fraction of a cubic meter beyond the third decimal shall be rounded off to the nearest third decimal.
2. The prices under Item shall apply for concreting at all pedestals plinths and foundations for gantries/portals and supporting steel work and cable trenches.
3. For purpose of computation of volume of concrete and brick wall under Item, the volume of steel work embedded in the foundation block or muff shall be ignored.
4. The volume of each muff will be included in the volume of concrete for the respective foundation for purpose of computation of volume of concrete.
5. The prices shall include cost of embodiment of drain pipes, conduits for cable or earthing flats where necessary.
6. In respect of concrete for cable trenches the price shall not include the cost of cable supports and trays, which shall be supplied and erected by the contractor and shall be paid for under item.

7. Dowel bars in special foundations and nominal reinforcement in black cotton soil foundation will be necessary such nominally reinforced foundations in black cotton soil will be payable under item. The steel for nominal reinforcement and dowel bars will be supplied by the contractor and the concrete mixture in such a case shall be as for normal foundation 1:3:6.

Item No. A-4 : Concrete for foundation and plinth in all type of soil including hard/rocky soil (including excavation and supply of all materials viz., sand, cement, and ballast etc.)(M-20 Grade):

The price shall include all works mentioned in all classes of soil, concrete or, masonry/drains/walls and rock. The price shall also include the cost of digging, cement concrete & soil refilling. The price shall be same for any shape and size of concrete blocks for foundation, in calculating the individual volume of concrete, fraction of a cubic meter beyond the third decimal shall be rounded off to the next nearest third decimal. The price shall apply for concreting of all foundations for masts, gantries, portals, anchor blocks for guy rods and fencing uprights. For purposes of computation of volume of concrete, the volume of steel work embedded in the foundation block and muff shall be ignored. Cost of all concrete will be paid for only under item No.1 and the prices of other item shall not include. For purposes of compilation of volume of concrete, the volume of concrete shall include the volume of sand and bitumen in sand core foundation. For purposes of compilation of volume of concrete, the volume of each muff for all masts shall be taken as 0.02 cum., except for masts with balance weights and for column of portal, each head span masts, 2 or 3 track cantilever masts and special fabricated masts for which the volume of muff shall be taken as 0.08 cum. irrespective of the size and shape of muff on a flat basis. Mixture for casting of foundation shall be 1:1.5:3 (M-20 Grade) and mixture for grouting shall be 1:1.5:3 (M-20 Grade). Curing of foundation shall be done by contractor for 28 days. No scroll will be supplied by Railway; contractor will use his scroll. Necessary details like, type, implantation, chainage shall be supplied by Railway. Contractor has to prepare standard cube of size 150x150x150mm for every 25 cum of foundation cast & is to be tested in the Govt. approved laboratory as per IS-516/1959 (or Latest) to obtain the result as per IS 456/1978. Cement used shall be OPC & grade 53. The price also cover cost for smooth plasters on exposed foundation and muff.

SCHEDULE - B (Steel and OHE items)

Item No. B-1: Supply of rolled or fabricated and galvanized traction mast, TTC, Portals, auxiliary transformer masts, feeder mast, bridge masts etc.

Supply of traction main masts of OHE comprising rolled, broad flanged beams, fabricated K-series, B series, portal upright, boom pieces & associated fittings, D.A., extension chairs and AT Masts, feeder mast, bridge mast etc.

1. The price shall cover cost of fabrication, galvanization, and supply of individual tractions masts.
2. Galvanization thickness shall be as per Railway Specification No. ETI/OHE/13(4/84) with c.s.4/90 or latest with galvanization thickness of 1000 gram per sq. meter.

3. In case, required size of channels are not available as per approved drawing, higher size of channels can be used with approval of Dy. Chief Electrical Engineer (construction) and payment as per actual black weight will be paid.
4. The price shall also include the straightening of masts/portal uprights etc bent during transit and cutting of masts/portal uprights to suit the site condition.
5. For standard fabrication of steel work or structures for which RDSO/CORE approved drawing are available, the black steel weight of steel work as specified in RDSO/CORE drawing, shall be considered for payment.
6. However in case the unit sectional weight of any member indicated in RDSO's drawing is not in conformity with the unit sectional weight as per the latest IS specification the weight of the fabricated steel work shall be calculated on the basis of latest IS specification and the same will be considered for payment for the nonstandard fabricated steel work, the calculated weight to be considered for payment under this item shall be included in the relevant drawing based on latest IS sectional weight at the time of submitting the designs for approval of the purchaser.
7. There will be no addition for increased weight due to galvanizing or painting or reduction for holes or screw cut.
8. Galvanization damaged during transportation/ carting will be touch up with cold ZINC paints by tenderer.
9. Crane will be arranged by railway for Portal boom erection only on demand by contractor. Rail crane operator & diesel for rail crane will be arrange by contractor.
10. Materials will be supplied at site of work.
11. Payable unit weights for standard mast.

Sr. No.	Type of mast	Weight in Kg/m incl. galvanization	Sr. No.	Type of mast	Weight in Kg/m incl. galvanization
1	6"x6"x25.15 BFB	38.03	14	K-150	38.18
2	162x154x27.1 BFB	38.00	15	K-175	43.72
3	200x200x49.9 BFB	51.20	16	K-200	49.87
4	8"x6"x35 RSJ	53.39	17	K-225	57.50
5	S-1	53.30	18	K-250	66.72
6	S-3	76.40	19	B-100	27.71
7	S-4	53.39	20	B-125	32.47
8	S-5	111.53	21	B-150	39.07
9	S-6	53.39	22	B-175	44.61
10	S-7	76.40	23	B-200	50.76
11	S-8	111.53	24	B-225	61.50
12	K-100	23.70	25	B-250	70.72
13	K-125	30.30	26	S-100	23.72

Note: Material should be provided as per approved drawing to calculate the quantity of material required for both conventional and High Rise OHE.

Item No. B-2: Supply of fabricated and galvanized steel works other than traction mast, TTC, portals etc. (SPS)-

The price shall cover cost for supply of SPS for different type of masts, portals, DA, isolator, boom, Bridge Mast holding down bolt. Payment of SPS will be made as per black steel weight of material as per RDSO/CORE latest approved drawings and supplier.

1. The price shall cover cost of fabrication, galvanization, supply setting before grouting of individual tractions masts.
2. Galvanization thickness shall be as per Railway Specification No. ETI/OHE/13(4/84) with c.s.4/90 or latest with galvanization thickness of 1000 gram per sq. meter.
3. In case, required size of channels are not available as per approved drawing, higher size of channels can be used with approval of Dy. Chief Electrical Engineer (construction) and payment as per actual black weight will be paid.
4. The price shall also include the straightening of masts/portal uprights etc bent during transit and cutting of masts/portal uprights to suit the site condition.
5. For standard fabrication of steel work or structures for which RDSO/CORE approved drawing are available, the black steel weight of steel work as specified in RDSO/CORE drawing, shall be considered for payment.
6. However in case the unit sectional weight of any member indicated in RDSO's drawing is not in conformity with the unit sectional weight as per the latest IS specification the weight of the fabricated steel work shall be calculated on the basis of latest IS specification and the same will be considered for payment for the nonstandard fabricated steel work, the calculated weight to be considered for payment under this item shall be included in the relevant drawing based on latest IS sectional weight at the time of submitting the designs for approval of the purchaser.
7. There will be no addition for increased weight due to galvanizing or painting or reduction for holes or screw cut.
8. Galvanization damaged during transportation/ carting will be touch up with cold ZINC paints by tenderer.
9. Materials will be supplied at site of work.

Note: Material should be provided as per approved drawing to calculate the quantity of material required for both conventional and High Rise OHE.

Item No. B-3: Supply of single cantilever assembly complete with insulator for High Rise OHE and inside the tunnel

1. The price shall cover on a flat rate basis for supply of bracket assembly on a traction mast or Support on drop arm and shall include those on high/low level platform in the vicinity of turnouts over bridges or overlaps and at all locations with reduced encumbrance/ terminating wires as per latest RDSO drawing.

2. The price shall include the cost of supply of all components including galvanized steel tube duly fabricated and Porcelain insulators 1050/1600 mm CD as desired by open line) for polluted Zone (Id. 6000-1, 6030-1) including bolts, nuts etc. if any.
3. The price shall cover supply of all components including registered arm dropper excluding small parts steel work if any.
4. However, this does not include the anti-creep arrangement at masts/structures, however double suspension clamp where required is included in item.
5. Composite insulators shall be used in polluted Zone and stone pelting areas with prior approval of Dy.CEE/C.
6. Necessary SED will be supplied by Railway for each cantilever which supplied through Schedule F, Item No 1.
7. The price also covers cost for testing of insulator (ST/BT/9T) with Hydraulic insulator testing machine. Calibrated Insulator testing machine shall be arranged by contractor.
8. All Components shall have complied Latest RDSO/CORE specification.

(Note: Forge type fittings shall be used instead of MCI wherever applicable.)

Item No. B-4: Supply of pull-off arrangement for OHE

The price shall cover supply of all components required for a pull-off arrangement to pull OHE equipment, including head span mast fittings complete with M.S. angle equalizing plate assembly steady arm, catenary dropper clip, contact wire swivel clip and fittings, including porcelain 9 ton insulators (1050mm CD) conductors, small jumpers (50 Sq.mm) wire. The price shall cover erection of all components including composite solid core insulators, small jumper wire and conductors.

