

भारत सरकार
GOVERNMENT OF INDIA



निविदा दस्तावेज़
TENDER DOCUMENT
(Open E-Tender)

निविदा सं.: डी.आर.एम-एस.एन.टी-ए.डी.आई-सिग 05 ऑफ 2026-27

TENDER No.: DRM-SnT-ADI-Sig 05 of 2026-27

कार्य का नाम:- अहमदाबाद मण्डल के अंतर्गत विरमगाम में इनडोर सिग्नलिंग उपकरणों को इलेक्ट्रॉनिक इंटरलॉकिंग सिस्टम से अपग्रेड करने के सिलसिले में इलेक्ट्रॉनिक इंटरलॉकिंग (ईआई) प्रणाली के डिजाइन, आपूर्ति, स्थापना, प्रोग्रामिंग, परीक्षण और कमीशनिंग का कार्य।

Name of Work: - Design, Supply, Installation, Programming, Testing and commissioning of Electronic Interlocking (E.I) system in connection with Viramgam Upgradation of Indoor Signalling equipment by Electronic Interlocking system of Ahmedabad Division.

TWO PACKET SYSTEM TENDER (E-TENDERING)

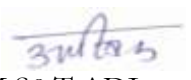
E-Tender Document Cost: Nil

कार्य की अनुमानित लागत } Rs. 31,48,68,507.65/-
Approximate Cost of Work }

(For details please refer to web site- "www.ireps.gov.in")

(अधिक जानकारी हेतु देखें: "www.ireps.gov.in")

Tenderer's Signature
Date


DRM S&T ADI
For & on behalf of the President of India

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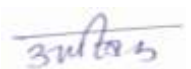
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Tenderer's Signature
Date


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 For & on behalf of the President of India

WESTERN RAILWAY**“E-Tender Notice”****Tender No. DRM-SnT-ADI-Sig 05 of 2026-27**

Date 22.06.2026

Sr. Divisional Signal & Telecommunication Engineer (Co) Ahmedabad Division Western Railway, acting for and on behalf of the President of India invites E-Tender for the following work:

Name of work	Design, Supply, Installation, Programming, Testing and commissioning of Electronic Interlocking (E.I) system in connection with Viramgam Upgradation of Indoor Signalling equipment by Electronic Interlocking system of Ahmedabad Division.
Bidding/Tender Type & System	Works Normal Open E-Tender, Two packet system. (IREPS Portal)
Tender Advertised Value	Rs. 31,48,68,507.65/- (Rs. Thirty One Crore Forty Eight Lakh Sixty Eight Thousands Five Hundred Seven Rupees and Sixty Five Paise Only)
Bid Security/Earnest Money	Rs. 62,97,400/- (Rs. Sixty Two Lakh Ninety Seven Thousands Four Hundred only)
Cost of Tender Document	NIL
Pre- Bid Conference	NA
Bid start date	15 days before closing date
Time & Date of Closing of Bid	15.00 Hrs. on 20.07.2026
Time & Date of Opening of Bid	After 15.30 Hrs. on 20.07.2026
Time & Date of Opening of Commercial Bid	Date will be intimated after evaluation of the technical bid.
Validity of Offer	90 days from tender opening.
Completion period	18 Months
JV Allowed	Allowed
Tendering section Office Incharge & Place of Opening of Bid	Sr. Divisional Signal & Telecommunication Engineer (Co) Ahmedabad, DRM office Ahmedabad, Gujarat.
The tender can be viewed online at E-Tender Portal www.ireps.gov.in and the offer must be submitted on the same E-Tender Portal.	

1. General Information/Instruction of Tender

- Tender Document is available on www.ireps.gov.in at designated place.
- The Bid Security shall be deposited either in cash through e payment gateway or submitted as Bank Guarantee bond from a scheduled commercial bank of India or as mentioned in tender documents. Bank Guarantee bond to be submitted as per Annexure –VIA of Part I of GCC (Appendix 1, annexure M). The original Bank Guarantee should be delivered in person to the official floating this tender before closing date for submission of bids (i.e. excluding the last date of submission of bids) Tenderers are advised to keep a watch on any corrigendum to the documents being released by the tender inviting office to ensure that they use the latest document for their offers.

Tenderer's Signature
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- c) It is the responsibility of the Tenderer to check any correction or any modifications published subsequently in the web site and to take into account while submitting their tender.
- d) If the Tenderer / Contractor makes any change / addition / deletion and the same is detected at any stage even after the award of the tender, full Bid Security will be forfeited and the contract will be terminated at his / their risk and cost. The tenderer is also liable to be banned from doing business with railways and / or prosecuted.
- e) Tenderer(s) to please note that after opening of tender, any document/credential pertaining to technical & financial eligibility, constitution of firm etc. shall neither be asked nor be entertained/considered under any circumstances and no claim or representation whatsoever from the tenderer in this regard shall be entertained. Scanned copy of the documents, uploaded by the tenderer shall be clear & readable.

However, Railway reserves the right to seek any clarification on the documents/credentials already submitted by the tenderer along with the offer. **E-Tender under Two Packet System** are invited from reliable, bonafide & experienced agencies with required experience as per prequalification criteria stipulated in Tender Document for the above work.

- 2. The **TENDER DOCUMENT** forming the complete Tender (which is deemed to be part of the contract) consist of the following

2.1 Packet-1, Technical Document :

The Technical Bid comprises of the following -

Section I:-

Chapter I: Tender form

Chapter II: Instructions to Tenderers

Chapter III: Special conditions of Tender & Contract

Chapter IV: GCC April 2022 with correction slip.

Section II: - Appendix, Annexure, Attachments

Section IV: - Technical Specifications for the schedule of the Tender

1. Indian Railways Standard General Conditions of Contract 2022, hereinafter called General Conditions of Contract, and Indian Railway Code for the Engineering Department with up to-date corrections (not enclosed herewith). Relevant instructions to tenderer & general However, conditions/provisions in the Tender Form and Special Conditions of Tender & Contract and Technical Specifications will override any overlapping or conflicting conditions / provisions given in these documents.
It is presumed that Bidder has acknowledged the knowledge of GCC of Railways.
2. Indian Railway Signalling / Telecommunication Manual with latest corrections (not enclosed herewith).
3. All general and detailed drawings pertaining to this work which will be issued by the Sr. Divisional Signal & Telecommunication Engineer (Co) Ahmedabad Division Western Railway, or his representative from time to time with all changes and modifications.
4. **Order of Precedence of Documents:** In a contract agreement, in case of any difference, contradiction, discrepancy, with regard to conditions of tender/contract, specifications, drawings, Bill(s) of Quantities etc., forming part of the tender/contract, the following shall be the order of precedence:
 - i. Letter of Award/Acceptance (LOA)
 - ii. Bill(s) of Quantities /Schedule of Rates

Tenderer's Signature

Date

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- iii. Special Conditions of Contract
- iv. Technical Specifications as given in tender documents
- v. Drawings
- vi. Indian Railways Standard General Conditions of Contract updated with correction slips issued up to date of inviting tender or as otherwise specified in the tender documents.
- vii. IR Specifications/RDSO specifications/Guidelines updated with correction slips issued up to date of inviting tender or as otherwise specified in the tender documents.
- viii. Relevant B.I.S. Codes updated with correction slips issued up to date of inviting tender or as otherwise specified in the tender documents.

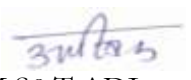
Note: The standard documents which are not enclosed herewith can be seen in the office of Sr. Divisional Signal & Telecommunication Engineer (Co), Ahmedabad Div, Western Railway, on any working day during office hours.

5. Contents of the Technical Bid to be submitted by Tenderer should include the following-

(Pl. refer tender documents for details required in each Performa/Annexures etc. to be submitted along with the offer. Documents may be submitted carefully as eligibility will be decided generally based on documents submitted along with offer)

- i) Mandatory Information Fields required in IREPS Portal to be filled correctly.
- ii) Covering Letter if any.
- iii) Summary details of Technical Bid duly filled by Bidder in attached Format.(Appendix 1, Annexure A)
- iv) Tender Form as per (Appendix 1, Annexure B)
- v) Affidavit/Certificate as per Annexure-V of GCC 2022 or (Appendix 1, C&H for JV Bidder) of tender Doc. As the case may be.
- vi) Details of Technical Eligibility Fulfillment: List of 1 or 2 or 3 works which are similar in nature & of value mentioned in tender conditions. This shall be supported by credential/work completion certificate in respect of works fulfilling technical eligibility criteria issued by user/Employer.
- vii) Details of FINANCIAL CREDENTIAL in the form of
 - a. Average Annual contractual payment received/contractual turnover issued by CA. Duly supported by Audited Balance Sheets.
 - b. Audited Balance Sheets duly certified by the Chartered Accountant for required period (past 3 financial years).
- viii) Details of Bid capacity Eligibility Criteria :**(for tender value more than 10 crore)**
 - a. CA certificate & Calculations of Bid capacity as per given formula.
 - b. Detailed Break up of financial turnover (Value A) duly supported by List of works showing contractual payment received in past 3 financial years duly certified by CA.
 - c. Details of Balance liabilities of contractual works (Value of B) duly supported by List of all ongoing works duly certified by CA.
- ix) Details of make of specific Equipment & MOU/Authorisation from OEMs/Indian Representatives with relevant details like country of origin(to check land sharing country details), Local content related documents, past experience of OEMs/Equipment, etc. if

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asked in the tender. Power of Attorney duly supported by Board resolution/partnership deeds as the case may be.

- x) Copy of MOA & Article of Association (AOA)/partnership deed/JV agreement based on type of Bidder as mentioned in tender document.
- xi) Other documents as mentioned in tender documents/check list attached with tender documents including deviation certificates, MOU with OEMs (if asked), make of specific equipment offered (EI, IPS, MSDAC, Datalgger, switches, IP MPLS equipment, etc.)
- xii) Certificate of Local content duly certified by CA. (Appendix 1, Annexure K)
- xiii) Declaration of site acquaintance. (Appendix 1, Annexure J)
- xiv) List of Plant & Machineries.
- xv) List of Technical Manpower. (Appendix 2, Annexure 3)
- xvi) List of Works In Hand (if not submitted with Bid capacity)
- xvii) Other optional documents: (To be submitted after issue of LOA):
 - a. Planning Of Execution, Proposed Scheme and Program of Work To Complete It Within The Stipulated Completion Period.

2.2. Packet-2, FINANCIAL BID:

The financial bid documents comprise the following: -

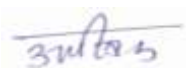
SECTION III:-SCHEDULE OF WORKS

Different schedules (with details of items) as listed in IREPS portal.

Contents of the Offer Document:

- A. Offer Document should be complete with rates quoted by the tenderer for Supply, Works and execution in prescribed Proforma at designated place on www.ireps.gov.in website. An incomplete offer will be summarily rejected.
- B. The tenderer(s) shall quote a single percentage against **each schedule of the tender both, in 'figures' and words'**, in the designated space provided. If there be any variance in percentage quoted by the tenderer in 'words' and 'figures', that quoted in 'words' will be treated as final.

Tenderer's Signature
Date


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SECTION-I

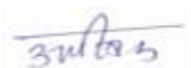
CHAPTER-I: Tender Form

CHAPTER-II: Instructions to Tenderers

CHAPTER-III: Special Conditions of Contract

CHAPTER-IV: General Conditions of Tender & Contract (Attachments 2 and 2.x)

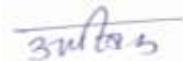
Tenderer's Signature
Date


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SECTION-I

CHAPTER-I: Tender Form

Tenderer's Signature
Date


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{TENDER FORM}

Appendix 1, Annexure – B
(Ref: Annexure -I of Part I of GCC)

WESTERN RAILWAY
TENDER FORM (First Sheet)

Tender No: -- DRM-SnT-ADI-Sig 05 of 2026-27.

Name of Work: - Design, Supply, Installation, Programming, Testing and commissioning of Electronic Interlocking (E.I) system in connection with Viramgam Upgradation of Indoor Signalling equipment by Electronic Interlocking system of Ahmedabad Division.

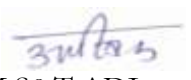
To

The President of India,

Acting through the Sr. Divisional Signal & Telecommunication Engineer,
Ahmedabad Division,
Western Railway.

1. I/We _____ have read the various conditions to tender attached hereto and agree to abide by the said conditions. I/We also agree to keep this offer open for acceptance for a period of **as specified in NIT** days from the date fixed for closing of the tender and in default thereof, I/We will be liable for forfeiture of my/our "Bid Security". I/We offer to do the work for Western Railway, at the rates quoted in the attached bill(s) of quantities and hereby bind myself/ourselves to complete the work in all respects within **a period as specified in NIT** from the date of issue of letter of acceptance of the tender.
2. I/We also hereby agree to abide by the Indian Railways Standard General Conditions of Contract, with all correction slips up-to-date and to carry out the work according to the Special Conditions of Contract and Specifications of materials and works as laid down by Railway in the annexed Special Conditions/Specifications, Standard Schedule of Rates (SSOR) with all correction slips up-to-date for the present contract.
3. A Bid Security of ₹_____ (**as specified in NIT**) has already been deposited online/ submitted as Bank Guarantee bond. Full value of the Bid Security shall stand forfeited without prejudice to any other right or remedies in case my/our Tender is accepted and if:
 - (a) I/We do not submit the Performance Guarantee within the time specified in the Tender document;
 - (b) I/We do not execute the contract documents within seven days after receipt of notice issued by the Railway that such documents are ready; and
 - (c) I/We do not commence the work within fifteen days after receipt of orders to that effect.
4. (a) I/We am/are a Startup firm registered by Department of Industrial Policy and Promotion (DIPP) and my registration number is valid upto (Copy enclosed) and hence exempted from submission of Bid Security.

Tenderer's Signature
Date


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5. We are a Labour Cooperative Society and our Registration No. is withand hence required to deposit only 50% of Bid Security.
6. Until a formal agreement is prepared and executed, acceptance of this tender shall constitute a binding contract between us subject to modifications, as may be mutually agreed to between us and indicated in the letter of acceptance of my/our offer for this work.

Signature of Witnesses: _____

(1) _____ Signature of Tenderer(s)

(2) _____ Date _____

Address of the Tenderer(s)

—

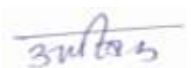
Tenderer's Signature
Date


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CHAPTER-II

{INSTRUCTIONS TO TENDERERS}

Tenderer's Signature
Date


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For & on behalf of the President of India

1.0 GENERAL INSTRUCTIONS:

- i) On behalf of the President of India Sr. Divisional Signal & Telecommunication Engineer (Co) Ahmedabad Division Western Railway, invites tenders from established firms and reliable manufacturers or their authorised agents for the supply and execution.
- ii) All offers in the prescribed form, should be submitted before the time and date fixed for the receipt of offer or offers as set forth in the tender papers. Offers received after the stipulated time and date, are liable to be rejected.
- iii) All information in the offer should be in English. Information in any language must be accompanied by its authenticated translation in English. In the event of any discrepancy between an offer in a language other than English and its English translation, the English translation will prevail.
- iv) The offer shall be as per:
 - a. Instructions to Tenderers,
 - b. General Condition of Contract,
 - c. Special Conditions of Contract,
 - d. Technical Specifications,
 - e. Schedules,
 - f. Annexure.
- v) However, the tenderer shall indicate their compliance or otherwise against each clause and sub-clause of these conditions. The tenderer shall for this purpose enclose a separate statement indicating compliance or otherwise of each clause and sub-clause. Whenever, a tenderer deviates from such provision of a clause/sub-clause, he shall furnish his detailed justification for the same. However, acceptance of any such condition/deviation is not bound on the railway while accepting the offer.

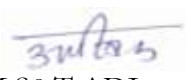
2.0 SIGNING OF TENDER:

- i) The Tenderer must submit his offer on **www.ireps.gov.in**. This is to be submitted using the Registration process with Class III Digital Signature Certificate and Digital Encryption Certificate. Any document submitted through the above Digital Signature will be deemed to have been signed. However, all Annexures are to be properly filled up, signed & stamped wherever required and to be uploaded at designated place for the completion of offer.

3.0 SUBMISSION OF TENDER:

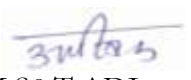
- i) Tender shall be submitted in Single part with compliance of Technical requirement and Financial Offer as instructed in Tender Document and IREPS guidelines.
- ii) Tenders must be submitted in the designated place on **www.ireps.gov.in** using the Class III Digital Signature Certificate and Digital Encryption Certificate.
- iii) The online offer will be accepted till Date and time as specified in above NIT Header.
- iv) **The Bid Security shall be deposited either in cash through e payment gateway or submitted as Bank Guarantee bond from a scheduled commercial bank of India or as mentioned in tender documents.**
- v) **All rates must be submitted only under Specified Space only on ireps portal .**
- vi) Any individual(s) signing the tender or other documents connected therewith should specify whether he is signing:
 - a. as sole proprietor of the concern or are attorney of the sole proprietor;
 - b. as a partner or partners of the firms;
 - c. as a director, Manager or Secretary in the case of a Limited company duly authorised by resolution passed by the board of directors or in pursuance of the Authority conferred by Memorandum of Association.

Tenderer's Signature
Date


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- vii) In the case of a firm not registered under the Indian partnership Act, all the partners or the attorney duly authorised by all of them should sign the tender and all other connected documents. The original power of attorney should be submitted to the W. Railway for verification, if required.
- viii) All prices and other information like documents etc. having a bearing on the price shall be written both in figures and in words in the prescribed offer form. In case of difference in word and figure the amount written in words will be taken into consideration. In the event of any discrepancy between unit rate and total cost (Unit rate X quantity), the value shown in unit rate will be taken for evaluation purposes.
- ix) Offer shall be as per the General and Special Conditions of Contract given in the Bid Documents. However, the tenderer shall indicate his acceptance or otherwise against each clause and sub-clause of the General and Special Conditions of Contract. For this purpose, the tenderer shall enclose a separate statement (Appendix 1, Annexure I) indicating only the deviations from any clause or sub-clause of the General and Special Conditions of Contract, which he proposes with full Justification for such deviations. Railway, however, reserves the right to accept or reject these deviations and Railway's decision thereon shall be final.
- x) The tenderer should avoid ambiguity in his offer e.g. if his offer is to his standard sizes/length/dimensions, he should specially state them in detail without any ambiguity. Brief descriptions such as "standard length" etc. should be avoided in the offer.
- xi) Tender documents in which tenders are submitted by the tenderer(s) shall become the property of Railway and the Railway shall have no obligation to return the same to the tenderer(s).
- xii) This tender document (in full) downloaded along with the various documents required to be uploaded at www.ireps.gov.in before the date and time stipulated in the tender document.
- xiii) The Bid Security shall be deposited either in cash through e-payment gateway or submitted as Bank Guarantee bond from a scheduled commercial bank of India or as mentioned in tender documents.
- xiv) Tenderers intending to participate in the e-Tender must make payment of Bid Security either in cash through e-payment gateway or submitted as Bank Guarantee bond from a scheduled commercial bank of India or as mentioned in tender documents.
- xv) Tenders other than in the form of e-Tendering shall not be accepted against this tender. For this purpose, tenderers are required to register themselves with IREPS. Registration requires procurement of Class III Digital Signature Certificate and Digital Encryption Certificate.
- xvi) Bidding unit to be entered as per ireps website requirement.
- xvii) In case of any difficulty faced by the tenderer while submitting their bid in the IREPS website assistance from a help desk available with the website may be sought.
- xviii) Railway Administration will not be responsible for any delay/difficulties /inaccessibility of the downloading facility for any reason whatsoever. In case of any discrepancy between the tender documents downloaded from the internet and the master copy available in the offices, the latter shall prevail and will be binding on the tenderer(s). No claim on this account will be entertained.
- xix) The tender document is available after having deposited the requisite cost of the tender document (if any) as per NIT on IREPS website. It is understood that you agree to abide by the conditions laid down in the tender document when you submit the tender.

Tenderer's Signature
Date


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4.0 OPENING OF THE BIDS:**a) For Single Packet System.**

- i) Technical Bid & Financial Bid will be opened on date and time as specified in NIT Header. Opening will be done as per IREPS Portal norms.
- ii) Price Bids will be opened on the IREPS Website.
- iii) In the event of the specified date of Bid Opening happens to be holiday/bandh, the Bids will be opened at the appointed time and location on the next working day.

b) Two packet System.

- i) The E-Tender PACKET-I (Technical Bid) will be opened on date and time as specified in NIT Header. Opening will be done as per IREPS Portal norms.
- ii) The opening of PACKET-II (Price Bid) of the qualified bidders will be intimated later on. Note: -The successful tenderer who will be considered technically acceptable and eligible will be informed and the Financial Bids (PACKET-II) of these tenderers will be opened subsequently on the date time notified to the tenderer/s. The financial bids of unsuccessful tenderer/s will not be opened.
- iii) Price Bids will be opened on the IREPS Website.
- iv) In the event of the specified date of Bid Opening happens to be holiday/bandh, the Bids will be opened at the appointed time and location on the next working day.

5.0 EVALUATION OF THE TENDER:

- i) The tender will be evaluated on aggregated cost of work comprising all Schedules.

6.0 COMPLIANCE TO TENDER CONDITIONS, SPECIFICATION & DRAWINGS:

- i) The equipment offered shall be in accordance with the drawings and specifications. Details of variation from the drawings and specifications, if any, should be clearly indicated and in such an event, a certificate from the users must be furnished to the effect that the product offered performs the requisite functions satisfactorily, & is an alternative acceptable in one or more other countries. The name of users in those foreign countries should also be indicated.
- ii) Firms who have not carried out the works and supplied the items tendered for in this case for the Indian Railways in the past should give details of supplies and works carried out and the customers along with their performance certificates.
- iii) The tenderer(s) shall indicate paragraph by paragraph for each section of the tender document that either his tender complies in every respect with the requirements of each clause and sub-clause or if not, precisely how they differ from the requirements of the tenderer(s). In later case, "the tenderers) shall enclose a separate statement as per Performa given, indicating only the deviations for any clause or sub-clause of General Conditions of Contract, Special conditions of Contract, Instructions to tenderer(s) and conditions of tendering, Technical specification, etc. which he proposes with" details justifications for deviations proposed. The purchasers, reserves the right to accept or reject these deviations and his decision thereon shall be final.
- iv) In case the tenderer(s) is not able to comply with the provisions of any condition(s) and/or technical specification of this tender, he shall submit clause-wise non-compliance report giving reasons, and to submit in writing "I/We hereby confirm that I/We agree to comply all the conditions of the complete Tender this effect, he shall mentioned in different para of this tender document except those mentioned in my/our non-compliance statement enclosed," along with his offer, without which his/their offer is liable to be rejected.

Tenderer's Signature
Date


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7.0 BID SECURITY:

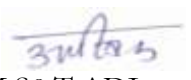
- 1(a) The tenderer shall be required to submit the Bid Security with the tender for the due performance with the stipulation to keep the offer open till such date as specified in the tender, under the conditions of tender. The Bid Security shall be as under:

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

Note:

- i) The Bid Security shall be rounded off to the nearest 100. This Bid Security shall be applicable for all modes of tendering.
 - ii) Any firm recognized by the Department of Industrial Policy and Promotion (DIPP) as 'Startups' shall be exempted from payment of Bid Security detailed above.
 - iii) Labour Cooperative Societies shall submit only 50% of above Bid Security detailed above.
- (b) It shall be understood that the tender documents have been issued to the tenderer and the tenderer is permitted to tender in consideration of stipulation on his part, that after submitting his tender he will not resile from his offer or modify the terms and conditions thereof in a manner not acceptable to the Engineer. Should the tenderer fail to observe or comply with the said stipulation, the aforesaid amount shall be liable to be forfeited to the Railway.
- (c) If his tender is accepted, this Bid Security mentioned in sub para (a) above will be retained as part security for the due and faithful fulfilment of the contract in terms of Clause 16 of the Standard General Conditions of Contract. The Bid Security of other Tenderers shall, save as herein before provided, be returned to them, but the Railway shall not be responsible for any loss or depreciation that may happen thereto while in their possession, nor be liable to pay interest thereon.
- (2) The Bid Security shall be deposited either in cash through e-payment gateway or submitted as Bank Guarantee bond from a scheduled commercial bank of India or as mentioned in tender documents. The Bank Guarantee bond shall be as per Annexure-VIA of Part I of GCC and shall be valid for a period of 90 days beyond the bid validity period.
- (3) In case, submission of Bid Security in the form of Bank Guarantee, following shall be ensured:
- (i) A scanned copy of the Bank Guarantee shall be uploaded on e-Procurement Portal (IREPS) while applying to the tender.
 - (ii) The original Bank Guarantee should be delivered in person to the official nominated as indicated in the tender document before the closing date for submission of bids (i.e. excluding the last date of submission of bids).(Appendix 2, Annexure M).
 - (iii) Non submission of scanned copy of Bank Guarantee with the bid on e-tendering portal (IREPS) and/or non-submission of original Bank Guarantee within the specified period shall lead to summary rejection of bid.
 - (iv) The Bid Security shall remain valid for a period of 90 days beyond the validity period for the Tender.
 - (v) The details of the BG, physically submitted, should match with the details available in the scanned copy and the data entered during bid submission time, failing which the bid will be rejected.
 - (vi) The Bank Guarantee shall be placed in an envelope, which shall be sealed. The envelope shall clearly bear the identification **"Bid Security for the Tender"**

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No. _____” and shall clearly indicate the name and address of the Bidder. In addition, the Bid Due Date should be indicated on the right-hand top corner of the envelope.

- (vii) The envelope shall be addressed to the officer and address as mentioned in the tender document.
- (viii) If the envelope is not sealed and marked as instructed above, the Authority assumes no responsibility for the misplacement or premature opening of the contents of the Bid submitted and consequent losses, if any, suffered by the Bidder.

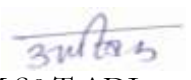
8.0 SECURITY DEPOSIT:

- i) The Security Deposit shall be **5%** of the contract value. The Bid Security submitted by the Contractor with his tender will be retained/encashed by the Railways as part of security for the due and faithful fulfilment of the contract by the Contractor. Provided further that, if Contractor submits the Cash or Term Deposit Receipt issued from a Scheduled commercial bank of India or irrevocable Bank Guarantee Bond from a Scheduled commercial bank of India, either towards the Full Security Deposit, the Part Security Deposit equal to or more than Bid Security, the Railway shall return the Bid Security, to the Contractor.
- ii) Balance of Security Deposit may be deposited by the Contractor in cash or Term Deposit Receipt issued from Scheduled commercial bank of India or irrevocable Bank Guarantee bond issued from Scheduled commercial bank of India, or may be recovered at the rate of **6%** of the bill amount till the full Security Deposit is recovered. Provided also that in case of defaulting Contractor, the Railway may retain any amount due for payment to the Contractor on the pending "on account bills" so that the amounts so retained (including amount guaranteed through Performance Guarantee) may not exceed 10% of the total value of the contract.
- iii) The Irrevocable Bank Guarantee submitted towards Security deposit shall be initially valid up to the stipulated date of Maintenance period plus 60 days and shall be extended from time to time, depending upon extension of contract granted in terms of Clause 17A and 17B of the Standard General Conditions of Contract.

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

- i) Refund of Security Deposit:** Security Deposit mentioned in sub clause (1) above shall be returned to the Contractor along with or after, the following:
 - a. Final Payment of the Contract as per clause 51.(1) and
 - b. Execution of Final Supplementary Agreement or Certification by Engineer that Railway has No Claim on Contractor and
 - c. Maintenance Certificate issued, on expiry of the maintenance/Warranty period as per clause 50.(1) of GCC , in case applicable.

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- ii) **Forfeiture of Security Deposit:** Whenever the contract is rescinded as a whole under clause 62 (1) of these conditions, the Security Deposit already with railways under the contract shall be forfeited. However, in case the contract is rescinded in part or parts under clause 62 (1) of these conditions, the Security Deposit shall not be forfeited.
- iii) No interest shall be payable upon the Bid Security and Security Deposit or amounts payable to the Contractor under the Contract, but Government Securities deposited in terms of Sub-Clause 16.(4)(b) of this clause will be payable with interest accrued thereon.

9.0 BRIEF DESCRIPTION OF THE WORK:

Please refer to Appendix 2, Annexure 1.

For exact item wise details, schedule of work & its corresponding technical specification may be referred. However, any further clarifications thereof can be obtained from the office of Sr. Divisional Signal & Telecommunication Engineer (Co) Ahmedabad Division Western Railway well in advance.