Item No. B-5: Supply of Guy rod assembly

1. The price shall cover supply of guy rod assembly of various lengths for traction masts/portal upright complete with mast guy rod fittings, guy rod with adjustments and parts to be grouted etc in the anchor block including S.P.S
2. The price shall not include the cost of supply of dwarf masts.
3. COMPONENTS REQUIREMENTS

Railway ID No.	Description of components	Qty/unit
3241	Mast Anchor Fitting for cliff type of structure	1 No
3242	Mast guy rod fitting with 4 sets of bolts of 20 mm dia of suitable length with nuts, Locknuts, washers for attachments to mast/S.P.S including appropriate fitting	1 No
5001-3	Stud bolts for draft mast (850mm)	2 Nos.
-	Triangular attachment for Dwarf mast	1 No
5002	Guy rod stirrup	1 Set
5004 or 5005 or 5006.1 or 5070-1	Guy rod with nut, washer, split pin	1 Set
5007-1	Anchor 'V' bolt	1 Set
5008	Anchor loop	1 Set

5220-2	Guy rod double strap assembly.	1 Set
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Note: All components should be as per latest Specification with Revision (if any).

Item No. B-6: Supply of regulating equipment complete with all accessories including counter weight assembly and SS wire rope for OHE

The price shall cover supply of counter weight assembly including 9 Tonne adjuster & 9T Porcelain Insulator CD 1050 mm with double strap assembly, and normal/antitheft guide tube assembly including supply of regulating equipment as per RDSO Specification No. TI/SPC/OHE/ATD/0060 Rev.-1 with A&C Slip No.1 or latest and stainless steel wire rope as per Rly Specification No. TI/SPC/OHE/WR/1060(06/2006) With A & C No.1, 2 & 3 or latest suitable for **3 Pulley ATD** required for regulating equipment and small parts steel work, if, if any. The price shall also cover supply of anti-falling device, anti-climbing (stiffener) Angle on Anchoring and double eye distance rod. The price also covers cost for compliance of Latest Technical circular, MI/SMT's, Reliability action plan etc. (if applicable)

Note: Material should be provided as per approved drawing to calculate the quantity of material required for both conventional and High Rise OHE.

Item No. B-7:-Supply of Galvanized Structure and other bonds

1. The price shall cover for supply of all materials including Galvanized flat 40 x 6 mm required to provide GI structure bond and other type of bonds to connecting a traction mast or structures to the nearest non track circuited rail, or earth electrode including all fasteners at both ends.
2. The price shall include shaping and drilling of the bond.
3. The price shall also include provision of heat shrinkable PVC sleeve & HDPE pipe as per latest guideline for structure bond under track circuited rail.

Item No. B-8A and B-8B : Supply of Earth electrode assembly as per IS 3043/ RDSO specification

The price shall cover supply of an earth electrode assembly of respective length as per RDSO Specification No. ETI/OHE/P/7021 rev.A or latest applicable with all accessories & fasteners. The price also covers the provision of a protective concrete box with removable cover.

Item No. B-9: Supply of GI flat for earth (50mmx6mm)

The price shall cover supply per metre length of 50x 6 mm GI steel strip. The price also cover cost for supply of fasteners required for connecting the flat with earth bus. The price also covers cost for welding where ever required.

Item No. B-10: Supply of fencing upright

The price shall cover Supply of fabricated fencing uprights painted with two coats of red oxide zinc chromate primer and Finished with two coats of Aluminium paint as per IS:2339. The price shall be on the basis of black weight of the steel section of the

approved drawing with no deduction for holes and skew cuts or no increase for weld materials

Item No. B-11: Supply of fencing panel & gate as per RDSO approved drawing

The prices shall include supply of fencing panels painted with two coats of red oxide zinc chromate primer and finished with two coats of Aluminium paint as per IS: 2339. The prices shall not include supply of fencing uprights, anti-climbing devices but shall include the cost of fasteners and the price shall be for a meter length of the panels, measured in the plan view of the approved drawings. The fencing panel should be made with 8 SWG Wire.

Item No. B-12: Supply of Antibird disc on insulator end fitting

The price shall include supply of Antibird disc on ST,BT&9 toninsulators end fitting as per Drg No. TI/DRG/OHE/ABD/RDSO/00000/19/0 Rev 1 (Sh 1 & 2) ,under RDSO MI No. TI/MI/00059 Rev 3 or latest. The disk shall be made up of polycarbonate of fire flammability rating of V-2 or higher as per UL94, from Group 01,class2 of latest ASTM D 3935-2, with additional properties as given in SMI.

Item No. B-13: Supply of Anti Monkey climbing device (AMCD) as monkey scare for mast.

The price shall include supply and fabrication of Anti Monkey scare measure for OHE mast at Monkey menace prone areas as per RDSO SMI No. TI/MI/0056 Rev-2 or latest. The AMCD shall be barbed wire frame type as perDrg no TI/SK/OHE/ANTIMON/RDSO/00001/08/0 given in Annexure 1 OR Cylindrical arrangement as per drawing given in Annexure II. Location and type of AMCD shall be jointly decided by SSE/Elect/Construction and SSE/TRD and approved by Sr DEE/TRD . One sample for each type of OHE mast /Structure is to be fabricated and submitted to concern SSE for approval before utilization at site. Any modification suggested by concern SSE based on practical implication must be incorporated in the design.

Item No. B-14: Supply of Anti Monkey climbing device as monkey scare for portals

The price shall include supply and fabrication of Anti Monkey scare measure for OHE Portal/TTC at Monkey menace prone areas as per RDSO SMI No. TI/MI/0056 Rev-2 or latest. The AMCD shall be barbed wire frame type as perDrg no TI/SK/OHE/ANTIMON/RDSO/00001/08/0 given in Annexure 1 OR Cylindrical arrangement as per drawing given in Annexure II. Location and type of AMCD shall be jointly decided by SSE/Elect/Construction and SSE/TRD and approved by Sr DEE/TRD . One sample for each type of OHE mast /Structure is to be fabricated and submitted to concern SSE for approval before utilization at site. Any modification suggested by concern SSE based on practical implication must be incorporated in the design.

Item No. B-15: Supply of nylon/plastic net - High density polyethylene (HDPE) monofilament netting type III, UV stabilized as per IS 16008(part-2)-2016/PVC virgin HDPE Net preferably in black colour.

The price shall include supply of Anti Bird high density poly ethelene (HDPE) filamentnetting type III, UV stabilized as per IS 16008 (Part-2)-2016. PVC virgin HDPE

net preferably in black colour on fabricated structure, Portals/TTC, Fabricated DA, Gantry boom, etc. as per RDSO MI No. TI/MI/0050 Rev-1 Dtd.27.09.2021.the price shall include supply and tying with UV resistant nylon cable tie as per para 4.4 of RDSO SMI.

SCHEDULE –C (Switch Gear, Insulators & other Elec. Items).

Item No. C-1: Supply of 25 KV, Vacuum interrupter-

The price shall cover supply of 25kV Vacuum interrupter, complete with operating mechanism, all fittings, and accessories including terminal connectors as per RDSO Spec. No. TI/SPC/PSI/LVCBIN/0121 (05/23) or latest. The price shall also cover the supply of an enameled number plate and required quantity of Long shackle brass Pad lock (Make - Godrej, Link).The price also covers cost of interlocking arrangement between VCB and concern DPI (as per RDSO guidelines).

Item No. C-2: Supply of 25KV double pole isolator with interlocking mechanism.

1. The price shall cover supply of a 25 KV, 3150A Double pole isolator complete (as per RDSO specification No. RDSO's letter No. TI/SPC/PSI/ISOLTR/0210 or latest), with mounting base (including 25 KV pedestal insulators-4 Nos. and operating rod insulators-2 Nos.), operating rod and operating rod guides required for the operation of the isolator.
2. The price shall also cover supply of Al/Cu strips, Integral lock, a 50 mm Brass pad-lock (Make - Godrej, Link), flexible copper jumper for earthing and an Enameled number plate of approved design for each isolator.
3. The price also covers cost for 04 no. terminal connector.

Item No. C-3A: Supply of 25KV single pole isolator without earth contact assembly

1. The price shall cover supply of a 25 KV, 1600A for SP/SSP's and OHE's Single pole isolator complete (as per RDSO specification No.ETI/OHE/16 (1/94) Rev2 (Mar-04) and RDSO's letter No. TI/PSI/25/ISOL /POLICY /99 dt 3.6.99 or latest), with mounting base (including 25 KV pedestal insulators-2 Nos. and operating rod insulators- 1 Nos.), operating rod and operating rod guides required for the operation of the isolator.
2. The price shall also cover supply of Al/Cu strips, integral lock, a 50 mm Brass pad-lock (Make - Godrej, Link), copper jumper for earthing and an Enameled number plate of approved design for each isolator.
3. The price also covers cost for terminal connector as per RDSO standard for connection of Isolator to Busbar, Busbar to Busbar (splice) and Busbar to 160sqmm jumper (RI no. 6310, 1009 etc.) as required.
4. The price shall also cover the supply of 18mm copper bus bar for use with SPI in OHE.
5. The price also covers supply of Key box for station and Switching station.

Item No. C-3B Supply of 25KV single pole, 1600A isolator with Earth Contact Assembly.

1. The price shall cover supply of a 25 KV, 1600A for SP/SSP's and OHE's Single pole isolator complete (as per RDSO specification No.ETI/OHE/16 (1/94) Rev2 (Mar-04) and RDSO's letter No. TI/PSI/25/ISOL /POLICY /99 dt 3.6.99 or latest), with mounting base (including 25 KV pedestal insulators-2 Nos. and operating rod insulators- 1 Nos.), operating rod and operating rod guides required for the operation of the isolator.
2. The price shall also cover supply of Al/Cu strips, integral lock, a 50 mm Brass pad-lock (Make - Godrej, Link), copper jumper for earthing and an Enameled number plate of approved design for each isolator.
3. The price also covers cost for terminal connector as per RDSO standard for connection of Isolator to Busbar, Busbar to Busbar (splice) and Busbar to 160sqmm jumper (RI no. 6310, 1009 etc.) as required.
4. The price shall also cover the supply of 18mm copper bus bar for use with SPI in OHE.
5. The price also covers supply of Key box for station and Switching station.
6. The price shall cover the cost of supply and erection of 3x25 mm copper connection between the earth contact assembly and the structure.

Item No. C-4: Supply of PTFE short Neutral section-

The price shall cover supply of a complete assembly of short neutral section (PTFE) (Phase brake). The price shall also cover end fitting for contact & catenary wire and other material required for erection & smooth operation with earthing arrangement. The short neutral assembly to be as per RDSO specification No.TI/SPC/OHE /SNS/ 0000 Rev.-1 with A&C Slip No.1or latest. Neutral section should be purchase from RDSO/CORE approved source only. The material is suitable for i.e. 65 sq.mm Catenary and 107 sq.mm contact wires.

Item No. C-5: Supply of materials for termination of double conductor (including supply of cut-in -insulator) of overhead equipment.

The price shall cover supply of all material necessary for the termination of double conductor of overhead equipment terminating wire on a traction mast or structure including clevis assembly, adjuster, anchor double strap, ending clamp for catenary or contact or terminating wire with fitting and porcelain 9 tonne insulator assembly (for polluted zone) but excluding terminating wire if any, wherever double termination if required. Materials like equalizing /compensating double strap assembly. It includes the all fasteners required for termination.

Item No. C-6: Supply of materials for termination of Single conductor including supply of 9T insulator.

The price shall cover supply of all material necessary for the termination of Single conductor of overhead equipment terminating wire on a traction mast or structure including clevis assembly, adjuster, anchor double strap, ending clamp for catenary or contact or terminating wire with fitting and porcelain 9 tonne insulator assembly (for polluted zone) but excluding terminating wire if any, wherever double termination if

required. Materials like equalizing /compensating double strap assembly. It includes the all fasteners required for termination.

Item No. C-7: Supply of section insulator assembly including core and cut-in insulator

The price shall cover supply of all components required for a standard section insulator assembly on High Rise OHE including section insulator assembly (Five parts), also provide 2 nos., stiffener (contact bar) & other materials as per details given below: All material shall be with latest specifications.

Railway ID No.	Description of component	Qty per unit
RI-1120	Catenary ending clamp	2 Nos.
RI-1190	Catenary dropper clip assembly	As required
RI-6170	Parallel clamp for double contact wire.	12 Nos.
RI-6110	Dropper assembly for Section Insulator.	As required
RI-6100-1	Porcelain section insulator along cree-page.	01 No.
RI-6020-1	Porcelain 9 tonne insulator	01 No
RI-6181-2	Double straps for section insulator.	02 Nos.

Item No. C-8: Supply of 25KV solid core cut-in insulator.

The price shall cover cost for supply of complete 25 KV solid core long creepage Porcelain cut-in-insulator including double strap, Catenary wire or contact wire ending cone etc. as per latest RDSO/CORE specification.

Item No. C-9: Supply of 25KV solid core suspension insulator.

The price shall cover cost for supply of complete 25 KV solid core long creepage Porcelain suspension insulator assembly including Double strap, single eye clevis, suspension clamp etc. as per latest RDSO/CORE specification and drawings.

Item No. C-10: Supply of 25KV Post/Support insulator.

The price shall cover cost for supply of 25KV Post Insulator with fasteners and saddles as per RDSO specification No. - TI/SPC/OHE/INS/0070 (04/2007) with A & C slip no. 1 & 2 or latest.

Item No. C-11A: Supply of 10 KVA Change over panel as per RDSO spec. suitable for 10 KVA AT supply

The price shall cover cost for supply of 10 KVA Change over panel as per RDSO specification No. TI/SPC/PSI/CLS/0020(12/02) (with A&C slip No. 1 to 4) or latest and suitable for 10 KVA AT Supply. The price also cover cost of any relay, fittings, Glands, fasteners, Lugs etc. for commissioning of panel and smooth working.

Item No. C-11B: Supply of 25 KVA Change over panel as per RDSO spec. suitable for 25 KVA AT supply

The price shall cover cost for supply of 25 KVA Change over panel as per RDSO specification No. TI/SPC/PSI/CLS/0020(12/02) (with A&C slip No. 1 to 4) or latest and suitable for 25 KVA AT Supply. The price also cover cost of any relay, fittings, Glands, fasteners, Lugs etc. for commissioning of panel and smooth working.

Item No. C-11 C: Supply of 5 KVA Change over panel as per RDSO spec. suitable for 5 KVA AT supply

The price shall cover cost for supply of 5 KVA Change over panel as per RDSO specification No. TI/SPC/PSI/CLS/0020(12/02) (with A&C slip No. 1 to 4) or latest and suitable for 5 KVA AT Supply. The price also cover cost of any relay, fittings, Glands, fasteners, Lugs etc. for commissioning of panel and smooth working.

Item No. C-12: Supply of terminal board in control cubicle

The price shall cover cost for supply of terminal board for 230V AC supply to Interrupters in switching post control cubicle as per RDSO/CORE latest drawings and specifications.

Item No. C-13: Supply of 110V DC distribution board.

The price shall cover cost for supply of 110V DC distribution board in switching post control cubicle suitable for section and as per RDSO/CORE latest drawings and specifications.

Item No. C-14: Supply of 230V AC distribution board.

The price shall cover cost for supply of 230V AC distribution board in switching post control cubicle suitable for section and as per RDSO/CORE latest drawings and specifications.

Item No. C-15: Supply of PT Type- I

The price shall cover cost for supply of 27.5 kV/100V potential transformer Type-I (as per RDSO specification no. TI/SPC/PSI/PTS/0990(09/99) with A&C slip No. 1 to 5 or latest) complete with all fittings and accessories including terminal connectors. The price also cover cost for supply of an enameled number plate and material for any Modification required for comply Latest TC, SMI/MI or local arrangement by open line. The price shall also cover for supply and modification of PT DO Fuse in SSP/SP post.

Item No. C-16: Supply of 110V battery charger (40AH).

The price shall cover supply of a battery charger for 110V, 40Ah low maintenance lead acid battery complete with stand and accessories as per RDSO specification No. TI/SPC/PSI/40-150/ CHGR/1210 dt 30-7-21or latest and a tool board Hydro Meter and thermometer. The price shall also cover for cost of suitable size of cable to connect between battery charger and battery including lugs and connectors.

Item No. C-17 Supply of 110 V, 40AH lead acid battery.

The price shall cover supply of a 110V, 40Ah low maintenance lead acid battery complete with stand and accessories as per RDSO specification No. RDSO/PE/SPEC/TL/0040-2003 (Rev.-0) with amendment No.-1 or latest, and a tool board.

Item No. C-18-A: Supply of Auxiliary Transformer 25 kV/230 V, 10 KVA with DO fuse assembly, LV box & Anti climbing device

The price shall cover cost for supply of Auxiliary Transformer 25 kV/230 V, 10 KVA as per RDSO specification No. ETI/PSI/15 (8 /03) or latest, with 25 KV DO fuse complete assembly including insulators as per RDSO Specification No. ETI/ PSI/14(1/86) Rev 1 (Apr '87), LV box for AT, Type-I Box & Anti climbing device complete including barbed wires etc. the price also cover cost for Clamps, lugs, Name Plate etc.

Item No. C-18-B: Supply of Auxiliary Transformer 25 kV/230 V, 25 KVA with DO fuse assembly, LV box & Anti climbing device

The price shall cover cost for supply of Auxiliary Transformer 25 kV/230 V, 25 KVA as per RDSO specification No. ETI/PSI/15 (8 /2003) or latest, with 25 KV DO fuse complete assembly including insulators as per RDSO Specification No. ETI/ PSI/14(1/86) Rev 1 (Apr '87), LV box for AT, Type-I Box & Anti climbing device complete including barbed wires etc. the price also cover cost for Clamps, lugs, Name Plate etc.

Item No. C-18-C: Supply of Auxiliary Transformer 25 kV/230 V, 5 KVA with DO fuse assembly, LV box & Anti climbing device

The price shall cover cost for supply of Auxiliary Transformer 25 kV/230 V, 5 KVA as per RDSO specification No. ETI/PSI/15 (8 /2003) or latest, with 25 KV DO fuse complete assembly including insulators as per RDSO Specification No. ETI/ PSI/14(1/86) Rev 1 (Apr '87), LV box for AT, Type-I Box & Anti climbing device complete including barbed wires etc. the price also cover cost for Clamps, lugs, Name Plate etc.

Item No. C-19: Supply of Lightning arrestor for 25 KV OHE.

The Price shall cover cost for supply of 42 KV Metal oxide gapless type Lightening Arrestor as per RDSO specification No. TI/SPC/PSI/MOGTLA/0101 (02/ 2015) or latest including surge monitor (including suitable length of 35 sqmm cu. cable & clamps) and dis-connector assembly and an enameled number plate with fasteners and clamps.

Item No. C-20: Supply of RTU for switching post.

The Price shall cover cost for supply of Remote terminal unit (RTU) for switching post as per RDSO specification No. No. TI/SPC/RCC/SCADA/0133) with latest amendments and same shall support existing SCADA system at RCC.

Item No. C-21: Supply of 50/39 mm aluminium bus bar

The price shall cover cost for supply of 50/39 mm Al. bus bars procured from CORE approved sources in standard length. Bus bar shall be made of aluminium alloy grade63401 (WP condition to IS:5082-1981 or latest. The tolerance on diameter & thickness shall be as per Class-I of IS:2673-1979 or latest. The bus bar shall be clean, smooth, mechanically sound and free from surface and other defects. The open end of bus-bar shall be covered by suitable tube cap. No splicing normally be allowed in the tubular bus-bars, unless the bus-bars exceeds 6M.