10.0 QUALIFYING / ELIGIBILITY CRITERIA: (Applicable on Tender having NIT value more than 50 lakhs)

Tender eligibility criteria defined in para 10.1 to 10.5 must be fulfilled or else Bid may be rejected summarily. All Tenderer(s) irrespective of their being known to this organisation or not, must submit related supporting documents in respect of the following:

10.1 TECHNICAL ELIGIBILITY CRITERIA:

- a) The tenderer must have successfully completed or substantially completed any one of the following categories of work(s) during last 07 (seven) years, ending last day of month previous to the one in which tender is invited:

Three similar works each costing not less than the amount equal to 30% of advertised value of the tender, or

Two similar works each costing not less than the amount equal to 40% of advertised value of the tender, or

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

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

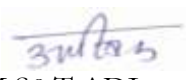
Three similar works each costing not less than the amount equal to 30% of advertised value of each component of tender, or

Two similar works each costing not less than the amount equal to 40% of advertised value of each component of tender, or

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

Note for b (1): Separate completed works of minimum required values shall also be considered for fulfilment of technical eligibility criteria for different components.

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- (b) (2) In such cases, what constitutes a component in a composite work shall be clearly pre-defined with estimated tender cost of it, as part of the tender documents without any ambiguity.
- (b) (3) To evaluate the technical eligibility of a tenderer, only components of work as stipulated in tender documents for evaluation of technical eligibility, shall be considered. The scope of work covered in other remaining components shall be either executed by tenderer himself if he has work experience as mentioned in clause 7 of the Standard General Conditions of Contractor through subcontractor fulfilling the requirements as per clause 7 of the Standard General Conditions of Contract or jointly i.e., partly himself and remaining through subcontractor, with prior approval of Chief Engineer in writing.

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

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

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

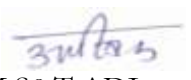
In case after award of contract or during execution of work it becomes necessary for contractor to change subcontractor, the same shall be done with subcontractor(s) fulfilling the requirements as per clause 7 of the Standard General Conditions of Contract, with prior approval of Competent authority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

Note for Item 10.1:

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

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

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

Similar Nature of Work means:

Please refer to Appendix 2, Annexure 1.

For Joint Venture Firm please refer Clause 17 of GCC 2022. (Along with all correction slips)

10.2 Financial Eligibility Criteria: (Ref: para 10.2 of GCC 2022 (along with all correction slips))

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

V= Advertised value of the tender in crores of Rupees

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

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

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

For Joint Venture Firm please refer Clause 17 of GCC 2022.

10.3 Bid Capacity :(Applicable for tender costing > 10 Cr.)

Applicable as per para 10.3 of GCC 2022.(along with all correction slips)

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

For tenders having advertised value more than Rs 10 crore wherein eligibility criteria includes bid capacity also, the tenderer will be qualified only if its available bid capacity is equal to or more than the total bid value of the present tender. The available bid capacity shall be calculated as under:

$$\text{Available Bid Capacity} = [A \times N \times 2] - 0.33 \times N \times B$$

Where,

A = Maximum value of construction works executed and payment received in any one of the previous three financial years or the current financial year (up to date of inviting tender), taking into account the completed as well as works in progress.

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

B = Existing commitments and balance amount of ongoing works with tenderer as per the prescribed proforma of Railway for statement of all works in progress and also the works which are awarded to tenderer but yet not started upto the date of inviting of tender.

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Note:

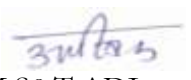
- (a) The Tenderer(s) shall furnish the details of -
- (i) Maximum value of construction works executed and payment received in any one of the previous three financial years or the current financial year (up to date of inviting tender) for calculating A, as per proforma at Appendix 1, Annexure F1 and
 - (ii) Existing commitments and balance amount of ongoing works with tenderer as per the prescribed Performa (Appendix 1, Annexure F2) of Railway for statement of all works in progress and also the works which are awarded to tenderer but yet not started upto the date of inviting of tender for calculating B. In case of no works in hand, a 'NIL' statement should be furnished. The submitted details for (i) and (ii) above should be duly verified by Chartered Accountant.
- (b) In case if a bidder is JV, the tenderer(s) must furnish the details of
- (i) Maximum value of construction works executed and payment received in any one of the previous three financial years or the current financial year (up to date of inviting tender) by each member of JV for calculating A in prescribed Performa at Appendix 1, Annexure F1 and
 - (ii) Existing commitments and balance amount of ongoing works with each member of JV either in individual capacity or as a member of other JV as per the prescribed Performa(.....) of Railway for statement of all works in progress and also the works which are awarded to each member of JV either in individual capacity or as a member of other JV but yet not started upto the date of inviting of tender for calculating B. In case of no works in hand, a 'NIL' statement should be furnished.
The submitted details for (i) and (ii) above should be duly verified by Chartered Accountant.
- (c) Value of a completed work/work in progress/work awarded but yet not started for a Member in an earlier JV shall be reckoned only to the extent of the concerned member's share in that JV for the purpose of satisfying his/her compliance to the above-mentioned bid capacity in the tender under consideration.
- (d) The arithmetic sum of individual "bid capacity" of all the members shall be taken as JV's "bid capacity".
- (e) In case, the tenderer/s failed to submit the above statement along with offer, their/his offer shall be considered as incomplete and will be rejected summarily.
- (f) The available bid capacity of tenderer shall be assessed based on the details submitted by the tenderer. In case, the available bid capacity is lesser than estimated cost of work put to tender, his offer shall not be considered even if he has been found eligible in other eligibility criteria/tender requirements.

10.4 Criteria related to with specific Equipment's OEMs

10.4.1 Criteria related to specific Equipment's OEMs in RDSO approved Source

- i. **EI: The systems to be offered against this tender shall be from RDSO approved sources only on the date of tender opening.**
- (a) **The successful bidder shall submit an undertaking from RDSO-approved EI OEM, after issue of LoA and before signing of Contract Agreement to confirm compliance with extant RDSO guidelines and to meet specific requirements and to provide after-sales support required during the warranty period and beyond the warranty period, failing which the contract is liable to be terminated.**

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- (b) The successful bidder shall submit authorised breakup of cards / modules, with complete details of EI system i.e detail of all modules, cards and accessories, full details of quantities (station/OC wise) & unit base rate item wise, including spares, in proforma provided with this tender, after issue of LoA and before signing of Contract Agreement
- ii. MSDAC: For ease of maintenance, only one uniform made of MSDAC is to be supplied and installed in this Project. The systems to be offered against this tender shall be from RDSO approved sources only on the date of tender opening.
 - (a) The successful bidder shall submit an undertaking from RDSO-approved MSDAC OEM, after issue of LoA and before signing of Contract Agreement, to confirm compliance with extant RDSO guidelines and to meet specific requirements and to provide after-sales support required during the warranty period and beyond the warranty period, failing which the contract is liable to be terminated.
 - (b) The successful bidder shall submit authorised breakup of Material, with complete details of MSDAC system i.e detail of all modules, cards and accessories, full details of quantities (station/OC wise) & unit base rate item wise, including spares, in proforma provided with this tender, before supply of material.

**10.4.2 Criteria related to special Equipments vendors(Non-RDSO approved Source)
(Not Applicable in this tender)**

10.5 Site Acquaintance verification criteria: (appendix 1, Annexure J)

Safety of material and staff will be the responsibility of the contractor. It is required that firms should compulsorily visit the site condition before filling the tender. The certificate to this effect may be submitted. Railway may like to have proof of visit of site to adjudged seriousness & sincerity of bidder while quoting rates.

10.6. Joint Venture: will be permitted in this tender. All required documents to be as per Indian Railway of GCC 2022. (along with all correction slips). Please submit MOU as per Appendix1- Annexure G & certificate by Each member as per annexure H.

10.7 Partnership Firm: The tenderer shall submit documents as mentioned in Clause 18 of the Tender Form (Second Sheet) of GCC 2022. (along with all correction slips)

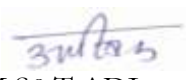
10.8 Credentials if submitted in foreign currency shall be converted into Indian currency i.e., Indian Rupee as under:

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

[Explanation for Para 10.1 to 10.5 - Eligibility Criteria:]

1. *Substantially Completed Work means an ongoing work in which payment equal to or more than 90% of the present contract value (excluding the payment made for*

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adjustment of Price variation (PVC), if any) has been made to the contractor in that ongoing contract and no proceedings of termination of contract on Contractor's default has been initiated. The credential certificate in this regard should have been issued not prior to 60 days of date of invitation of present tender.

- 2. In case a work is started prior to 07 (seven) years, ending last day of month previous to the one in which tender is invited, but completed in last 07 (seven) years, ending last day of month previous to the one in which tender is invited, the completed work shall be considered for fulfilment of credentials.*
- 3. If a work is physically completed and completion certificate to this extent is issued by the concerned organisation but final bill is pending, such work shall be considered for fulfilment of credentials*
- 4. In case of completed work, the value of the final bill (gross amount) including the PVC amount (if paid) shall be considered as the completion cost of work. In case the final bill is pending, only the total gross amount already paid including the PVC amount (if paid) shall be considered as the completion cost of work.*
- 5. If a bidder has successfully completed a work as subcontractor and the work experience certificate has been issued for such work to the subcontractor by a Govt. Organisation or public listed company as defined in Note for Item 10.1 Para 10 of the Tender Form (Second Sheet of GCC 2022), the same shall be considered for the purpose of fulfilment of credentials.*
- 6. In case a work is considered similar in nature for fulfilment of technical credentials, the overall cost including the PVC amount (if paid) of that completed work or substantially completed work, shall be considered and no separate evaluation for each component of that work shall be made to decide eligibility.*
- 7. In case of newly formed partnership firm, the credentials of individual partners from previous proprietary firm(s) or dissolved previous partnership firm(s) or split previous partnership firm(s), shall be considered only to the extent of their share in previous entity on the date of dissolution / split and their share in newly formed partnership firm. For example, a partner A had 30% share in the previous entity and his share in the present partnership firm is 20%. In the present tender under consideration, the credentials of partner A will be considered to the extent of 0.3×0.2 * value of the work done in the previous entity. For this purpose, the tenderer shall submit along with his bid all the relevant documents which include a copy of previous partnership deed(s), dissolution deed(s) and proof of surrender of PAN No.(s) in case of dissolution of partnership firm(s) etc.*
- 8. In case of existing partnership firm, if any one or more partners quit the partnership firm, the credentials of remaining partnership firm shall be re-worked out i.e., the quitting partner(s) shall take away his credentials to the extent of his share on the date of quitting the partnership firm (e.g. in a partnership firm of partners A, B & C having share 30%, 30% & 40% respectively and credentials of Rs 10 crore; in case partner C quits the firm, the credentials of this partnership firm shall remain as Rs 6 crore). For this purpose, the tenderer shall submit along with his bid all the relevant documents which include a copy of previous partnership deed(s), dissolution deed(s) and proof of surrender of PAN No.(s) in case of dissolution of partnership firm(s) etc.*
- 9. In case of an existing partnership firm if any new partner(s) joins the firm without in the name and PAN/TAN no. of the firm, the credentials of partnership firm shall get enhanced to the extent of credentials of newly added partner(s) on the same principles as mentioned in item 6 above. For this purpose, the tenderer shall submit along with his bid all the relevant documents which include a copy of previous partnership deeds,*

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dissolution/splitting deeds and proof of surrender of PAN No.(s) in case of dissolution of partnership firm etc.

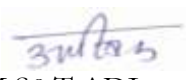
10. *Any partner in a partnership firm cannot use or claim his credentials in any other firm without leaving the partnership firm i.e., In a partnership firm of A&B partners, A or B partner cannot use credentials of partnership firm of A&B partners in any other partnership firm or proprietary firm without leaving the partnership firm of A&B partners.*
11. *In case a partner in a partnership firm is replaced due to succession as per succession law, the proportion of credentials of the previous partner will be passed on to the successor.*
12. *If the percentage share among partners of a partnership firm is changed, but the partners remain the same, the credentials of the firm before such modification in the share will continue to be considered for the firm as it is without any change in their value. Further, in case a partner of a partnership firm retires without taking away any credentials from the firm, the credentials of the partnership firm shall remain the same as it is without any change in their value.*
13. *In a partnership firm "AB" of A&B partners, in case A also works as proprietary firm "P" or partner in some other partnership firm "AX", credentials of A in proprietary firm "P" or in other partnership firm "AX" earned after the date of becoming a partner of the firm AB shall not be added in partnership firm AB.*
14. *In case a tenderer is LLP, the credentials of tenderer shall be worked out on above lines similar to a partnership firm.*
15. *In case company A is merged with company B, then company B would get the credentials of company A also.]*

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

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

- i) Certificates and testimonials regarding contracting experience for the type of job for which tender is invited with a list of works carried out in the past.
- ii) Audited Balance Sheet duly certified by the Chartered Accountant regarding contractual payments received in the past.
- iii) **CA certified local content certificates for complete tender value need to be submitted.**
 - a. **Note: minimum value shall be filled in IREPS Portal (Mandatory Field), However certificate may specify either minimum value or range of values as the case may be. (Details may be submitted as attached Format Appendix 1, Annexure K).**
- iv) The list of personnel / organisation on hand and proposed to be engaged for the tendered work. Similarly list of Plant & Machinery available on hand and proposed to be inducted and hired for the tendered work.
- v) A copy of certificate stating that they are not liable to be disqualified and all their statements/documents submitted along with the bid are true and factual. Standard format of the certificate to be submitted by the bidder is enclosed as Annexure-V of GCC-2022. Non submission of a copy of certificate by the bidder shall result in summarily rejection of his/their bid. It shall be mandatorily incumbent upon the tenderer to identify, state and submit the supporting documents duly self-attested / digitally signed by which she/he/they is/are qualifying the Qualifying Criteria mentioned in the Tender Document.

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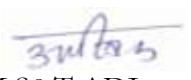
- vi) The Railway reserves the right to verify all statements, information and documents submitted by the bidder in his tender offer, and the bidder shall, when so required by the Railway, make available all such information, evidence and documents as may be necessary for such verification. Any such verification or lack of such verification, by the Railway shall not relieve the bidder of its obligations or liabilities hereunder nor will it affect any rights of the Railway there under.
- vii)(a) In case any information submitted by a tenderer is found to be false, forged or incorrect at any time during the process for evaluation of tenders, it shall lead to forfeiture of the tender Bid Security besides banning of business for a period of two years.
- (b) In case any information submitted by the tenderer is found to be false, forged or incorrect after the award of contract, the contract shall be terminated. Bid Security, Performance Guarantee and Security Deposit available with the railway shall be forfeited. In addition, other dues of the contractor, if any, under this contract shall be forfeited and the agency shall be banned from doing business for a period of two years.