Item No. C-22: Supply of all types of aluminum bus bar terminal assembly, Splice assembly and various types of connectors for 50 mm bus bar

The price shall cover cost for supply aluminum bus bar terminal assembly, splice assembly and various types of connectors for 50 mm bus bar. as per requirement. The price also covers supply of fasteners and bimetallic strip (if applicable). The material shall be procured with latest RDSO specifications and approved source only.

Item No. C-23:Supply& Erection of 25KV 9 tonComposite insulator (CD1600 mm)

The price shall cover cost for supply & erection of complete 25 KV9 ton Composite insulator (CD1600 mm). as per latest RDSO/CORE specification

SCHEDULE –D (Copper items and PVC cables).**Item No. D-1: Supply of overhead equipment excluding catenary & contact wire. Scope includes supply of number plates & various types of caution & other boards including shock treatment chart, anti-creep assembly (excluding anti-creep wire) etc.**

The price shall cover supply of all components i.e. different type of PG clamps, 5 mm Dropper wire, contact and catenary wire dropper clip, catenary and contact wire ending clamp, catenary and contact wire splices, double straps, Retro-reflective/ enameled Number plate & various type of caution & other boards, shock treatment chart, anti-creep anchor including 9T insulator and fittings (Catenary wire will be supplied by railway), Material required for providing contact wire in place of catenary wire (Contact wire will be supplied by railway) under FOB, ROB and over line structure etc. (As per latest guide lines) with SPS for attachment on mast / structure, Jumper wires of suitable size with PG clamps for 'G, jumper, potential equalizing jumper, anti-theft jumper, X-feeder drop jumper, Isolator Jumpers and any other jumpers(where their use is approved), terminating wires etc.

S. No.	Description of Items
1.	Different types Parallel grooved clamps&Large-size modified double bolted PG clamps shall be provided at all G-jumper connections to ensure better electrical continuity and mechanical strength. Three (03) PG clamps, instead of two (02), shall be provided on G-jumpers, F jumper, AT Jumpers. and isolator jumpers to ensure firm connections.
2.	5 mm Copper Droppers. Double inclined droppers shall be provided throughout the entire section in all the cantilevers to improve mechanical stability of the contact wire.
3.	Contact and catenary clips assembly.
4.	Contact and Catenary ending clamp assembly.
5.	Catenary & Contact Splice
6.	Retro-reflective/ Enamel Number Plates with SPS and fastener, Caution boards, Danger Boards, Power block working limit boards, Unwired OHE/ Turn out, 250M, 500M, DJ close, DJ open and other indication boards must for commissioning for OHE. Existing mast number plates also to be supplied along with SPS and include erection.
7.	Different type of Copper Jumpers i.e. 'G', Potential equalizing, Anti-theft, X-feeder, Drop, Isolator Jumpers etc. Double G-jumpers shall be provided at the first sub-sector to enhance current carrying reliability or latest guidelines
8.	Any extra fittings required for Turn-out, X-over, Diamond X-ing.

9.	Anchor Double straps, Cut-in-insulators (9T) assembly for IOL's, compensating plate/equalizing plate
10.	If tramway OHE is required to be erected then it will be paid in OHE erection only for erection of contact wire including supply & erection of Bridle wire, PG clamp etc.
11.	Anti-creep complete assembly (excluding anti-creep copper wire which will be supplied by railway from railway store)
12.	The price shall not cover cost of catenary and contact wire.

Item No. D-2: Supply of Catenary wire splice suitable for 65 sq mm catenary wire

The price shall cover cost for supply of Catenary Splice suitable for 65 sq mm catenary wire, over and above the requirement for item no. D1, as per Drawing No.ETI/OHE/P/1090 or latest.

Item No. D-3: Supply of Contact wire splice suitable for 107 sq mm contact wire

The price shall cover cost for supply of Contact wire splice (toothed type) suitable for 107 sq mm contact wire, over and above the requirement for item no. D1, as per Drawing No.ETI/OHE/P/1081-1Rev-C or latest.

Item No. D-4: Supply of 10 x 2.5 Sq.mm PVC insulated stranded copper cable for control and indication of Interrupters.

The price shall cover cost for supply of 10 core x 2.5 sq mm PVC insulated, PVC sheathed, Copper conductor, Un armoured Electric Control cable for working voltage up to and including 1100 volts as per specification No. IS:1554/ Pt-I/ 1988 or latest and shall be packed in corrugated steel drums and procured at concern SSE's store or as desired by railway administration.

Item No. D-5: Supply of 2x2.5 Sq.mm PVC insulated stranded copper cable for catenary indication.

The price shall cover cost for supply of 2 core x 2.5 sq mm PVC insulated, PVC sheathed, Copper conductor, Un armoured Electric Control cable for working voltage up to and including 1100 volts as per specification No. IS:1554/ Pt-I/ 1988 or latest and shall be packed in corrugated steel drums and procured at concern SSE's store or as desired by railway administration.

Item No. D-6: Supply of 2x4 Sq.mm PVC insulated stranded copper cable for heater supply.

The price shall cover cost for supply of 2 core x 4.0 sq mm PVC insulated, PVC sheathed, Copper conductor, Un armoured Electric Control cable for working voltage up to and including 1100 volts as per specification No. IS:1554/ Pt-I/ 1988 or latest and shall be packed in corrugated steel drums and procured at concern SSE's store or as desired by railway administration.

Item No. D-7: Supply of copper strip for earthing. (25 x 3mm)

The price shall cover cost for supply of 25 x 3.0 sq mm and confirming IS 191/1981 & IS:613/ 1984 or latest, and procured at concern SSE's store or as desired by railway administration.

Item No. D-8: Supply of Solid copper busbar 18mm

Price shall cover supply of solid copper bus bar (18 mm) of RDSO's approved make as drawing and specification of RDSO with latest version with required attachments for single/double pole isolators. The price shall also cover Supply of all other required attachments for isolators than already mentioned in other items.

Item No. D-9: Supply of solid copper bus bar terminals

The price shall cover the supply and erection of copper bus bar terminal and Connector compression type ID no. 6311-2 conforming to RDSO's Spec no. ETI/OHE/49(9/95) with AC Slip no. -1(3/97 or latest (Drg no.TI/DRG/OHE/FTGNF/RDSO/00006/03/3 or latest) suitable for 18mm bus bar as per site requirement. The price shall include all types of fasteners required for bus bar connector. The price shall also include supply of required crimping tools @ 01 set per 100nos. bus bar terminal /connector supply for which no extra payment will be made.

Item No. D-10: Supply of solid copper bus bar connector's bus splice

The price shall cover supply of bus splice of RDSO approved make. Suitable for 18mm copper bus bar. Inspection of new bus splices to be carried out by Rly representative.

SCHEDULE – E: (Erection)**Item No. E-1: Preparation all drawing and design for overhead equipment including preparation of pre pegging, pegging and OHE layout plan:**

The price shall be covered for preparation of Pre pegging and Pegging Plan of OHE - LOP, CSD, SED, SWR, LSD for the OHE work and supply of 6 sets hard copy. The price also cover cost for supply of AED of LOP, SED, SWR, LSD with minimum 6 sets of Hard copy with Soft copy. The price also cover cost for preparation of digitalized sectioning diagram and supply of minimum 6 sets of hard copy with soft copy. The price also cover cost for soil testing or any other requirement to complete the above schedule item. Railway will be supplied soft copy of ESP yard plans only. All electrical (TRD) related drawings shall be prepared by successful tenderer. The price also covers cost for retracing of existing drawings on new drawings. Preparation of Power supply dia-gram and sectioning diagram also included in item for complete section 50% of the price will be paid on approval of the drawing for execution and balance 50% after successful completion of the work and handing over of the soft and hard copies to the client.

Item No. E-2: Preparation of design and drawing of switching stations.

The price shall cover on a flat rate basis per switching station in the section, survey, investigation of soil bearing pressure and soil resistivity, Preparation of cross section drawings, preparation of general arrangement drawings, detailed layout of equipment, bus-bar connections and insulators, layout of cable trenches outdoor and inside the control room, layout of earthing system and earth connection, layout of earth screen wire, design of supporting structures for 25 KV equipment's, detailed drawings for steel work and structural support and drawings/ designs for equipment's, components,, fitting and materials supplied by the contractor. The price shall include supply of requisite number of copies of all drawings including completion drawings to the purchaser. The contractor shall prepare and furnish all relevant drawings in 6 copies at no extra cost for

approval by the employer before commencing fabrication/manufacture of the equipment and before carrying out any work at site. The drawing shall be prepared in Auto Cad. Such drawings shall be coordinated with all agencies executing civil works etc. 50% of the price will be paid on approval of the drawing for execution and balance 50% after successful completion of the work and handing over of the soft and hard copies to the client.

Item No. E-3: Erection of rolled or fabricated and galvanized traction mast and auxiliary transformer masts, TTC and Portals.

The price shall cover cost of erection of traction main masts of OHE comprising rolled, broad flanged beams, fabricated K series, B series, portal upright, boom pieces & associated fittings, D.A., extension chairs etc.

1. The price shall cover cost of erection, alignment and setting before grouting of individual tractions masts.
2. In case, required size of channels are not available as per approved drawing, higher size of channels can be used with approval of Dy.Chief Electrical Engineer (construction) Western Railway, and payment as per actual black weight will be paid.
3. The prices shall also include the cost of stenciling of location number, height of contact wire, implantation, R.L. etc on masts/portal uprights in the manner as directed by purchaser.
4. The price shall also include the straightening of masts/portal uprights etc bent during transit and cutting of masts/portal uprights to suit the site condition.
5. For standard fabrication of steel work or structures for which RDSO/CORE approved drawing are available, the black steel weight of steel work as specified in RDSO/CORE drawing, shall be considered for payment.
6. However in case the unit sectional weight of any member indicated in RDSO's drawing is not in conformity with the unit sectional weight as per the latest IS specification the weight of the fabricated steel work shall be calculated on the basis of latest IS specification and the same will be considered for payment for the nonstandard fabricated steel work, the calculated weight to be considered for payment under this item shall be included in the relevant drawing based on latest IS sectional weight at the time of submitting the designs for approval of the purchaser.
7. There will be no addition for increased weight due to galvanizing or painting or reduction for holes or screw cut.
8. Galvanization damaged during transportation/ carting will be touch up with cold ZINC paints by tenderer.
9. Crane will be arranged by railway for portal boom erection only on demand by contractor. Rail crane operator & diesel for rail crane will be arrange by contractor.
10. ***Note:- In case of Erection Crane with BFR is provided by railway for erection of Mast/ Portal, then 75% of Erection rates shall be paid.***

Item No. E-4: Erection of fabricated and galvanized steel works other than traction mast (SPS)

The price shall cover cost for erection of SPS for different type of masts, portals, DA, isolator, Portal boom, AT Mast, Bridge Mast etc. Payment of SPS will be made as per black steel weight of material as per RDSO/CORE latest approved drawings and supplier.

Item No. E-5: Erection of single cantilever assembly complete with insulator for High Rise OHE and inside the tunnel

The price shall cover cost for erection of single cantilever assembly complete with insulator for High Rise OHE and inside the tunnel

1. The price shall cover on a flat rate basis for erection of bracket assembly on a traction mast or support on drop arm and shall include those on high/low level platform in the vicinity of turnouts over bridges or overlaps and at all locations with reduced encumbrance/terminating wires as per latest RDSO drawing.
2. The price shall include the cost of erection of all components including galvanised steel tube duly fabricated and solid core Porcelain / Composite insulators (CD 1050/1600 mm) for polluted Zone (Id. 6000-1,6030-1) including bolts, nuts etc if any.
3. The price shall cover erection of all components including solid core insulators & registered arm dropper excluding small parts steel work if any.
4. However, this does not include the anti-creep arrangement at masts/structures.
5. The price shall cover cost of insulator testing with hydraulic testing zig. Zig shall be arranged by contractor.
6. Necessary SED will be supplied by Railway for each cantilever.

Item No. E-6: Erection of pull-off arrangement for OHE

The price shall cover erection of all components required for a pull-off arrangement to pull OHE equipment, including head span mast fittings complete with M.S. angle equalizing plate assembly steady arm, catenary dropper clip, contact wire swivel clip and fittings, including composite/ porcelain 9 ton insulators (1050/1600 mm CD) conductors, small jumpers (50 Sqmm) wire. The price shall cover erection of all components including composite solid core insulators, small jumper wire and conductors.

Item No. E-7: Erection of guy rod assembly.

1. The price shall cover erection of complete guy rod assembly of various lengths for traction masts/portal upright complete with mast guy rod fittings, guy rod with adjustments and parts to be grouted etc in the anchor block including S.P.S
2. The price shall not include the cost of supply of dwarf masts.

Item No. E-8: Erection of regulating equipment complete with all accessories and Adjustment of the same.

The price shall cover erection testing and commissioning of counter weight assembly including 9 Tonne adjuster with double strap assembly, and normal/antitheft guide tube assembly including supply of regulating equipment as per RDSO Specification No. TI/SPC/OHE/ATD/0060 Rev.-1 with A&C Slip No.1 or latest and stainless steel wire rope as per Rly Specification No. TI/SPC/OHE/WR/1060(06/2006) With A&C No.1, 2 & 3 or latest required for regulating equipment and small parts steel work, if any. The price shall also cover adjustment of entire regulating equipment assembly, including anti-falling device, adjust X, Y value and painting of maximum and minimum 'Y' value on the mast. The price shall also include to erect anti climbing (stiffener) Angle on Anchoring and double eye distance rod. The price also covers cost for compliance of Latest Technical circular, MI/SMI's, Reliability action plan etc. (if applicable)

Item No. E-9: Erection of GI Structure & other bonds.

1. The price shall cover erection of all materials including GI flat 40x6 mm required to provide a structure bond connecting a traction mast or structures to the nearest non track circuited rail, or earth electrode including all fasteners at both ends.
2. The price shall include shaping and drilling of the bond and erection of all materials including the bond.
3. The price shall also include provision of heat shrinkable PVC sleeve for structure bond under track circuited rail.
4. This would also cover connection or earthing terminals of equipment's like L.T. transformers with structures and then to rails as per relevant drawings.
5. The price shall cover cost for Painting of bond including supply of Paint as per railway Specification and requirements.

Item No. E-10:A&B-Erection of Earth electrode as per IS 3043 OR RDSO specification

The price shall cover cost of erection testing and commissioning of an earth station confirming to IS 3043 or RDSO specification with latest amendment. The price also covers cost for manual excavation of earth for providing earth station, cost for wooden charcoal, salt to found earth resistance within limits and erection of protective concrete box and RCC cover.

Item No. E-11: Erection of GI flat for earth (50mmx6mm) laid in ground and Exposed.

The price shall cover Supply and installation per meter length of 50x6mm GI flat, buried at a depth of 60cm below ground level or on exposed portion. The price shall also cover connections of the steel flats to the main earth ring and to the steel structures and metallic frame work /terminals of the various equipment's as required. The price shall also cover cost for Painting of bond including supply of Paint as per railway Specification and requirements.

Item No . E-12: Erection of Fencing upright

The price shall cover erection of fabricated fencing uprights painted with two coats of red oxide zinc chromate primer and Finished with two coats of Aluminium paint as per IS:2339. The price shall be on the basis of black weight of the steel section of the approved drawing with no deduction for holes and skew cuts or no increase for weld materials. The cost of foundation of uprights will be paid under Schedule "A".

Item No. E-13: Erection of fencing panel

The prices shall include erection of fencing panels painted with two coats of red oxide zinc chromate primer and finished with two coats of aluminium paint as per IS: 2339. The prices shall not include supply of fencing uprights, anti-climbing devices but shall include the cost for erection of fasteners and the price shall be for a meter length of the panels, measured in the plan view of the approved drawings.

Item No. E-14: Erection of 25KV Vacuum Interrupter.

The price shall cover erection testing and commissioning of 25kV Vacuum BM, complete with operating mechanism, all fittings, and accessories including terminal connectors. The price shall cover grouting the supporting frame and mechanism box on foundation block and mounting of other accessories in their respective places. It shall also cover, testing and commissioning of the circuit breaker. The price shall also cover the erection of an enameled number plate and required quantity of Long shackle brass Pad lock (Make - Godrej, Link). The Contractor shall make his own arrangement for power supply requirement for testing purpose. All necessary tools, equipment's instruments required for carrying out necessary checks and tests and commissioning shall be arranged by the Contractor.

Item No. E-15: Erection of 25 KV double pole isolator with interlocking mechanism

The prices shall cover erection testing and commissioning of double pole isolator switches of approved make, complete with arcing horns, operating rods, operating rod guides, mounting base (including 25KV pedestal insulators-4Nos and operating rod insulator-2 No) and integral locks. The price shall also cover erection of a pad lock and, number plate of approved design for each isolator, and also cover erection of copper flexible jumper along with accessories between isolator to OHE and support of operating rods on gantries/mast. The price shall not include supply and erection of small parts steel work complete with bolts and nuts etc.

Item No. E-16A: Erection of 25KV single pole isolator without earth contact assembly.

The prices shall cover erection testing and commissioning of isolator switches of approved make, complete with arcing horns, operating rods, operating rod guides, mounting base (including 25KV pedestal insulators-2Nos and operating rod insulator-1 No) and integral locks. The price shall also cover erection of a pad lock and a number plate of approved design for each isolator, and also cover erection of copper flexible jumper along with accessories between isolator to OHE and support of operating rods on gantries/mast. The price shall include supply and erection of smallparts steel workcomplete with bolts andnuts etc. The price also covers cost for supply and erection of terminal connector as per RDSO standard for connection of Isolator to Busbar, Busbar to Busbar (splice) and Busbar to 160sqmm jumper (RI no. 6310, 1009 etc.) as required. The price shall also cover the erection of 18mm copper bus bar for use with SPI in OHE. The price also covers supply of Key box for station and Switching station.

Item No. E-16B: Erection of 25KV single pole isolator with earth contact assembly.

The prices shall cover erection testing and commissioning of isolator switches of approved make, complete with arcing horns, operating rods, operating rod guides, mounting base (including 25KV pedestal insulators-2Nos and operating rod insulator-1 No) and integral locks. The price shall also cover erection of a pad lock and a number plate of approved design for each isolator, and also cover erection of copper flexible jumper along with accessories between isolator to OHE and support of operating rods on gantries/mast. The price shall include supply and erection of smallparts steel workcomplete with bolts andnuts etc. The price also covers cost for supply and erection of terminal connector as per RDSO standard for connection of Isolator to Busbar, Busbar to Busbar (splice) and Busbar to 160sqmm jumper (RI no. 6310, 1009 etc.) as required. The price shall also cover the erection of 18mm copper

bus bar for use with SPI in OHE. The price also covers supply of Key box for station and switching station. The price shall cover the cost of supply and erection of 3x25 mm copper connection between the earth contact assembly and the structure.

Item No. E-17: Erection PTFE Short Neutral section.

The price shall cover erection, testing and commissioning of a complete assembly of short neutral section (PTFE) (Phase brake). The price shall also cover end fitting for contact & catenary wire and other material required for erection & smooth operation with earthing arrangement. The short neutral assembly to be as per RDSO specification No.TI/SPC/OHE /SNS/ 0000 Rev.-1 with A&C Slip No.1or latest.

Item No. E-18: Erection of materials for termination of Single/double conductor (including erection of cut-in insulator) of overhead equipment.

The price shall cover erection of all material necessary for the termination of double conductor of overhead equipment terminating wire on a traction mast or structure including clevis assembly, adjuster, anchor double strap, ending clamp for catenary or contact or terminating wire with fitting and 9 tonne Composite or porcelain insulator (as desired by railway) assembly (for polluted zone) but excluding terminating wire if any, wherever double termination if required. Materials like equalizing /compensating double strap assembly.