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

10.10 The tenderer(s) must submit copies of certificates and testimonials with regards to:

- i. Summary details of Technical Bid duly filled by Bidder in attached Format. (Appendix 1, Annexure A)
- i) Tender Form as per (Appendix 1, Annexure B)
- ii) Affidavit/Certificate as per Annexure-V or (V and VA both) of GCC 2022/Appendix 1, Annexure C or H of tender Doc.
- iii) Details of Technical Eligibility Fulfillment: List of 1 or 2 or 3 works which are similar in nature & of value mentioned in tender conditions. This shall be supported by credential/work completion certificate in respect of works fulfilling technical eligibility criteria issued by user/Employer.
- iv) Details of FINANCIAL CREDENTIAL in the form of
 - a. Average Annual contractual payment received/contractual turnover issued by CA. duly supported by Audited Balance Sheets.
 - b. Audited Balance Sheets duly certified by the Chartered Accountant for required period(past 3 financial years).
- v) Details of Bid capacity Eligibility Criteria: (if applicable)
 - a. CA certificate & Calculations of Bid capacity as per formula
 - b. Details of Break up of Financial turnover (Value A) duly supported by List of works showing contractual payment received in past 3 financial years duly certified by CA.
 - c. Details of Balance liabilities of contractual works (Value of B) duly supported by List of all ongoing works duly certified by CA.
- vi) Power Of Attorney duly supported by Board resolution/partnership deeds(submitted **along with vetting copy of same**) as the case may be.
- vii) Copy of MOA & Article of Association (AOA)/partnership deed/JV agreement based on type of Bidder as mentioned in tender document.
- viii) Other documents as mentioned in tender documents/check list attached with tender documents including deviation certificates, MOU with OEMs (if applicable), make of specific equipments offered (EI, IPS, MSDAC, switches, IPMPS equipments, etc.)

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- ix) Certificate of Local content duly certified by CA.(Appendix 1, Annexure K)
- x) Declaration of site acquaintance.(Appendix 1, Annexure J)
- xi) List of Plant & Machineries.
- xii) List of Works In Hand
- xiii) List of Technical Manpower.(Appendix 2, Annexure 3)
- xiv) GST Certificate.

Other optional documents: (To be submitted after issue of LOA):

- Planning Of Execution, Proposed Scheme And Programme of Work To Complete It Within The Stipulated Completion Period.

10.11 Engineering Organization:

- i) The Contractor shall also employ at least one Project Manager and 01 Site Engineer for this Work, details of which are to be given in (Appendix 2, Annexure 3).
- ii) The above deployed persons must be trained in railway signalling system and safety in General from Railway signalling Training institute, with valid certificate. In case the person is not found trained, He will be sent to SBI/STTC for training immediately at the cost of the contractor.

10.12 Construction Machinery

The firm should have minimum construction machinery, Tools and plants, vehicles etc. Details of which will be furnished by them along with the tender.

10.13 Test and measuring instruments, special tools and installation material

Special tools required for installation and maintenance of all the equipment shall be arranged by the tenderer(s) in adequate quantities. All installation materials for complete commissioning of the system shall be provided by the tenderer(s).

All tests and measuring instruments and other arrangements required for all the acceptance tests shall be provided by the tenderer(s) free of cost.

11.0 Documents to be submitted by different type of tenderer

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

i. Following documents shall be submitted by the tenderer:

a. Sole Proprietorship Firm:

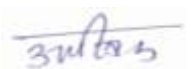
All documents in terms of Para 10 of the Tender Form (Second Sheet of GCC 2022) above.

b. HUF:

- i. A copy of notarized affidavit on Stamp Paper declaring that he who is submitting the tender on behalf of HUF is in the position of 'Karta' of Hindu Undivided Family (HUF) and he has the authority, power and consent given by other members to act on behalf of HUF.
- ii. All other documents in terms of Para 10 of the Tender Form (Second Sheet of GCC 2022) above.

c. Partnership Firm:

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All documents as mentioned in para 18 of the Tender Form (Second Sheet of GCC 2022).

d. Joint Venture (JV): All documents as mentioned in para 17 of the Tender Form (Second Sheet of GCC 2022).

e. Company registered under Companies Act 2013:

- i) The copies of MOA (Memorandum of Association) / AOA (Articles of Association) of the company
- ii) A copy of Certificate of Incorporation
- iii) A copy of Authorization/Power of Attorney issued by the Company (backed by the resolution of Board of Directors) in favour of the individual to sign the tender on behalf of the company and create liability against the company.
- iv) All other documents in terms Para 10 of the Tender Form (Second Sheet of GCC 2022) above.

f. LLP (Limited Liability Partnership):

- i) A copy of LLP Agreement
- ii) A copy of Certificate of Incorporation
- iii) A copy of Power of Attorney/Authorization issued by the LLP in favour of the individual to sign the tender on behalf of the LLP and create liability against the LLP.
- iv) An undertaking by all partners of the LLP that they are not blacklisted or debarred by Railways or any other Ministry / Department of the Govt. of India from participation in tenders / contracts as on the date of submission of bids, either in their individual capacity or in any firm/LLP or JV in which they were / are partners/members. Concealment / wrong information in regard to above shall make the contract liable for determination under Clause 62 of the Standard General Conditions of Contract.
- v) All other documents in terms of Para 10 of the Tender Form (Second Sheet of GCC 2022).

g. Registered Society & Registered Trust:

- i) A copy of Certificate of Registration
- ii) A copy of Memorandum of Association of Society/Trust Deed
- iii) A copy of Power of Attorney in favour of the individual to sign the tender documents and create
- iv) liability against the Society/Trust.
- v) A copy of Rules & Regulations of the Society
- vi) All other documents in terms of Para 10 of the Tender Form (Second Sheet of GCC 2022) above.

B If it is NOT mentioned in the submitted tender that tender is being submitted on behalf of a Sole Proprietorship firm / Partnership firm / Joint Venture / Registered Company etc., then the tender shall be treated as having been submitted by the individual who has signed the tender.

C After opening of the tender, any document pertaining to the constitution of Sole Proprietorship Firm /Partnership Firm / Registered Company/ Registered Trust / Registered Society / HUF/LLP etc. shall be neither asked nor considered, if submitted. Further, no Suo moto cognizance of any document available in public domain (i.e., on internet etc.) or in Railway's record/office files etc. will be taken for consideration of the tender, if no such mention is available in tender offer submitted.

D A tender from JV shall be considered only where permissible as per the tender conditions.

E The Railway will not be bound by any change of power of attorney or in the composition of the firm made subsequent to the submission of tender. Railways may, however, recognize

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such power of attorney and changes after obtaining proper legal advice, the cost of which will be chargeable to the Contractor.

12.0 Power of Attorney

The tenderer whether sole proprietor / a company or a partnership firm / joint venture (JV) / registered society / registered trust / HUF / LLP etc if they want to act through agent or individual partner(s), should submit along with the tender, a copy of power of attorney duly stamped and authenticated by a Notary Public or by Magistrate in favour of the specific person whether he/they be partner(s) of the firm or any other person, specifically authorising him/them to sign the tender, submit the tender and further to deal with the Tender/ Contract up to the stage of signing the agreement except in case where such specific person is authorised for above purposes through a provision made in the partnership deed / Memorandum of Understanding / Article of Association / Board resolution, failing which tender shall be summarily rejected.

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

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

13.0 EMPLOYMENT, PARTNERSHIP, SHARE etc. of Retired Railway Employee:

a. Should a tenderer

- i) be a retired Engineer of the gazetted rank or any other gazetted officer working before his retirement, whether in the executive or administrative capacity or whether holding a pensionable post or not, in the Engineering or any other department of any of the railways owned and administered by the President of India for the time being, OR
- ii) being partnership firm / joint venture (JV) / registered society / registered trust etc have as one of its partners/members a retired Engineer of the gazetted rank or any other gazetted officer working before his retirement, OR
- iii) being an incorporated company have any such retired Engineer of the gazetted rank or any other gazetted officer working before his retirement as one of its directors

AND

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

THEN

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

- b. In case, upon successful award of contract, should a tenderer depute for execution of the works under or to deal matters related with this contract, any retired Engineer of gazette rank or retired gazetted officer working before his retirement in the Engineering or any other

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department of any of the railways owned and administered by the President of India for the time being, and now in his employment, then the tenderer will ensure that retired Engineer or retired gazetted officer had retired from government service at least 1 year prior to the date of his employment with tenderer and in case he had retired from service within a year then he possesses the requisite permission from the President of India or any officer, duly authorised by him in this behalf, to get associated with the tenderer.

- c. Should a tenderer or Contractor being an individual, have member(s) of his family or in the case of partnership firm/ company / joint venture (JV) / registered society / registered trust etc. one or more of his partner(s)/shareholder(s) or member(s) of the family of partner(s)/shareholder(s) having share of more than 1% in the tendering entity employed in gazetted capacity in the Engineering or any other department of the railway, then the tenderer at the time of submission of tender, will inform the authority inviting tenders the details of such persons.

Note: -If information as required as per 13.a), b), c) above has not been furnished, contract is liable to be dealt in accordance with provision of clause 62 of the Standard General Condition of contract.

14.0 Errors, Omission & Discrepancies:

The contractor(s) shall not take any advantage of any mis-interpretation of the conditions due to typing or any other error and if 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 mis-interpretation shall be entertained.

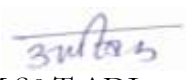
15.0 Acceptance / Rejection of Tender(s):

1. The authority competent for the acceptance of this tender does not bind himself to accept the lowest or any other tender nor does he undertake to assign reasons for declining to consider any particular tender or tenders. No tenderer(s)/ tenderer(s) shall demand any explanation of the cause of rejection of her/his/their tender. No correspondence will be entertained with the tenderer(s)/tenderer(s) in respect of the rejection of any or all tenders.
2. The tender containing erase and/or alterations of the tender documents are liable to be rejected. Any corrections made by the tenderer(s) in his/their entries must be attested.
3. If a tenderer(s) deliberately gives/tenders wrong information in her/his/their tender or creates circumstances for the acceptance of his/their tender, the Railway reserves the right to reject such tender at any stage.
4. If a tenderer(s) expires after the submission of his tender or after the acceptance of his tender, the Railways shall deem such tender as cancelled. If a partner of the firm expires after the submission of their tender or after the acceptance of their tender the Railway shall deem such tender as cancelled unless the firm retains its character.

16.0 Local Conditions:

1. It will be imperative on each tenderer(s) to fully acquaint himself with all the local conditions and factors which would have any effect on the performance of the contract and cost of the stores. The purchaser shall not be entertaining any request for clarifications from the tenderer(s) regarding such local conditions. No request for the change of price or time schedule of delivery of stores shall be entertained after the offer is accepted by the purchaser on account of any local condition or factor.

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2. In the event of the tenderer(s) desiring to have a field survey before furnishing his quotations, he may apply to Railway for permission in this regard. Such permission will be given in writing by the Railways but the expenses in this regard will be borne by the tenderer(s) completely.
3. The intending tenderer is advised to study the tender papers carefully. Any submission of a quotation by the tenderer(s) shall be deemed to have been done after a careful study and examination of these documents with full understanding of the implication thereof. These conditions and specifications shall be deemed to have been accepted unless otherwise, specifically commented upon by the tenderer(s) in his quotation. Failure to adhere to anyone or all these instructions may render his offer liable to be ignored without any reference.
4. Should a tenderer(s) find discrepancies in, or omission from the drawing or any of the tender papers or he has any doubt to their meaning, he should at once notify the Railway who may send a written clarification to all tenderer(s).
5. Before submitting tender(s) the tenderer(s) is advised to inspect the proposed site of work and fully acquaint himself/themselves with the site conditions, working hours, type of land, trees or shrubs that he/ they will have to cut, stacking space for materials, approach roads, pathways available etc. and all relevant items connected with the execution of the work. No claim shall be entertained at a later stage by the Railway on such grounds from the contractor(s).

17.0 Drawing(s) For the Work:

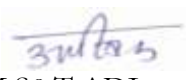
Drawing(s) for the work can be seen in the office of the Sr. Divisional Signal & Telecommunication Engineer (Co) Ahmedabad Division Western Railway, at any working day during office hours. The drawings are tentative and Railway reserves the right to make changes in plans if considered necessary and no compensation in any form will be admissible on this account. The contractor(s) will have to execute the work as per final plans at the rates quoted by him/them.

18.0 Execution of Contract Agreement:

The successful tenderer(s) shall be required to execute a contract agreement (hereinafter called CA) with the Railway for carrying out the work according to condition of Tender & Contract, Special Condition of Tender & Contract, Specification of Tender, "General Conditions of Contract", edition-2022 with latest amendments of W. Railway (which shall also be applicable in this work, although meant for use in connection with Civil Engineering Works) and Schedule of Work after depositing the required Performance Guarantee Bond (PGB) as detailed under Special Conditions of Tender & Contract. The Tenderer shall execute the contract documents agreement within seven days of notice from Railways that the Contract Agreement is ready.

The Contractor who has been awarded the work shall as soon as possible but not later than 30 days after the date of receipt of the acceptance letter in respect of contracts with initial completion period of two years or less or not later than 90 days for other contracts have to submit the detailed programme of work indicating the time schedule of various items of works in the form of Bar Chart/PERT/CPM. He shall also submit the details of organisation (in terms of labour and supervisors), plant and machinery that he intends to utilise (from time to time) for execution of the work within stipulated date of completion. The programme of work amended as necessary by discussions with the Engineer, shall be treated as the agreed programme of the work for the purpose of this contract and the Contractor shall endeavour to fulfil this programme of work. The progress of work will be watched accordingly and the liquidated damages will be with reference to the overall completion date. Nothing stated

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herein shall preclude the Contractor in achieving earlier completion of item or whole of the works than indicated in the programme.

19.0 NEGOTIATION WITH TENDERER(S):

The Railway reserves the right to hold negotiations with L-1 tenderer, who should be the *lowest, valid, eligible and technically acceptable* tenderer considered for award of contract directly if the rates were not unreasonably high.

20.0 ADDRESS FOR COMMUNICATION:

Tenderer(s) shall indicate his fully communicable postal address, Mobile Number, email id, WhatsApp Number, telephone numbers, and fax numbers. Any communication sent to the tenderer(s) at his said address, shall be deemed to have reached timely, notwithstanding the fact that the communication could not reach the tenderer(s) at all or in time because of any inaccuracy or defect in the said address. Any change thereof shall be advised to the Railway promptly. All notices, communications, reference and complaints made by the Railway or the Engineer or the Engineer's Representative or the Contractor inter-se concerning the works shall be in writing or email on registered email IDs and no notice, communication, reference or complaint not in writing or through e-mail, shall be recognized.

21.0 MOBILISATION ADVANCE: Mobilisation Advance is applicable as per para 46.(4) (a).

(Applicable for tender more than 20 Cr.)

22.0 PRICE VARIATION: Price Variation is not applicable in this tender and even in the extended period.

23.0 JOINT VENTURE: Different documents required to be submitted by JV partners may be studied in great detail given in GCC. Some documents need to be given by Each member of the JV.

24.0 E-Reverse Auction: Applicable only for tender costing more than 50 Cr. (NA for this case)

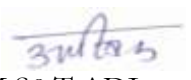
Electronic Reverse Auction (e-RA)

- i) The process of e-RA will be followed for works tenders Valued more than Rs. 50 Cr.
- ii) Technical Bid and Initial Price offer.
 - a) Bidders shall be simultaneously required to electronically submit a Technical commercial Bid and Initial Price offer. Offers found eligible for award contract/meeting eligibility criteria shall be categorised as Qualified for Award Contract for the purpose of e-RA.
 - b) Offers not complying with essential technical & commercial requirements of tender shall be declared as Ineligible for the award of contract.
 - c) Initial price offer of only those bidders categorised as Qualified for award of contract shall be opened and tabulated by the system separately.
- iii) Financial Bid:
 - a) Financial Bid shall comprise of Final Price Offer obtained through Reverse Auction. Following conditions and procedure shall be followed in selection of bidder..... Conduct of Reverse Auction.

Selection of bidders for Reverse for the award of Contract in work tenders:

Name of tenderers qualified for award of contract	Name of tenderers to be selected for Reverse Auction	Remarks
< 3	NIL*	The bids disallowed from participating in Reverse Auction shall be highest bidder(s) in the tabulation of initial Price Offer.
3 to 6	3	

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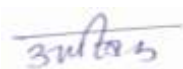
More than 6	50% of bidders Qualified for award of contract (round off to next higher integer)	In case the highest bidders quote the same rate, the initial Price Offer received last, as per time log of IREPS, shall be removed first, on the principle of last in first out, the IREPS system itself
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*If the number of bidders qualified for the Award of contract is less than 3, RA shall not be done and tender may be decided on the basis of Initial Price Offer(s).

- b) During the Reverse Auction process, bidders shall not be allowed to bid a rate higher than the lowest Initial Price Offer.
 - iv) After obtaining the final bids of Reverse Auction, tenders shall be finalised as per the existing policy.
 - v) Date and time of start of e-RA will be communicated to qualified tenderers after evaluation of the Technical Bid.
 - vi) Initial e-RA period: 06 (six) Hrs (e-RA will be opened for this duration)
 - vii) 30(thirty) min (In case any offer is received in the time period equal to auto extension period from the time of last bid. There shall be no upper limit of the number of auto extensions. When no offer is received in the last auto extension period, e-RA shall be closed).
 - viii) Minimum decrement (%): 0.1 (Zero point one) %
 - ix) After submission of Initial Price Bid, tenderers will not be allowed to receive the taxes and other levies.
 - x) During the auction period, identities of the participating tenderer will be kept hidden.
 - xi) Minimum admissible bid value will be the last bid value minus minimum decrement as specified above. Starting point for reverse auction shall be the lowest Initial Price Bid of the tenderer eligible for award of contract.
 - xii) After close of e-RA, tabulation of last (minimum) bids received from all the tenderers will be generated and made visible to Railways and participating tenderers.
- Bidders are not allowed to withdraw their last offer.*
- xiii) L-1 will be defined as the lowest bid obtained after the closure of R.A. session.
 - xiv) Bidders may refer to the User Manual for contractors for Two stage Reverse Auction (Works Module), provided in the learning centre of IREPS website in case of any difficulty.

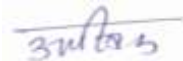
25. Procurement of price sensitive equipment: Not applicable for this tender.

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CHAPTER- III
{SPECIAL CONDITIONS OF TENDER AND
CONTRACT }

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1.0 GENERAL:

- 1.1 The Special Conditions of Tender and Contract, along with the Technical Specifications and the Schedule of Works of this contract in addition to the General Condition of the Contract, 2022 with latest amendments shall also be applicable for this contract. Indian Railway Code for the Engineering Department with up to date corrections, Standard Specifications for materials and works and the Indian Railway Signal / Telecommunication Manual shall govern the work to be executed.
- 1.2 Where there is any conflict between the Special conditions of Tender & Contract and Specifications on one hand and General Conditions of Contract, 2022 on the other hand, the former shall prevail.
- 1.3 Any special conditions stated by the tenderer(s) in the covering letter submitted along with the tender shall be deemed to be the part of the contract to such extent only as have explicitly been accepted by the Railways, and incorporated in the contract agreement.
- 1.4 General details of site, works, scope of work, definition of similar works, etc. have been compiled as Appendix 2, Annexure-1.

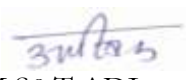
2.0 Scope of The Work:

The scope of the work broadly includes supply of materials and execution of the work as described in details in the Schedule of Work, drawings and technical specifications of the tender, unless deviations if any, specifically approved by the Railway. (Pl refer Appendix 2, Annexure 1)

3.0 Programme of Works:

- 3.1 **Completion Period:** The contractor shall have necessary resources to execute the work so that the entire work is completed within a period as specified in NIT header from the date of issue of Letter of Acceptance of the tender. The Progress of Work shall commensurate with Target set by Zonal Railways/Railway Board. The Contractor has to perform accordingly with required resources to execute the work in time. Penalty may be invoked, if the Progress required is not met in time.
- 3.2 The Contractor who has been awarded the work shall as soon as possible but not later than 30 days after the date of receipt of the acceptance letter in respect of contracts with initial completion period of two years or less or not later than 90 days for other contracts have to submit the detailed programme of work indicating the time schedule of various items of works in the form of Bar Chart/PERT/CPM. He shall also submit the details of organisation (in terms of labour and supervisors), plant and machinery that he intends to utilise (from time to time) for execution of the work within the stipulated date of completion. The programme of work amended as necessary by discussions with the Engineer, shall be treated as the agreed programme of the work for the purpose of this contract and the Contractor shall endeavour to fulfil this programme of work. The progress of work will be watched accordingly and the liquidated damages will be with reference to the overall completion date. Nothing stated herein shall preclude the Contractor in achieving earlier completion of item or whole of the works than indicated in the programme.
- 3.3 The arrangement or the approval of the programme by the Engineer shall not relieve the contractor of any of his responsibilities to complete the various sections of the work.
- 3.4 If the work does not commence within specified date of starting or if at the subsequent time the rate of execution falls below the specific programme as mentioned above, the Railway Administration will have the power to determine the end of the contract at any stage without incurring any liability on the part of the Railway Administration for any sort of compensation for the money invested by the contractor the loss incurred by him / them, due

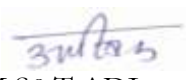
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to such termination of the contract. In all cases of incomplete work, either by termination of contract by the Railway Administration under consideration stated above or due to failure on the part of the contractor to complete the work within stipulated date of completion of the Agreement, the Railway shall be entitled to take the action for rescinding the contract in terms of Clause 62 of GCC-2022 with latest amendments.

- 3.5 The contractor shall be held responsible for the execution of the work according to the Programme given above for the execution of the work in full compliance of the approved SIP, PD & RCC and also the various clauses of the technical supplements, Technical specifications, instruction and drawings available separately. Failure to comply with any of these will be dealt with as per provision laid down in General Conditions of Contract 2022.
- 3.6 The contractor on his part will have to employ labour in full strength commensurate with the working area available. He will also arrange matching materials and equipment to complete the job most expeditiously so as to ensure that the work is completed in phases within the stipulated period.
- 3.7 No facility whatsoever, e.g. provisions of approach road and provision of temporary level crossing etc. will be provided by the Railway for carting materials. Approach roads within the Railway limits can be used carting materials.
- 3.8 The contractor shall collect the materials and shall commence the work on receipt of Letter of Acceptance of Tender.
- 3.9 The contractor shall have to procure all the requisite tools for execution of the work before the actual commencement of the work and the contractor shall satisfy the Engineer-in-charge that the tools so procured are of good quality.
- 3.10 Supervising personnel as deemed necessary shall be posted at the site of work by Railway and such personnel will give demarcation for installation of various Signal and/or Telecom equipment and the contractor shall then carry out the work as per approved plans and specification etc.
- 3.11 The contractor shall give at least seven days' notice to the Engineer-in-charge regarding commencement of the work, so that he can arrange supervisory staff in time. The Contractor shall complete the work in a reasonable time as allowed without causing hindrance and disturbance to train working.
- 3.12 The successful tenderer(s) will however have no claim or right in the execution of any work which in the opinion of Engineer should be carried out departmentally or otherwise and the Railway reserves the right at any time to keep back from the contract and carry out the work or any portion of the work through any other agency, it may think necessary, without assigning any reason. No claim for compensation / loss or whatsoever on this account will be entertained by the Railway.
- 3.13 No work on working installations shall be undertaken without the specific permission of the Railway representative and without the presence of Railway representative at the site of the work
- 3.14 The contractor shall be responsible for safe custody of all newly installed equipment including Railway materials, if any, till such time installation is completed in all respects and is taken over by the Railway.
- 3.15 The work during execution shall be subjected to checks and tests at all stages as prescribed in Technical Specification. The tests shall be carried out by the engineer-in-charge or his authorised representative. After taking the test a list of discrepancies / deficiencies, if any, shall be given to the contractor. The contractor shall be liable to remedy such discrepancies/ deficiencies as discovered during these tests and make good at his own cost, within a period of 30 (Thirty) days from the date of testing.

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- 3.16 The contractor shall have to arrange adequate tools and measuring equipment for execution of the work at his own cost.
- 3.17 If at any time, any materials or tools which the contractor would normally have to arrange for himself for executing the work is supplied by the Railway either at the contractor's request suo-moto in order to prevent possible delay in the execution of the work due to contractor's inability to make adequate arrangements for the supply thereof or otherwise, such materials or tools may be made available to the contractor from the Railway stores if available at the discretion of engineer-in-charge.
- 3.18 In case of loss or damage caused to materials and/or tools supplied as mentioned above recovery shall be made from the contractor in terms of clause No. 11.1 of CHAPTER III OF SECTION I of tender document.
- 3.19 If the materials or tools however, not available in Railway stock or Railway decides not to supply the same, whatsoever be the reason, the Railway shall not be bound to arrange for the supply nor will this fact be accepted as an excuse for delay in the execution of the work.
- 3.20 NA.
- 3.21 While executing the work any increase of quantity upto 25% shall in no degree affect the validity of the contract and shall be performed by the contractor as provided therein and be subject to the same conditions, stipulations and obligations originally included and approved for in specification and drawings and the amount to be paid thereof shall be calculated in accordance with the accepted rates of the schedule.
- a) For completion of the work if any necessity arises for execution of excess quantity of any item (work as well as supply) beyond 25% of the quantity provided in the schedule of work, the contractor shall notify the engineer-in-charge at least 7 (Seven) days in advance. The Railway shall have the option to execute such extra work / supply by any other means and the contractor shall have no claim for loss or damage that may result from such procedure.
- b) The rates for such items increasing beyond 25% shall be decided in terms of GCC, 2022 (along with all correction slips).

3.22 Commissioning Tests:

After execution of all the items of the work as per schedule of the work the contractor will offer the entire work for commissioning tests with at least 15 (fifteen) days advance intimation to the Engineer-in-charge.

In case of any faults detected during the said test, the contractor shall be responsible for localization of fault(s) and rectify of those at his own cost and then re-offer for testing, till the entire work is finally cleared for acceptance by the Engineer-in-charge.

Any special type of Measuring Instruments and accessories required for Commissioning Testing of the installations are to be arranged and brought at site by the contractor at his cost

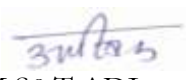
4.0 Non-Interlocked working/Disconnection:

4.1 NON-INTERLOCKED WORKING -

The mandatory requirement for deployment of technical staff by contractor during NI period should be typically as mentioned below:

- a. Relay Room: Two wiremen/technicians or as per engineer incharge along with a supervisor should be available in the relay room for carrying out testing, wiring during commissioning in each distributed relay room.

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- b. In Panel/SM room: Two wiremen/technicians or as per engineer incharge should be available in the SM's office for testing the panel and block wiring etc. exclusively. They will work under the supervision of the relay room supervisor.
- c. Outdoor Room: Sufficient staff with supervisor to look after the outdoor activities. The strength of staff as mentioned above is the bare minimum required for small 3 or 4-line stations. Proportionately, more staff should be deputed whenever required as per direction given by Engineer In charge.
- d. The strength of staff as mentioned above is the bare minimum required for small 3-line stations. Proportionately, more staff should be deputed whenever required.
- e. The deployed Technical staff from contractors must be trained in railway signalling system and safety in General from Railway signalling Training institute, with valid certificate. In case the person is not found trained, He will be sent to SBI/STTC for training immediately at the cost of the contractor.

4.2 DISCONNECTION WORKING –

The Instant Work also includes establishment of new communication between adjacent stations.

- (a) Block Section - Working on Quad/OFC Cable in Block Section between Station “A” and “B” there should be a good jointer available in Block section for jointing along with the necessary help for doing the job to the satisfaction of supervisor In-charge.
- (b) At Station – One no. of Technical Person to be placed at each Station “A” and Station “B” during disconnection for any kind of technical support during disconnection/reconnection. Same should be competent for Quad/OFC parameter measurement.

5.0 COMPLETION & COMMISSIONING of the Work:

- 5.1 (i) The work shall not be considered to have been completed in accordance with the terms of contract until the engineer in-charge shall have issued certificate in writing to this effect. No approvals of material or workmanship or approval of part of the work during the program of execution shall bind the engineer in-charge of in any way prevent him from even rejecting the work which is claimed to be completed and to suspend the issue of his certificate of completion until such alterations and modifications of reconstruction have been effected at the cost of the contractors as shall enable him to certified that the work has been completed to his satisfaction.