Item No. E-19: Erection of anti-creep with 9T insulator over & above as incl. in E34

The price shall covers cost for erection of complete Anti-creep assembly including 9T insulators, Terminations, copper anti creep wire etc. over and above as included in item no. E34. The copper wire will be supplied by railway from concern SSE's store.

Item No. E-20: Erection of section insulator assembly including core and cut-in insulator.

The price shall cover erection testing and commissioning of all components required for a standard section insulator assembly on High Rise OHE including section insulator assembly (Five parts), also provide 2 nos., stiffener (contact bar) & other materials as per details given below: All material shall be with latest specifications.

Railway ID No.	Description of component	Qty per unit
RI-1120	Catenary ending clamp	2 Nos.
RI-1190	Catenary dropper clip assembly	As required
RI-6170	Parallel clamp for double contact wire.	12 Nos.
RI-6110	Dropper assembly for Section Insulator.	As required
RI-6100-1	Porcelain section insulator along cree-page.	01 No.
RI-6020-1	9 tonneinsulator	01 No
RI-6181-2	Double straps for section insulator.	02 Nos.

Item No. E-21: Erection 25KV solid core cut-in insulator.

The price shall cover cost for erection testing and commissioning of complete 25 KV solid core Porcelain/ Composite cut-in-insulator including Double strap, Catenary wire or

contact wire ending cone etc. as per latest RDSO/CORE specification. This item not covers cost for erection of cut-in-insulator which is covered in any other schedule.

Item No. E-22: Erection of 25KV solid core suspension insulator

The price shall cover cost for erection testing and commissioning of complete 25 KV solid core Porcelain / Composite suspension insulator assembly including Double strap, single eye clevis, suspension clamp etc. as per latest RDSO/CORE specification and drawings. This item not covers cost for erection of suspension insulator which is covered in any other schedule.

Item No. E-23: Erection of 25KV post insulator

The price shall cover cost for erection of 25KV Post Insulator with fasteners and saddles as per RDSO specification No - TI/SPC/OHE/INS/0070 (04/2007) with A & C slip no. 1 & 2or latest.

Item No. E-24: Erection, Testing and commissioning of 5, 10& 25 KVA Change over panel as per RDSO spec.

The price shall cover cost for erection, testing and commissioning of 5,10, 25 KVA Change over panel as per RDSO specification No. TI/SPC/PSI/CLS/0020(12/02) (with A&C slip No. 1 to 4) or latest and suitable for 10 KVA AT Supply. The price also covercost of any relay, fittings, Type-I Box, Glands, fasteners, Lugs etc. for commissioning of panel and smooth working.

Item No. E-25: Erection of terminal board in control cubicle.

The price shall cover cost for erection, testing and commissioning of terminal board for 230V AC supply to Interrupters in switching post control cubicle as per RDSO/CORE latest drawings and specifications.

Item No. E-26: Erection of 110V DC distribution board.

The price shall cover cost for erection of 110V DC distribution board suitable for section in switching post control cubicle as per RDSO/CORE latest drawings and specifications.

Item No. E-27: Erection of 230V AC distribution board.

The price shall cover cost for erection of 230V AC distribution board suitable for section in switching post control cubicle as per RDSO/CORE latest drawings and specifications.

Item No. E-28: Erection of PT Type-I-

The price shall cover cost for Erection, testing and commissioning of 27.5 kV/110V potential transformer Type-I (as per RDSO specification no. TI/SPC/PSI/PTS/0990(09/99)with A&C slip No. 1 to 5 or latest) complete with all fittings and accessories including terminal connectors. The price also cover cost for supply of an enameled number plate. The price also include cost for any modification for comply MI/SMI/TC and local arrangement.

Item No. E-29: Erection of 110V, 40AH battery charger.

The price shall cover Erection, testing and commissioning of a battery charger for 110V, 40Ah low maintenance lead acid battery complete with stand and accessories as per

RDSO specification No. ETI/PSI/1(6/81) or latest and a tool board Hydro Meter and thermometer. The price shall also cover for cost of suitable size of cable to connect between battery charger and battery including lugs and connectors.

Item No. E-30: Erection of 110V lead acid, 40 AH battery-

The price shall cover erection, testing & commissioning of a 110V, 40Ah low maintenance lead acid battery complete with stand and accessories as mentioned in relevant specification and a tool board. The price for erection shall include installation, connecting up, charging and commissioning of the battery.

Item No. E-31A: Erection & commissioning of auxiliary transformer 5 &10KVA including DO fuse Assembly, LV box & anti climbing device

The price shall cover cost for erection, testing and commissioning of Auxiliary Transformer 25 KV/230 V, 5 &10 KVA as per RDSO specification No. ROSO specification no.ETI/PSI/15 (8/03) or latest, with 25 KV DO fuse complete assembly including insulators as per RDSO Specification No. ETI/ PSI/14(1/86) Rev 1 (Apr '87), LV box for AT & Anti climbing device complete including barbed wires etc. the price also cover cost for Clamps, Type-I Box ,lugs, Name Plate etc.

Item No. E-31-B:- Erection & commissioning of auxiliary transformer 25KVA including DO fuse Assembly, LV box & anti climbing device

The price shall cover cost for erection, testing and commissioning of Auxiliary Transformer 25 KV/230 V, 25 KVA as per RDSO specification No. ROSO specification no.ETI/PSI/15 (8 /2003) or latest, with 25 KV DO fuse complete assembly including insulators as per RDSO Specification No. ETI/ PSI/14(1/86) Rev 1 (Apr '87), LV box for AT, Type-I Box& Anti climbing device complete including barbed wires etc. the price also cover cost for Clamps, lugs, Name Plate etc.

Item No. E-32: Erection of Lightning arrestor 42 KV-

The Price shall cover cost for erection, testing and commissioning of 42 KV Metal oxide gapless type Lightening Arrestor as per RDSO specification No. TI/SPC/PSI/MOGLA/0101 (02/ 2015) or latest including surge monitor and disconnector assembly and an enameled number plate with fasteners and clamps. The price also cover cost for THRC measurement.

Item No. E-33: E, T & C of RTU's at Switching posts.

The Price shall cover cost for erection, testing and commissioning of Remote terminal unit (RTU) for switching post and suitable for section as per RDSO specification No. TI/SPC/RCC/SCADA/0134) with latest amendments and same shall support existing SCADA system at RCC. The price includes cost for Software changes in SCADA at RCC including changing of protocol to support existing SCADA system as per RDSO Specification. The interlocking facility shall be provided at RCC as per guidelines for those posts and also necessary hardware to be provided for requirement of interlocking in RTUs of boundary posts. The software integration is necessary for all the section SP/SSP with the existing software at RCC. The price shall also include augmentation, Configuration & linking of RTUs with the existing SCADA system due to insertion of new RTU in existing system. The price shall also include coordination between

hardware supplier and software supplier. As it is an augmentation work, the erection of RTUs at controlled posts and software changes at RCC shall be done with minimum disturbance to the existing system and as per direction of Railways. The tenderer as per direction of Railways, if required, shall arrange the manning of particular post/RCC. The price shall include the license fee for the supply and installation of Standard Electric Traction SCADA software. Necessary on line Training as decided by the Sr.DEE/TRD to be imparted to Railway staff for erection, testing & commissioning during the SCADA commissioning work.

Item No. E-34: Erection of overhead equipment, including catenary, contact, jumper and dropper wires, fixing of number plates & various type of boards

The price shall cover erection of all components which is covered under Supply of OHE items (Schedule 'D' Item No.-1) including Catenary & Contact wire, 5 mm Dropper wire, ending cones, contact/catenary splices, Retro-reflective/ enameled Number plate, various types of caution and warning boards (As per latest guide lines) with SPS for attachment on mast/structure, Jumper wires of suitable size with PG clamps for 'G, jumper, potential equalizing jumper, anti-theft jumper, X-feeder drop jumper, Isolator Jumpers and any other jumpers (where their use is approved), terminating wires etc. The price also covers cost for providing anti creep anchor, contact wire in place of catenary under ROB, FOB and over line structures. Catenary and contact wire shall be supplied to contractor at concern SSE's store. Transportation cost shall be borne by contractor and shall not be paid under transportation item.

Note: -

1. The price shall also include erection of any extra fitting required for turnout, cross over, diamond crossing.
2. The price shall cover erection of all components fitting required for erection of contact and catenary wire including contact and catenary splices, catenary wire ending clamp, contact wire ending clamp, Anchor double strap, compensating plate/equalizing plate etc.
3. The price also cover cost for Cut in (9T) insulator with catenary/contact wire ending clamp for catenary & contact wire for all insulated overlaps.
4. The price shall cover cost for erection of Catenary/Contact wire splices and other materials required for modification in existing OHE/New OHE where contractor claims erection of OHE cost.
5. If tramway OHE is required to be erected then it will be paid in OHE erection only for erection of contact wire including supply & erection of Bridle wire, PG clamp etc.
6. The price shall cover cost for erection of complete Anti-creep assembly including termination assembly, anti-creep wire and other SPS's etc.
7. The price also covers cost for erection of a large span wire.
8. The price shall cover cost of tree trimming and cutting as required for charging by 25 kv OHE/ commissioning of the section.
9. ***Tower wagon shall be made available for final checking of OHE prior to commissioning. In case of wiring train/8 Wheeler-Tower wagon is provided by railway for wiring, 75% of Erection rates of overhead equipment shall be paid.***

Note: Wiring train/Tower wagon/Crane may be supplied by Railway as per availability. Contractor shall make their own arrangement for erection of OHE structures & wiring. Road crane shall be hired for erection of OHE structures for locations easily accessible by Road. However, for inaccessible locations, crane with crew

will be made available by Railways free of cost for erection of portal booms, but fuel is to be arranged by the contractor. *Rail crane operator & diesel for rail crane will be arrange by contractor.* Final decision regarding such locations will be taken by Dy.CEE (C). However, Tower wagon shall be made available for final checking of OHE prior to commissioning. *Tower wagon platform DG set fuel (Diesel) is to be arrange by Contractor.*

Item No. E-35: Transportation & laying of 10x2.5 Sq.mm, 2x2.5 Sq. mm, 2x10 Sq. mm, 2x4 Sq. mm, PVC insulated stranded copper cable for control / indication.