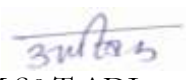
- (ii) After the work is completed, the contractors shall give notice of such completion to the engineer in-charge and within 30 days of receipt of such notice the engineer in-charge/ site-engineer nominated by engineer-in-charge shall inspect the work and if there is no defect in the works shall furnish the contractor with a certificate indicating the date of completion. However if there are any defects which is in the opinion of engineer in-charge are rectifiable he shall inform the contractors the defects noticed. The contractor after rectification of such defects shall notify the engineer in-charge and then the engineer in-charge shall inspect the work and issue the necessary completion certificate within three days if the defects are rectified to his satisfaction and if not be shall inform the contractor indicating defects yet to be rectified. The time cycle as above shall continue.

5.2 Work Closure:-

A) **Work closure without AMC schedule:** - Refer to GCC code 51 (1).

B) **Work Closure with AMC Schedule of specific equipment:-**

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If the AMC of EI or (any other specific equipment) is the part of the original work/tender, it will be executed by the Open Line division under the following conditions:

Schedule of AMC- Schedule will be separate for AMC part. AMC condition shall be clearly defined including cost, time, periodicity, availability of staff, penalties etc.

Date of Commencement of AMC: The AMC will commence based on the expiry of warranty periods.

Bank Guarantee (BG): A separate Bank Guarantee will be obtained for the AMC for the 5% value of AMC schedule cost for validity of complete AMC period.

Agreement Execution: The AMC agreement will be executed between the Sr. Divisional Signal & Telecom Engineer (Sr.DSTE) and the Contractor and will be called as subsidiary AMC contract agreement

Warranty Period for specific equipment (EI):

- a. **Multiple Stations:-**For works involving EI multiple stations for completion period more than one year :
 - i. The warranty period for the first station shall be two years or completion period whichever is less after commissioning of station.
 - ii. The warranty period for the last station shall be one year or completion period whichever is less after commissioning of station.
- b. If all stations are completed within a year of contract then the warranty period shall be one year from the commissioning of the last station.
- c. **Single Station: work involve single station**
 - If the scope includes only a single station, the warranty period will be one year from its commissioning.

Note: - For other specific equipment- Warranty period may be defined separately.

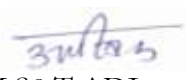
Handover of AMC: The AMC portion shall be handed over to the Sr.DSTE after the completion of warranty period and handed over to Sr DSTE within one month, through separate subsidiary contract agreement of AMC.

Closure of Work/Final Bill: The work shall be closed after handing over the AMC portion to the Open Line division. In case, AMC part was not agreed to execute by open line, contract can be close without operating this item.

6.0 Extension (s) to Completion period:

- i. Time is the essence of the contract. Extension of time for the completion of the work shall be governed by Clause No. 17 of the General Condition of Contract with latest amendments edition and the contractor shall be responsible for requesting such extension in terms thereof.

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- ii. The contractor will have to complete the work, within specified period from the date of issue of the letter of acceptance of this tender, unless any extension to the date of completion is granted subsequently as per General Condition of Contract 2022 with latest amendments edition (GCC) vide clause no. 17, 17A(i) (ii) (iii).
- iii. Extension under Clause No. 17(B) provides recovery of liquidated damages from the contractor. If the extension period is granted due to contractor's delay, clause No. 17(B) of GCC will be implemented.

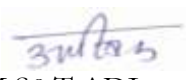
7.0 Time Limitation:

- i. Subject to any requirement in the contract as to execution of any portion or portions of the work before completion of the whole, the contractor shall fully and finally complete the whole of the work comprised in the contract by the date entered in the contract, provided that if any modifications have been ordered which, in the opinion of the Railway engineer have materially increased the magnitude of the work, then such extension of the contract date of completion may be granted as shall appear to the Railway Engineer to be reasonable in the circumstances, provided moreover that the contractor shall be responsible for requesting such extension of the date as he may consider necessary as soon as cause thereof shall arise and in any case not less than one month before expiry of the original date fixed for completion of the work.
- ii. In all cases where extension of the contract date of completion is required the contractor shall have to make normal request in writing to the Engineer-in-charge of the work who shall then promptly forward such request to the competent authority with his clear and complete comments, recommendation and any other information as necessary for obtaining final decision by the competent authority.

8.0 Inspection of Works:

- (i) **Field Book and Order Book** in terms of Paras 1122E and 1123E respectively of the Engineering Code shall be maintained at the site of the work by Railway wherein instructions regarding the working etc. shall be recorded by the Engineer or his executive subordinates. It is expected of the contractor or his representative at the site to note such instructions whenever asked upon to do so and take action accordingly. The contractor 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 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 Railway's representative.
- (ii) **Site Order Register** - All instructions issued by the engineer or the supervisor to the contractor or his representative as the case may be, shall be entered. The contractor(s) or his/their representative at the site shall acknowledge such instructions whatever asked upon to do and take action accordingly. The contractor shall promptly acknowledge orders given therein by the Engineer or his representative or his superior officers and comply with them. The compliance shall be reported by the Contractor to the Engineer in good time so that it can be checked.
- (iii) **Field Book** - In the Field Book, the date of inspection and particulars of any special features, incorrect practice(s) and deficiencies observed in the work being executed

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and/or materials supplied by the contractor shall be recorded by the Engineer or his executive subordinates. It will be the responsibility of the contractor to rectify the deficiencies observed (if any) at his own cost and also to prevent any recurrence. Complaints, deficiencies if any, pointed out by the contractor or his representative shall also be recorded in this book.

- (iv) **Hindrance Register** - A hindrance register should be maintained by the contractor to record various hindrances encountered during execution. The hindrances are to be noted on a day to day basis with date of occurrence and removal. Disputes, if any, should be included in the program status report and discussed with the contractor in weekly/monthly/steering committee meetings. Record of hindrances can be used to seek contractual extension of dates for milestones, consequent compensation for delays as well as raise attention for early removal of hindrance.

All registers at item (i) to (iii) mentioned as above will be maintained by the representative of the contractor and signed by the representative of the engineer. Any other registers considered necessary by the Engineer, shall be maintained at site in which the representative of the Engineer and the contractor will have to sign. The registers, proforma charts, etc. will be the property of the Railway. Registers as mentioned above will have to be maintained depending on the scope of the work as prescribed by Engineer's/representative at site.

9.0 Inspection of Trenches, Chases And Fillings:

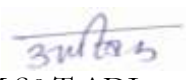
Details can be seen in tender schedule specifications.

10.0 Representation on Works:

- a) The contractor shall when he is not personally present on the site of the work, place and keep a responsible agent at the works during working hours who shall on receiving reasonable notice, present himself to the Engineer and orders given by the Engineer or the Engineer's representative to the agent shall be deemed to have the same force as if they had been given to the contractor. Before absenting himself, the contractor shall furnish the name and address of his agent for the purpose of this clause. The Contractor shall place and keep on the works at all times efficient and competent staff to give necessary directions to his workmen and to see that they execute their works in sound and proper manner and shall employ only such supervisor, workmen and labourers in or about the execution of any of the works as are careful and skilled in their various trades.

The contractor shall at once remove from the work any agent, supervisors, workmen or labourer who shall be objected to by the Engineer and if and whenever required by the Engineer. He shall submit a correct return showing the names of all staff and workmen employed by him. In the event of the Engineer being of the opinion that the contractor is not employing on the works a sufficient number of staff and workmen as is necessary for the proper completion of the works within the time prescribed, the contractor shall forthwith on receiving intimation to this effect take on the additional number of staff and labour specified by the Engineer within seven days of being so required and failure on the part of the contractor to comply with such instructions will entitle the Railway to rescind

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the contract under Clause-61 of the General Condition of contract 2022 with latest amendments edition.

The contractor(s) shall nominate in writing his representative(s) on the works who will be authorised to receive and acknowledge materials issued by the Railway and take all orders issued by the inspecting official of the Railway, as mentioned in clause No. 9.0 above before commencement of execution of work at site, with intimation to the engineer-in-charge well in advance. Contractor shall also ensure that at least one nominated representative remains available at site during execution of work.

Regarding representation on works and supervision, the provisions in clause 12 of General Condition of Contract and clause 24 of Standard Special Condition of contract shall be applicable respectively.

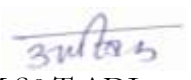
- b) **Night work:** The provision in clause 23 of General Condition of Contract shall be noted regarding execution of work between sunset and sunrise. If the contractor is, however, satisfied that the work is not likely to be completed in time except by resorting to night work, by special order the contractor would be requested to carry out the work even at night, without conferring any right on the contractor for any extra payment for introducing night work. In the event of night working, the contractor will make necessary adequate lighting arrangements for smooth execution of the work. If the contractor works round the clock on all days including Sundays and holidays, the Railway shall make arrangements for the supervision accordingly.

11.0 MATERIALS (Supply, Transportation, Inspection, Handling, return & Safe Custody):

- a. **Coordinating Consignee for material supply and its billing will be SSE/Sig/MSH-Store**
- b. **Consignee in charge for execution of work and execution related billing will be SSE/SIG/Viramgam.**
- c. **Engineer In charge: DSTE/Special works.**
 - (i) Supply of some items have to be supplied as per IRS/RDSO specification. In such cases, material has to be supplied from RDSO approved vendors only. However, for items for which vendors have not been approved by RDSO, make of equipment has to be approved by Engineer Incharge before procurement of items.
 - (ii) For all other supply items which are to be supplied as per non IRS/RDSO specification costing more than 1% of tendered cost, make and supplier name has to be approved by Engineer In Charge if they are not already mentioned in tendering stage or in schedule or LOA.
 - (iii) All the materials, except mentioned otherwise, are to be drawn by the contractor or his authorised representative from the Store depot of the Consignee, as per instruction of the Engineer-in-charge of the work, by placing requisitions as and when required supported by Indemnity Bond to the approximate value of materials in the requisition. Railway will supply required quantity of materials, if felt necessary for completion of the work. All of these materials are to be transported to the site of the work by the contractor as per the details given in the tender schedule. The Indemnity Bond shall not be released till such time the materials for which the INDEMNITY BOND is furnished are installed and handed over with full account to the Railway by the contractor.

I. MATERIAL HANDLING

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- a) The materials as detailed in Schedule shall be brought by the contractor to the site of work after offering the same in the office of **Consignee** for inspection and record. The contractor shall have such materials by authorised representative of Engineer-in-charge before being used for the work. He will also produce necessary inspection certificates to prove that the materials have already been passed by RDSO/RITES/CONSIGNEE where required. The materials have to be submitted to the office of **Consignee** along with the challan of the firm who has supplied the material and will be taken into the account of the Supervisor-in-charge and then shall be issued to the contractor, supported by Indemnity Bond; equal to the value of payment claimed by the contractor for materials supplied.
- b) The contractor shall be liable to render full accountability for the materials issued by the Railway. If the quantity of the Railway materials is consumed in excess or wasted or damaged or lost or otherwise not satisfactorily accounted for, recovery shall be made from the contractor at twice the assessed rate of materials, prevailing at the time of last issue of the materials, if necessary by en cashing the Indemnity Bond. The assessed rate will be calculated by escalating the W. Railway's last purchase rate at the rate of 12% (Twelve percent) cumulative per year or part thereof. Materials consumed in excess or wasted or damaged or lost or unsatisfactorily accounted for shall be similarly charged to the contractor at the above rate.

RETURN OF RLY MATERIALS:

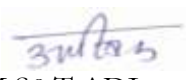
The contractor has to return at his cost any cut pieces of wires / cables etc. that may be left out and any surplus materials from the work and other packing materials that might have been handed over to him. These shall be handed over to **Consignee**. The contractor shall take proper written acknowledgement from the representative of the Engineer-in-charge for all the materials returned by him.

The Signalling and Telecom materials for which RDSO approved/Recommended List firms exist should be procured from approved/Recommended List firms only. No materials are to be procured from firms which are banned by Railway Board/RDSO.

12.0 Inspection of Materials:

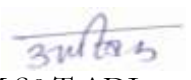
- I. In addition to what is indicated in the GCC of W. Railway, the Contractor shall also adhere to the following:
 - a. All Materials supplied are to be inspected by the respective Inspection Authorities. As a General rule, items supplied as per RDSO specification are to be inspected by RDSO/RITES if the value of the item is more than 5 lakhs. Items supplied as per IS & other specifications to be inspected by RITES/Consignee depending upon value of item.
 - b. Inspection Charges for RDSO and RITES shall be borne by Contractor, subject to the provisions herein contained.
 - c. The cost of all Tests and/or/Analysis effected at the Manufacturers or Contractors premises shall be borne by Contractor. Tests parameters as given in technical specifications/RDSO specifications, which are not possible to test at factory/OEM's premises/Indian representative premises, necessary test reports of type tests/routine tests reports need to be submitted to the satisfaction of Engineer in-charge.
 - d. The materials put up for Inspection shall be of the same type nature as specified in the Schedule and Specification. Any variation shall require prior approval of the Railway.
 - e. The expenses of travel, boarding etc. for Railway Engineer's representative incurred inwards Inspection shall be borne by Railway.

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- f. After inspection the contractor shall produce the materials along with Inspection Certificate, to **Consignee** for acceptance.
- g. If any material is found by the Engineer-in-charge to be not as per the specification or not in proper condition the same is to be replaced by the contractor within 15 (Fifteen) days free of cost. For this the Engineer-in-charge's decision is final and binding on the contractor.
- h. All the materials inspected and passed shall be marked suitably by the inspecting official and are to be kept under contractor's custody which will be used for execution only in presence of Railway supervisor at site. However, Railway reserves the right to reject any material, if found spoiled / damaged during execution, for which the contractor shall replace at his cost.
- i. Any material rejected by the inspecting official due to not being as per the specification or not in proper condition, the same is to be removed by the contractor within 7 (Seven) days at his cost. For this the decision of the inspecting official shall be final and binding on the contractor.
- j. The Engineer's representative has all the powers to inspect the materials at any stage and reject defective or inferior Work or Material. The contractor shall carry out such tests as may be required in the opinion of the Engineer at his cost.
- k. Any material can be installed only after inspection and acceptance by the Railway's Representative.
- l. Contractor may be called on to pay all expenses incurred by Railway in respect of work or material found to be defective or of Inferior Quality or otherwise unacceptable.
- m. Contractor shall be responsible for checking the materials before taking delivery from Railway Stores that all the materials given to him are in good condition. Any replacement required for defective/broken parts have to be requisitioned and obtained from the depot of the Subordinate in-charge of stores after returning the defective broken equipment provided the Railway Engineer is satisfied that such breakage/defects etc. is not due to the negligence etc. of the contractor or his representatives. He must also ensure that the materials supplied by him are also in good condition and if any defect /discrepancy noticed in the course of inspection of the Engineer or his authorised representative will have to be rectified/replaced at his own cost.
- n. The materials issued by the Railway shall be used solely and economically for the purpose of the works covered under this contract only. The materials shall be used in such quantities and manner as are indicated in schedule or as approved by the Engineer-in-charge of the works whose decision thereon shall be final. Wastage or damage to materials shall not be caused by the contractor in any manner.
- o. The contractor shall be liable to render full account for the materials issued by the Railway. The contractor has to return to the **Consignee** Store Depot cut pieces of wires / cables that may be left out and surplus materials, if any, from the work and other packing materials that might have been handed over to him and shall take proper written acknowledgement from the Engineer's representative for all the materials returned by him.
- p. A joint statement of materials issued, used and material returned shall be made by the Contractor and Engineer's representative. Such Joint Material Statement shall be checked and endorsed by the Site Engineer.
- q. If any quantity of the Railway materials consumed in excess or washed or damaged or lost or otherwise not satisfactorily accounted for recovery shall be made from the contractor at twice the market rate of materials prevailing at the last issue of the materials.
- r. If the materials, tools as however not available in the Railway stock, or the Railway decided not to supply the same, whatever be the reason, the Railway shall not be bound to arrange

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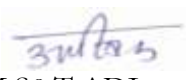
for the supply nor will this fact be accepted as an excuse for delay in the execution of the work.

- s. The site supervisor of the work and the contractor shall make out a list jointly signed for the materials, if expected to be released from a station and then after collection of the released materials by the contractor, the same shall be transported and handed over to **Consignee**
- t. Stores Depot was directed by **Consignee** after verifying the released materials with the list jointly prepared by Inspector-in-charge & the Contractor and acknowledged the receipt.

13.0 Safe Working Methods:

- a) The Contractor shall at all times adopt such safe measures of working and will ensure safety of train traffic, structures, equipment and labour.
- b) Fluorescent jackets, Shoes and protective Gears to work in the RE area must be provided by the contractor to his labour / staff working on the track, failing which they will not be allowed to work near the track. Contractor will be solely responsible for delay in work, if work is stopped by the Railway due to such circumstances.
- c) Trenching for laying cable across track/ road and laying of cable across track/road shall be done only in presence of Railway's representative. It shall be ensured by the contractor that digging of trenches, for cable laying, and pits for foundations do not cause any unsafe condition to the running of trains.
- d) No work on a working installation such as, points, signals, track circuits, level crossing gates, STMs, MUXs, cabin level frame, bridges, yards,, etc., shall be undertaken without specific permission of the Railway's representative and in the absence of Railway's representative at the site of work.
- e) The contractor shall take all precautionary measures in order to ensure protection of his own personal moving about all working on the Railway premises and shall have to conform to the rules and regulations of the WESTERN RAILWAY. As and when, while the work under the contract is in progress, there is likely to be any danger to the persons employed by the contractor due to running traffic or while working on Railway premises, the contractor shall apply in writing to the Railway to provide flagmen and look out-man for protection. The Railway will however, decide as to whether it is necessary to post such flagmen and look out-man for various types of works and also the number of such men required to protect the contractor's staff working at site. The flagmen and look out-man will be Railway servants and no expenses on this account will be recovered from the contractor.
- f) The contractor should abide by all the Railway regulations and also ensure that the same are followed by his representatives, servants or Sub-contractor or workmen. He is, therefore, bound under this clause to give notice to them about the provision of this clause and the consequent liabilities of the contractor under the agreement.
- g) Within the station, especially on the passenger platform, the contractor shall ensure sufficient free space for movement of passenger traffic. He must cover the excavations carried out in such areas with a view to avoid any accidents.
- h) The work must be carried out most carefully in such a way that they do not hinder the Railway operation except as agreed to by the Railway.
- i) The contractor's employees and workers shall not for any reason operate any appliance or installations of the Railway concerning the safety of train movements, but they should whenever necessarily notify the qualified Railway staff who will then take necessary steps. Special precautions are to be taken for installation of point machines. If required, the

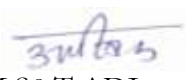
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spacing of sleeper in connection with installation of point machines has to be done by the contractor.

- j) The contractor shall abide by the Indian Electricity Act and the Indian Electricity Rules as amended from time to time.
- k) Suitable ladders for climbing the posts and slings for supporting men on the post shall be used. Ropes if required shall be used for erection of the Poles. The size of the rope shall be adequate. The contractor shall take necessary precautions for working near the power lines. If at any time the Railway finds the safety arrangement is inadequate or insufficient, the contractor shall take immediate corrective action as directed by the Railways representative at site. Any direction in the matter shall in no way absolve the contractor of his sole responsibility to adopt a safe working method.
- l) Necessary personal safety equipment as considered adequate by the Engineer-in-charge should be kept available for the use of the persons employed on the site and maintained in a condition suitable for immediate use, and the contractor should take adequate steps to ensure proper use of equipment by those concerned.
- m) No electrical apparatus which is liable to be a source of danger used by the operator shall remain electrically charged.
- n) Suitable face masks should be supplied by the contractor for use by the workers when paint is applied in the form of spray.
- o) Steps taken in order to avoid damages to Railway Installations:
The contractor shall see that no damage is caused to Railway Signaling and transmission wires, cables, station installations, communications lines, electric devices, trains, tracks, any kind of fencing as well as any rolling stock and in general to all Railway installations and equipment. If any damage is caused to or suffered by any Railway property, by or as a consequence of the acts or unlawful omissions of the contractor, its employees and workmen or other persons connected with it, the necessary repairs or replacement shall be affected by the Railways at the risk and cost of the contractor. The said expenses shall be recovered from the money due and payable to the contractor or by the other appropriate process.
- p) Contractor's liability costs, damages etc:
All costs, damages and expenses which the Railway may incur or suffer and which are recoverable from the contractor under the terms of this contract of the relevant law may at the discretion of the Railways, be recovered by deducting the requisite amounts from any money due and payable or refund to the contractor on any account whatsoever or by legal proceeding. The Railway also reserves the right and shall be entitled to retain payments due to the contractor under this contract and to set off the same against all claims whether arising out of this contract or out of any other transaction whatsoever against the contractor, in exercising this right the Railway shall not act unreasonably.
- q) In the event of any breach of the aforesaid conditions, the contractor shall in addition to throwing himself open to action for contravention of the terms of the agreement and or for criminal breach of trust, be liable to account to Government for all money, advantages or profits resulting on which in the usual course would have resulted by reason of such breach.
- r) No vehicle will normally be permitted to play adjacent to the running lines. The contractor will be responsible for the safety of hired trucks and men etc. working at the site. He will also be responsible for any damage caused to the Railway property, staff and passengers' vehicles having been allowed to ply on the Bank, in case of an accident of any nature, the contractor will be indemnified for any losses caused by him as a result of the accident.
- s) Electric Supply: The contractor(s) should make his/their own arrangement for arranging electric supply, as may be required for work. The Railway may however assist in

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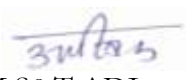
recommending his application to the electricity authority for the power supply. Contractor may make use of Railways electrical supply for indoor works such as for lighting, soldering, minor drilling works etc. free of cost at RBG rooms and Location Huts.

- t) Passes and Identity Cards: No Railway free passes will be issued to the contractor or his workmen for travel by train. However, identification letters may be issued to individuals employed for the work, on written demand from the contractors.

14.0 Rates for Items:

- i) The estimated rates, quantities & amount in Rupees for each of the items of the Tender Schedules along with total Estimated Cost are given in the Tender Document. The Tenderer(s) shall not quote against the individual items of Schedules. They shall only quote as one single percentage above or below or at par to the total cost applicable for each Schedules in the nominated space provided under IREPS Website. The rate so quoted should be written both in figure & words.
- ii) The rate quoted by the contractor in the schedule shall be inclusive of all taxes and charges for labour, transportation, plants and equipment, tools, fuel and consumable (if any) etc. However, if rates of existing GST or cess on GST for Works Contract is increased or any new tax /cess on Works Contract is imposed by Statute after the date of opening of tender but within the original date of completion/date of completion extended under clause 17 & 17A and the Contractor thereupon properly pays such taxes/cess, the Contractor shall be reimbursed the amount so paid. Further, if rates of existing GST or cess on GST for Works Contract is decreased or any tax/cess on Works Contract is decreased / removed by Statute after the date of opening of tender, the reduction in tax amount shall be recovered from Contractor's bills/Security Deposit or any other dues of Contractor with the Government of India.
- iii) No separate Discount shall be given separately except at the designated place in IREPS website.
- iv) No price escalation of the rate(s) shall ordinarily apply under this contract as detailed in Clause No. 31.0 of Special Conditions of Tender & Contract.
- v) Arrangement for permit and licence for materials will not be made by the Railway or any assistance given. The contractor(s) will have to make his/their arrangements. Also no import licence shall be arranged by the Railway for this work.
- vi) "ROAD PERMIT" for transporting the materials from manufacturer's premises to go-down/site of work will not be provided by the Railway nor any assistance given. The contractor will have to make his / their own arrangement for ROAD PERMIT.
- vii) The rate quoted by the contractor shall be the cost of complete work and shall include the cost of all labour and materials including transport, loading, unloading as well as sheds, construction plants, scaffolding and for which no separate payment is made to him on satisfactory completion of the work shall remain the property of the contractor.
- viii) The contractor shall entirely be responsible for ensuring safety of his labour, vehicles, construction plants and equipment while working, no extra payment shall be allowed to the contractor for any safety precautions to be observed during the execution of the work. The

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cost of such precautions shall be deemed to have been included in the rates for all the items of the schedule.

- ix) It shall be clearly understood that the rates to be quoted shall include all wastages and wash away either due to rains or storm or floods or other causes whatsoever. The rate shall also include the cost that may be necessary or stacking the materials at site of work.
- x) The quoted rates shall be deemed to include charges for all site facilities for labour that are considered necessary for execution of the work. Subject to availability of land the Railway may provide free site for labour camp, construction of yard etc. close to site of work.
- xi) No assurance can be given regarding the vulnerability of Railway land given for use to the contractor flooding during high floods. The Railway undertakes no responsibility or liability in this regard.
- xii) **Site facilities:** The rates should be deemed to include charges for any and all site facilities that are considered necessary for the execution of the work unless otherwise indicated in the contract. In this connection, specific attention is drawn to stipulations in clause 1(1) of the general condition of the contract.

15.0 QUANTITIES IN SCHEDULE AND THEIR VARIATIONS:

1. The quantities specified in the schedule of works enclosed herewith are approximate and meant to give the tenderer(s)/s an idea of the quantum of work involved. The Railway reserved the right to increase or decrease the quantities against various items and add/or delete from the items upto 25% of the quantities or even more as per the actual requirement at site. The successful tenderer(s) will have to execute all items required for the successful completion of the work at the quoted rates. The Engineer on behalf of the Railway is authorised to order in writing to enlarge, extend, diminish or reduce the works or make any alterations in the design, character, position of site, quantities, dimensions or in the method of their execution or in the combination and use of materials for execution thereof or to order any additional works to be done or any works not be done. The contractor shall be bound to carry the work.
2. The following procedures shall be adopted for dealing with variation in quantities during execution of work/contract:
 - Individual NS items (i.e. Non-Schedule items as per Tender Schedule) in the contract shall be operated with variation of plus or minus 25% and payment would be made as per agreement rate. For this, no finance concurrence would be required.
 - In case an increase in quantity of an individual item by more than 25% of the agreement quantity is considered as unavoidable, the same shall be executed by floating a fresh tender. If floating a fresh tender for operating that item is considered not practicable, quantity of that item may be operated in excess of 125% of the agreement quantity, subject to the following conditions: -
 - (i) Unless otherwise specified in the special conditions of the contract, the accepted variation in quantity of each individual item of the contract would be upto 25% of the quantity

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originally contracted, except in case of foundation work (in which no variation limit shall apply). However, the rates for the increased quantities shall be as per sub- para (iii) below.

(ii) The Contractor shall be bound to carry out the work at the agreed rates and shall not be entitled to any claim or any compensation whatsoever upto the limit of 25% variation in quantity of individual items of works.

(iii) In case an increase in quantity of an individual item by more than 25% of the agreement quantity is considered unavoidable, then same shall be executed at following rates

- a. Quantities operated in excess of 125% but upto 140% of the agreement quantity of the concerned item, shall be paid at 98% of the rate awarded for that item in that particular tender;
- b. Quantities operated in excess of 140% but upto 150% of the agreement quantity of the concerned item shall be paid at 96% of the rate awarded for that item in that particular tender;
- c. Variation in quantities of individual items beyond 150% will be avoided and would be permitted only in exceptional unavoidable circumstances and shall be paid at 96% of the rate awarded for that item in that particular tender.

d. **Variation to quantities of Minor Value Item:**

The limit for varying quantities for minor value items shall be 100% (as against 25% prescribed for other items). A minor value item for this purpose is defined as an item whose original agreement value is less than 1 % of the total original contract value.

(i) Quantities operated upto and including 100% of the agreement quantity of the concerned minor value item, shall be paid at the rate awarded for that item in that particular tender;

(ii) Quantities operated in excess of 100% but upto 200% of the agreement quantity of the concerned minor value item, shall be paid at 98% of the rate awarded for that item in that particular tender;

(iii) Variation in quantities of individual minor value items beyond 200% will be avoided and would be permitted only in exceptional unavoidable circumstances and shall be paid at 96% of the rate awarded for that item in that particular tender.

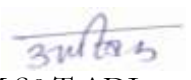
(iv) In case of earthwork items, the variation limit of 25% shall apply to the gross quantity of earthwork items and variation in the quantities of individual classifications of soil shall not be subject to this limit.

(v) As far as Standard Schedule of Rates (SSOR) items are concerned, the variation limit of 25% would apply to the value of SSOR schedule(s) as a whole and not on individual SSOR items. However, in case of Non Standard Schedule of Rates (SSOR) items, the limit of 25% would apply on the individual items irrespective of the manner of quoting the rate (single percentage rate or individual item rate).

(vi) For the tenders accepted at Zonal Railways Level, variations in the quantities will be approved by the authority in whose powers the revised value of the agreement lies.

The aspect of vitiation of tender with respect to variation in quantities should be checked and avoided. In case of vitiation of the tender (both increase as well as

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decrease of value of contract agreement), sanction of the competent authority as per single tender should be obtained.