The price shall cover erection, testing & commissioning of per meter length different type of control cable as specified in relevant item. The price also cover cost for transportation of cables from concern SSE's store including loading, un loading and handling. The price also cover cost for supply & erection of cu lugs, lacing and cable identification labels made of AL. at every 5 mtrs and at every corners on cable trench. The price shall also cover cost of insulation resistance measurement. Megger shall be arranged by contractor. Method of erection shall be as per Rly Guidelines.

Item No. E-36: Transportation & laying of 2x70-150 Sq.mm PVC insulated stranded aluminium cables from AT to DB

The price shall cover erection, testing & commissioning of per meter length of 2x70-150 sqmm AT cable as specified in relevant item. The price also covers cost for transportation of cables from concern SSE's store including loading, un loading, handling, digging & refilling of cable trench. The price also cover cost for supply & erection of cu lugs, lacing and cable identification labels made of AL. at every 5 mtrs and at every corners on cable trench. The price shall also cover cost of insulation resistance measurement. Megger shall be arranged by contractor. Method of erection shall be as per Rly. Guidelines.

Item No. E-37: Erection of copper strip for earthing. (25 x 3mm)

The price shall cover erection of 25mmx3mm copper strip to connect the earth terminals of equipment like potential transformers, lightening arresters, LT supply transformer to the main masts of the gantries on which they are mounted. The price shall cover all fastenings required for fixing the copper strips along any structure member of the gentry.

Item No. E-38: Erection of 150 sqmm copper feeder wire.

The price shall cover the cost of erection, testing & commissioning of 37/2.25 mm copper feeder wire (150 sq.mm) as per latest RDSO specification complete with all fittings.

Item No. E-39: Erection of 50/39 mm aluminium bus bar.

The price shall cover erection Testing & commissioning of per metre length of 50x39 mm dia. Aluminium tube to serve as bus bar or equipment to equipment bus bar connection in the traction sub-station, SP and SSP wherever required. The price shall include bending, shaping and connecting/clamping of the Aluminium tube to the equipment terminals/bus bar supports as required.

Item No. E-40: Erection of all types of aluminium bus bar terminal assembly, splice and connectors for 50 mm bus bar.

The price shall cover cost for erection, testing and commissioning of all types of aluminium bus bar terminal assembly, splice and connectors for 50 mm bus bar as

specified in concern item. The price also cover cost for contact resistance measurement as per procedure laid down in ACTM for commissioning of TSS, SP and SSP.

Item No. E-41: Transfer of OHE from one support to another and adjustment of droppers/slewing of OHE

The price shall cover transfer of overhead equipment to a bracket assembly on a new mast or support and dismantling of the erected bracket assembly from the old mast or support and consequent adjustment to overhead equipment required such as re spacing of droppers.

Item No. E-42: Providing (Supply with erection) of anticlimbing device for SSP/SP.

The price shall cover supply with erection of an anti-climbing device consisting of steel fixtures and galvanized barbed wire mounted on the fencing panels as per approved drawings. The price shall be per meter length of the panel. The price shall include painting of the fixtures with two coats of red oxide zinc chromate primer and finished with two coats of Aluminum paint as per IS: 2339.

Item No. E-43: Dismantling & removal of OHE complete with cantilever, droppers, contact & catenary wire etc.

The price shall cover cost for dismantle of complete OHE including contact and catenary wire, droppers, jumpers, insulators & other fitting if any. The price also cover cost for cutting of catenary wire, contact wire and other materials for DS-8 purpose (if required) and same will be handed over to concern SSE/C, Railways scrap depot for DS-8 or as desired by SSE/TRD/C. Transportation charges will be given relevant item of transportation.

Item No. E-44: Dismantling & removal of Auxiliary transformer with DO fuse

The price shall cover cost for dismantle of Auxiliary transformer including DO fuse assembly, Jumper wire, PG clamps, LT fuse box, anticlimbing device, Earth connection etc. Transportation charges will be given relevant item of transportation.

Item No. E-45: Dismantling & removal of Isolator complete

The price shall cover cost for dismantle of complete isolator including terminal connectors, jumper wire, PG clamps operating rod and support insulators, operating handle and SPS. Transportation charges will be given relevant item of transportation.

Item No. E-46: Dismantling & removal of Mast, portal, TTC & other small part steel

1. The price shall cover the dismantling of OHE mast, portal upright with boom, TTC and other small part steel by gas cutting and handing over to the railway at nominated place.
2. The price shall exclude the transportation charges and the same will be paid for against relevant item
3. Crane will be given by Railway for dismantle of Portal boom only. Rail crane operator & diesel for rail crane will be arrange by contractor.
4. The price shall also cover cost of cutting in suitable size pieces for scraping the material (i.e. 2.0M to 3.0M or as accepted by railway scrap depot).

Item No. E-47: Breaking of concrete foundation of Masts, portals & TTC

The price shall cover cost for breaking of foundation of Mast, Portal TTC etc. upto 0.8 M below rail level. The price also covers cost for removal of debris outside track.

Item No. E-48: Dismantling & removal of Guy rod assembly

The price shall cover to dismantle the Guy rods with Anchor fitting, Guy rod fittings, double strap, stirrup & Anchor V bolt etc. and same will be handed over to concern SSE/C Railways scrap depot for DS-8 or as desired by SSE/TRD/C. Transportation charges will be given relevant item of transportation.

Item No. E-49: Providing (Supply & erection) of layout board for switching posts.

The price shall cover cost for providing (Supply with erection) of lay-out board for switching post. The board shall be framed with Aluminium section in suitable size. Before supply the board necessary approval should be got from Concern Dy.CEE.

Item No. E-50: Providing (Supply & erection) of Sectioning diagram board at stations

The price shall cover cost for providing (Supply with erection) of Sectioning diagram at Stations. The board shall be framed with Aluminium section in suitable size. Before supply the board necessary approval should be got from Concern Dy.CEE.

Item No. E-51 :- Modification Upgradation, testing & commissioning in existing standard SCADA software at RCC equipments for configuration, integration/ hooking up of additional RTUs of adjacent section with master station as per RDSO Spec. No. TI/SPC/RCC/SCADA/0134) with latest amendments.

The price shall cover Modification/up gradation, testing & commissioning in existing standard SCADA software at RCC Equipments for configuration, integration/hooking up of additional RTUs of adjacent section including any associated work for hooking up & satisfactory operation of RTUs with Master Equipments/RCC as per particular specification of the tender.

Item No. E-52 : Supply of firefighting equipment.

The price shall cover cost for providing (supply with erection) of fire extinguisher confirming to IS: 2171 or latest. The firefighting equipment shall be suitable to take care of B & C class of fire. The extinguisher shall have 10 Kg. Capacity of dry chemical powder. The price also cover cost for hanging arrangement / suitable clamps.

Item No. E-53: Supply of First aid BOX with Stretcher etc.

The price shall cover supply with erection of standard first Aid box and stretcher with hanging arrangement of GI Sheet with pad lock as approved by the Employer. The list of items containing min the first aid box shall be obtained from employer/engineer.

Item No. E-54 : Transportation of Railway supply materials (Traction masts and other OHE equipment) from Railways depots to site of work OR Transportation of Release material from Site to Railway depot/ Scrap depot.

Price shall cover cost for Loading, unloading and transportation of all released OHE materials i.e. OHE mast, cantilevers, SI, SP Isolator, Guy rod, insulators, DA, Chair etc. from site to Construction depot. /Scrap depot for DS-8 or as desired by SSE/TRD/C. The

price also covers cost for transportation of materials (from OHE depot to Site) which is supplied by Railway and not covered in contractor's supply. The item of transportation of Contact wire, catenary wire, feeder wire and different type of cable shall not be cover under this item.

Item No. E55 Work under Power Block: Any erection work as per schedule done under power with Traffic block is subject to have 30% payment done of their erection cost under this Schedule item.

The price covers 30% payment done of erection cost of an item under this schedule item which is required Erection under a power block. The price under this item covers extra charges over and above erection rates of items for erection of equipment in the vicinity (less than 2 mtrs) of energized overhead equipment which calls for a power block (shut off of traction power supply). Power block will be arranged by Railway as per suitable demand of contractor. The price payable under this item shall be 30% extra over the erection rates of the items referred to above provided such work is not called for on account of non-compliance with specifications, approved drawings and instructions given by the purchaser from time to time.

Item No. E-56: Erection of Ant bird disc.

The price shall include the erection of Ant bird disc on ST, BT & 9 toninsulators and fitting as per Drg No. TI/DRG/OHE/ABD/RDSO/00000/19/0 Rev 1 (Sh 1&2), under RDSO MI No.TI/MI/00059 Rev 2 (or latest).

Item No. E-57: Erection of Anti Monkey climbing device as monkey scare for mast

The price shall include erection of Anti Monkey climbing device as Monkey scare measure at OHE mast at Monkey menace prone areas as per RDSO SMI No. TI/MI/0056 Rev-2 or latest. The erection of AMCD shall be done as per site requirement of respective OHE structure and as directed by concern SSE/Elect/C.

Item No. E-58: Erection of Anti Monkey climbing device as monkey scare for portals

The price shall include erection of Anti Monkey climbing device as Monkey scare measure at OHE Portal/TTC upright at Monkey menace prone areas as per RDSO SMI No. TI/MI/0056 Rev-2 or latest. The erection of AMCD shall be done as per site requirement of respective OHE portal /TTC upright and as directed by concern SSE/Elect/C.

Item No. E-59: Erection of nylon /plastic net - High density polyethylene (HDPE) monofilament netting type III, UV stabilized as per IS 16008(part-2)-2016/PVC virgin HDPE Net preferably in black colour.

The price shall include erection of Anti Bird High density polyethylene (HDPE) monofilament netting type III, UV stabilized as per IS 16008(part-2)-2016/PVC virgin HDPE Net preferably in black colour on fabricated structure, Portals/TTC, Fabricated DA, Gantry boom, etc. as per RDSO MI No. TI/MI/0050 Rev-1 Dtd.27.09.2021.the price shall also include tying with UV resistant nylon cable tie as per para 4.4 of RDSO SMI.

Item No. E-60: Erection of Additional contact wire piece across RRA clamp with 02 Nos. of PG clamps on either side (contact wire piece shall be supplied by Railway)

The Price shall include supply and fitting of 02 Nos. of PG clamps on either side of RRA clamp as per RDSO SMI No. TI/MI/0058 Rev-1, dated 10.08.2021.The additional contact wire of length 2.00 meter shall be fixed on out of run contact wire across RRA clamp

with the help of two Nos. PG clamps on either side (RI No. 1041-2) as per SMI. The work involves bending and fixing of contact wire as per site requirement. Contact wire piece will be supplied by Railway.

Item No. E-61: Provision of Buried Rail

The price shall cover cost for providing (supply with erection) of Buried Rail with all required materials except piece of Rail (13mtrs) as per RDSO specification No. TI/SPC/PSI/EARTHING/0210, dated 20.08.2021. The price shall cover cost for Providing Earth electrode with Earth pit, GI Flat size of 75x8 as required for connecting earth electrode to Buried Rail & Buried rail to Running track as mentioned in RDSO specification No. TI/SPC/PSI/EARTHING/0210, dated 20.08.2021. The price shall cover cost for Providing digging, copper rivet, fasteners, Nut bolt, washer, Check nut etc.

Rail will be provided by Railway from nearby site/P-way depot. The transportation up to site shall be in contractor's scope. All material except rail shall be supplied by the contractor.

The contractor shall have Supply, transportation and providing

Item No.E-62 Temporary Lighting Arrangement (TWO)

- 1) portable type 2 to 5 KVA, 240 volt, 50 HZ, DG Set on hiring basis complete with fuel, oil, accessories, and all material for temporary lighting during TWO/NI at different Locations as per site requirements.
- 2) At each location contractor should lay cables / wires from supply point to Gumty/ point & crossing -600 Mtrsapprox , switch Board consisting of One No 40 A , 230 V change over switch , 32 A DP MCB-1 No, lamp holder - 1 No , 6A socket with switch & top-6 Nos , 6/16A socket with switch & top complete - 1 No with wiring, tripod stand - 6 Nos , Pendent lamp holder, LED lamp -15 W-2 Nos , focus type LED 45 W fitting-6 Nos, pedestal fan- 1 No etc. Material procurement, Loading / Unloading, transportation of all material and man power provided by contractor, Rechargeable Emergency light with backup-1 No, Ensure earthing at each Gumty. Provision of fittings may be change as per site conditions.
- 3) No charges will be paid for preliminary work of Laying cables, provide stands, fans & luminaries etcor after completion of TWO disentailing work. period count on Hourly basis and operation of Gumtiesworking . If TWO operationalized hourly basis than fraction/ part of 24 hrs calculate for the purpose of Payment.
- 4) The contractor shall procure/purchase all Electrical items and kept ready in safe custody for operation.
- 5) Loading / Unloading and transportation of all material arrange by contractor at every location as suggested by site Engineer. Also arrange staff/Manpower staying/availability arrangement at remote locations.
- 6) Providing manpower of one Electrician per Gumty / location per day round the clock at site by contractor during TWO / NI for handling of DG set operation, filling of fuel oil and maintaining of lighting arrangement.
- 7) Daily consumable wiring wires, LED lamps, Fittings, kerosene, petrol, Diesel, lube oil, tools, PVC tape Roll etc. will be arranged by contractor on his cost for maintain proper lighting arrangements & power supply. Adopt all safety measure during rainy season to ensure uninterrupted power supply.
- 8) Normally gumty will be operated by Railway power supply, portable DG Set will be operated at the time of failure power supply. If near by power supply not available than DG set will be operate round the clock.

- 9) DG should be operated daily on load for one hour, so that there should be no complaint/ inconvenience in train operation at the time of supply failure.
- 10) During TWO/NI contractor should provide utility /jeep /vehicle at site round the clock to reach different location to attend any failure/inspection/ patrolling.
- 11) If any Location DG set failed during working hours, No charges will be paid and token penalty of Rs.1000/- (Rs.one thousand) per DG set per day per location will be deducted from the bill.
- 12) The contractor shall provide the lighting arrangement at nominated places as per instructions of site engineer. Normally intimation will be given 24 Hrs before commencing of TWO/NI or depend on site circumstances.
- 13) The lighting arrangement is to be provided at different locations at various stations in the jurisdiction of Dy.Chief Electrical Engineer, Construction, Rajkot of western Railway.
- 14) Transportation and handling of lighting arrangement material for providing at different locations of various stations is to be arranged by contractor at his own cost.
- 15) The contractor shall keep sufficient spare DG set, fuel, wires, LED light fittings, stands, and tape roll, lamp and field staff for daily maintenance.
- 16) After completion of TWO/NI period of every station/location all material to be removed from site and kept away in their godown/store in his safe custody.
- 17) Railway site Engineer (Electrical) will certify the working Hours, for the purpose of payment.
- 18) No charges will be paid for preliminary work of laying cables, provide stands, fans & luminaries etc or after completion of TWO dismantling work. Period count on per day basis and operation of Gunties working. If TWO operationalized hourly basis than fraction/ part of 24 hrs calculate for the purpose of Payment.

Item No. E-63: Preparation documents, SWR, App G, Display notice boards, key box for EIG & CRS.:

The price shall be covered for preparation of documents for SWR, Appendix G, EIG papers & CRS / PCEE sanctioned for the OHE work and supply of 6 sets hard copy with Soft copy. The price also covers cost for preparation of App G for all stations, make necessary correction till finalization and signed by authority concern. Collect all details for EIG and process up to finalized and submit minimum 6 sets of Hard copy with Soft copy. The price also cover cost for preparation of CRS/ PCEE sanction papers and supply of minimum 6 sets of hard copy with soft copy. ***App G & SWR are to be prepared phase wise as per commissioning of section. App G & SWR required in 11 sets in Hard Copy.*** The price also covers cost for retracing of existing drawings on new drawings.

Price shall cover Provision of boards as below;

- SWR display board Designing, high resolution printing, pasted on 5 transparent acrylic sheet, fixed with ss studs Size 8ft x 4 ft or as per required for all stations: 1 board/Station to be erected in Station master Room.

- Staff caution board, public caution board Designing, high resolution printing, pasted on Transparent acrylic sheet, fixed with ss studs Size 3 ft x 2 ft for all stations: 12 No Per Station and 2No per LC
- Display board for don't climb on roof Designing, high resolution printing, pasted on Aluminum composite panel Size 3 ft x 2 ft for all stations: 4 No Per Station.
- Display board for shock treatment designing, high resolution printing, pasted on aluminum composite panel size 3ft x 4 ft at all station buildings: 2no per Station, 1 no per LC
- Caution board for precaution to work on 25000 volt line designing, high resolution printing, pasted on aluminum composite panel size 5 ft x 16 inches: 2no per Station
- Boards for LC gate designing, high resolution printing, pasted on aluminum composite panel 1.25 ft x 1.25 ft: 1 no per LC
- Key box made from WPC sheet size 1.5 ft x 1.5 ft for stations
- Stationary Kit for each station including 1no Ablong Register, 2no pens, 1 pencil, 1sharpner, 1 rubber, 1 pocket size notebook to be provided at each station.

Item No. E-64: Tree Trimming for OHE section.

Clearance of OHE from any trees along the section should be maintained at least 4 mtr. Trees infringing the OHE should be trimmed. The price covers tree trimming irrespective of tree height. It will be paid per tree. Decision for trees to be trimmed should be as per railway supervisor deputed at site.

Item No. E65 : Cable Height Meter-

The price shall cover cost for supply of Cable height meter range 3 to 23 M, No of wire measured-6, Accuracy 0.5 % +/- 2 digit, resolution 10mm. Make- Suparule model no. 600E, Megger Model-CHM600E, Ultrasonic Model- AR600E or equivalent.

Item No. E66 : Erection of Solid copper busbar 18mm

Price shall cover erection of solid copper bus bar(18mm) as per requirement at site. Necessary instruction will be obtained from concerned Railway representative.

Item No. E67 : Erection of solid copper bus bar terminals

Price shall cover erection of Copper Bus-bar terminal & connectors including multiple hole (19mm) bolted type terminal connector for 18mm bus-bar. Necessary instruction will be obtained from concerned Railway representative.

Item No. E68 : Erection of solid copper bus bar connectors bus splice

The price shall include erection of bus splice with 18mm copper bus as per requirement at site Necessary tools and plants to be arranged by the contractor.

Note: Make and Model to be got approved by Dy CEE/C/RJT before supply.

Schedule F: T&P Items- (Item No F1 to F 31)

This complete schedule i.e. T&P items, require prior approval from Dy.CEE(C) RJT before supply.

Note:-The make & model of all T&P items shall be submitted by the contractor & got approved by Dy. Chief Electrical Engineer (Constn) W-Rly, Rajkot before supply at site.

End of Tender Document