In the event of any reduction in the quantity to be supplied or work to be executed for any reasons whatsoever the contractor shall not be entitled to any compensation but shall be paid only for the actual amount of work done or quantity of supply made in accordance with the accepted rate of the schedule. Supply of materials and works not covered by the schedule of work, but necessary for completion of the work as per approved plan, will be executed by the contractor, for which contractor will quote separately.

16.0 MEASUREMENTS & PAYMENT FOR WORKS:

- i) In terms of clause No. 45 of General Condition of Contract measurements of the work in progress shall be taken and recorded in the prescribed official Measurement Book from time to time and at such intervals as in the opinion of the engineer-in-charge shall be proper having regard to the progress of the work. The contractor shall be present at the site and shall sign the results of the measurements (which shall also be signed by the engineer-in-charge or his authorised representative) recorded in the aforesaid measurement book as an acknowledgement of his acceptance of the accuracy of the measurements.
- ii) Under the Contract all bills would be passed through eMB only.
- iii) The Contractor shall be entitled to be paid from time to time by way of "On Account Payment" as per Clause 46 of General Condition of Contract, at the rate in the accepted schedule of rates only for the items of the schedule of works except for supply of materials as in the opinion of the Engineer-in-charge he has executed in terms of the contract.

I. For Schedules:

A. For SCHEDULE A1-SOR Supply item, A2-Non SOR Supply item, A3-MSDAC, A4-Supply of IPS & C-Telecom Supply item.

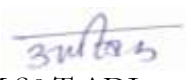
- a) 80% payment will be made on supply of the materials. Further 10% payment will be made on installation of the materials at site and the balance 10% will be paid after successful commissioning of equipment or all balance payment will be made after commissioning of the complete system.
- b) *100% will be paid for spares & for other items, which are not required to be erected by the contractor on receipt of the equipment and no loss certificate by consignee.*

B. For SCHEDULE B1-SOR Supply & Execution item, B2-Non SOR Supply & Execution item & D-Telecom Execution item.

90% payment will be made on completion of the Installation works and Balance 10% payment will be made on successful commissioning of the complete system.

- II. The contractor shall be paid the final payment in terms of the clause No. 51 of the General Condition of Contract.

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- III . The balance payment may be released against Bank Guarantee of an equal amount on the discretion of the competent authority, if commissioning is held up on Railway's account for a period of more than three months after the installation is tested by the contractor to the full satisfaction of Railways and kept ready for commissioning.

However, if rates of existing GST or cess on GST for Works Contract is increased or any new tax /cess on Works Contract is imposed by Statute after the date of opening of tender but within the original date of completion/date of completion extended under clause 17 & 17A and the Contractor thereupon properly pays such taxes/cess, the Contractor shall be reimbursed the amount so paid.

Further, if rates of existing GST or cess on GST for Works Contract is decreased or any tax/cess on Works Contract is decreased / removed by Statute after the date of opening of tender, the reduction in tax amount shall be recovered from Contractor's bills/Security Deposit or any other dues of Contractor with the Government of India.

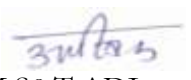
17.0 DEDUCTION OF INCOME TAX:

The Railway shall at the time of arranging payment to the contractor be entitled to deduct Income Tax on the amount of each bill, at specified rate decided by the Railway Board from time to time (at present the rate is 2%). An Income Tax Deduction Certificate can be issued to the firm on demand and the final settlement of Income Tax should be made with concerned income tax authority.

18.0 GOODS & SERVICES TAX (GST):

- a. Before submitting a tender, the tenderer will be deemed to have satisfied himself by actual inspection of the site and locality of the works, that all conditions liable to be encountered during the execution of the works are taken into account and that the rates he enters in the tender forms are adequate and all-inclusive to accord with the provisions in Clause-37 of the Standard General Conditions of Contract for the completion of works to the entire satisfaction of the Engineer.
- b. (Tenderers will examine the various provisions of The Central Goods and Services Tax Act, 2017(CGST)/ Integrated Goods and Services Tax Act, 2017(IGST)/ Union Territory Goods and Services Tax Act, 2017(UTGST)/respective state's State Goods and Services Tax Act (SGST) also, as notified by Central/State Govt.& as amended from time to time and applicable taxes before bidding. Tenderers will ensure that full benefit of Input Tax Credit (ITC)likely to be availed by them is duly considered while quoting rates.
- c. The successful tenderer who is liable to be registered under CGST/IGST/UTGST/SGST Act shall submit GSTIN along with other details required under CGST/IGST/UTGST/SGST Act to railway immediately after the award of contract, without which no payment shall be released to the Contractor. The Contractor shall be responsible for deposition of applicable GST to the concerned authority.
- d. In case the successful tenderer is not liable to be registered under CGST/IGST/UTGST/SGST Act, the railway shall deduct the applicable GST from his/their bills under reverse charge mechanism (RCM) and deposit the same to the concerned authority.
- e. When work is tendered for by a firm or company, the tender shall be signed by the individual legally authorised to enter into commitments on their behalf.

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- f. The Railway will not be bound by any power of attorney granted by the tenderer or by changes in the composition of the firm made subsequent to the execution of the contract. It may, however, recognize such power of attorney and changes after obtaining proper legal advice, the cost of which will be chargeable to the Contractor.
- g. All the bidders / tenders should ensure that they are GST compliant and their quoted tax structure /rates are as per GST Law. Offer must be inclusive of Goods & Service Tax. Contractor shall be liable to pay/refund the amount collected as GST to the Indian Railways along with interest and penalties, if any imposed by the authorities, in case GST input tax credit of Indian Railways is denied/rejected by the tax authorities due to reasons mentioned below but not limited to:
- Wrong/incorrect invoice s is sued by contractor;
No-filing of GST returns; Non-payment of GST collected from Indian Railways to the authorities;

Any other non-compliance done by Contractor;

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

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

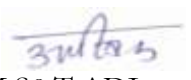
19.0 Issue of work completion Certificate:

19.1 Issue of work completion Certificate: As per para 5 above.

20.0 WARRANTY PERIOD/ Defect Liability period:

- a. The contractor shall be bound to rectify free of cost at site any defects and/or shortcomings that may arise in the work executed for a period of 365 (Three hundred sixty five) days after completion and taking over of the installation by the Railway. The aforesaid maintenance period of 365 days shall be reckoned from the date of taking over the work by the Railway, excluding day(s) that will lapse, from the date of sending the intimation by the Railway, to the Contractor (at his last known address) up to the date of completion of rectification. Should any dispute arise as to the correctness of the defects pointed out, the decision of Engineer-in-charge in this regard shall be final and binding. The necessary disconnection of working circuits /equipment (if any) for carrying out rectification shall be arranged by the Engineer-in-charge and such work shall be done only in presence of his authorised representative.
- i. After completion of such rectification works, all the circuits and equipment shall be tested and checked thoroughly by an authorised representative of the Engineer-in-charge before reintroduction of normal working.
- b. **Warranty for materials:** All the materials supplied under this contract shall be warranted for trouble free service for a period of 365 (three hundred sixty five) days from the date of commissioning of work.

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- c. **Removal of defective works:** If in the opinion of the Engineer, any of the works had been executed with improper materials or defective workmanship, the contractor when required by the Engineer, shall re-execute the same and substitute proper materials and workmanship forthwith at his own cost and in case of default of contract in so doing within a week, the Engineer shall have full power to employ other persons to execute the work and the cost thereof shall be borne by the contractor.

21.0 PROGRAMMING OF WORK TO AVOID INTERFERENCE WITH TRAIN MOVEMENTS:

The contractor will programme his work in such a manner so as not to interfere in the working and movement of trains. No extra payment shall be allowed on this account and for taking any precautions or wastage of Contractor Labour, Time etc. due to train working

22.0 SITE CLEARANCE:

At the end of the work in each section the contractor shall as a part of his contractual obligation leave the area completely cleared of rubbish and obstructions of all kinds according to the instructions of the Railways representatives. Besides, he shall take execution of work to avoid the presence of loose earth and ballast on platforms, in drains, on the track formation and pathways in the vicinity. If within fortnight of completion of the particular item of site work, the refuge is not cleared, the Railway will arrange to get them removed at the cost of the contractor. However, before the Railway actually gets the site cleared, intimation in writing shall be sent to the contractor.

23.0 PROGRESS REPORTING:

There shall be a formal official meeting between Contractor and Engineer Incharge every 15 Days regarding the Work Progress. The contractor shall submit to the Railway at his own cost periodic progress reports at regular intervals regarding the state and progress of work. The details and proforma of the report will mutually be agreed after award of the contract. Such reports shall be for daily man power, equipment and plant deployment, weekly work progress and monthly progress review reports. All actions as directed by IR pursuant to such reports shall be promptly attended to.

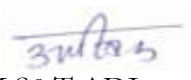
24.0 PRESENCE OF SUPERVISORS AT SITE:

No work of wiring, commissioning / energisation of equipment, cable lying, jointing etc. should be carried out unless and until contractors technical supervisors are present at site.

25.0 TRAINING:

- i) The tenderer shall undertake to impart training to Railway staff either at site of installation or their factory premises in different aspects of equipment, its architecture, functioning and planning, management supervision, field installation supervision, commissioning, testing and maintenance both for H/W and S/W areas in order to transfer complete know how so as to impart full knowledge and confidence to independently execute successfully the erection and maintenance of the exchange. The training courses should include hands-on equipment, visits to installations apart from formal classes.
- ii) The OEM should train the Railway personnel to such level of proficiency that they may carry out changes in the OEM specialised system without the help of OEM.

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- iii) Expenses on travel, accommodation and the incidental expenditure on training program for the Railway Staff will be borne by Railway.
- iv) The subjects of training, details of courses etc. should be furnished on demand of the Railway and it should be ensured that the trainees are given sufficient material for technical reference and guidance as well as for imparting complete know-how.
- v) In addition to the above, tenderer should also quote for fees leviable, if any, for the various courses man-week wise and course-wise so as to enable Railway to depute additional employees if considered necessary.
- vi) The complete documentation on the courses should be supplied to the trainees. Railway, however reserves the right to vary the number of personnel as well as course modules and training periods so considered necessary.
- vii) A CD/PEN DRIVE made with the specific intent of giving training on the theory and maintenance of equipment shall also be supplied.
- viii) **After Completion of Training, OEM may issue certificate that persons trained are capable to carry out the alteration in the field to suit signalling changes in the yard.**

26.0 FORCE MAJEURE:

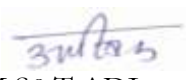
- 26.1 If, at any time, during the continuance of the agreement, the performance in whole or in part by either party of any obligation under the agreement shall be prevented or delayed by reasons of any war, hostile acts of the enemy, civil commotion, sabotage, fires, floods, explosions, epidemics/pandemic, quarantine restrictions, strikes and lock-outs and any statute, statute rules, regulations, orders or requisitions issued by any Govt. Department or a competent authority or acts of God (hereinafter referred to as eventualities), then provided notice of the happening of any such eventuality is given by either party to the other within 30 days from the date of occurrence thereon, neither party shall, by reason of such eventualities be entitled to terminate this contract agreement nor shall either party have any claim for damages against the other in respect of such non-performance or delay in performance.
- 26.2 Performance of the contract agreement shall, however, be resumed as soon as practicable after such eventuality has come to an end or ceased to exist. Provided that, if performance in whole or part of any obligation under the contract agreement is delayed by means of any such eventuality for a period exceeding six months, either party may, at his option, terminate the contract agreement provided further that in the event of such prevention or delay as aforesaid, then, instead of exercising the option, both parties may consult with each other with a view to agreeing between them the action mutually to be taken in order to minimise the effects of such prevention or delay and continue the operation of this contract agreement.

27.0 PERFORMANCE GUARANTEE BOND:

The procedure for obtaining Performance Guarantee is outlined below:

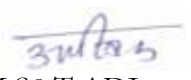
- a) The successful bidder shall have to submit a Performance Guarantee (PG) **within 21 (Twenty one) days** from the date of issue of Letter of Acceptance (LOA). Extension of time for submission of PG beyond 21 (Twenty one) days and upto 60 days from the date of issue of LOA may be given by the Authority who is competent to sign the contract agreement. However, a penal interest of 12% per annum shall be charged for the delay beyond 21 (Twenty one) days, i.e. from 22nd day after the date of issue of LOA. Further, if the 60th day happens to be a declared holiday in the concerned office of the Railway, submission of PG can be accepted on the next working day.

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- i. In all other cases, if the Contractor fails to submit the requisite PG even after 60 days from the date of issue of LOA, the contract is liable to be terminated. In case the contract is terminated, the railway shall be entitled to forfeit Bid Security and other dues payable to the contractor against that particular contract, subject to maximum of PG amount. In case a tenderer has not submitted Bid Security on the strength of their registration as a Startup recognized by Department of Industrial Policy and Promotion (DIPP) under Ministry of Commerce and Industry, DIPP shall be informed to this effect.
- ii. The failed Contractor shall be debarred from participating in re-tender for that work.
- b) The successful bidder shall submit the Performance Guarantee (PG) in any of the following forms, amounting to 5% of the original contract value and Additional Performance Guarantee as per clause 16(4)(h) (GCC-2022 correction Slip No. 11) in any of the following forms:-
 - i) A deposit of Cash;
 - ii) Irrevocable Bank Guarantee;
 - iii) Insurance Surety Bond as per Annexure-XVII
Note:- In case extension of Date of Completion, selected bidder needs to submit extended Insurance Surety Bond/Fresh Insurance Surety Bond/fresh Performance Security, in any form as given above, before expiry of existing Insurance Surety Bond.
 - iv) Government Securities including State Loan Bonds at 5% below the market value;
 - v) Pay Orders and Demand Drafts tendered by any Scheduled Commercial Bank of India;
 - vi) Guarantee Bonds executed or Deposits Receipts tendered by any Scheduled Commercial Bank of India;
 - vii) Deposit in the Post Office Saving Bank;
 - viii) Deposit in the National Savings Certificates;
 - ix) Twelve years National Defence Certificates;
 - x) Ten years Defence Deposits;
 - xi) National Defence Bonds and
 - xii) Unit Trust Certificates at 5% below market value or at the face value whichever is less. Also, FDR in favour of FA&CAO (free from any encumbrance) may be accepted.
- c) The Performance Guarantee shall be submitted by the successful bidder after the Letter of Acceptance (LOA) has been issued, but before signing of the contract agreement. This P.G. shall be initially valid upto the stipulated date of completion plus 60 days beyond that. In case, the time for completion of work gets extended, the Contractor shall get the validity of P.G. extended to cover such extended time for completion of work plus 60 days.
- d) The value of PG to be submitted by the Contractor is based on original contract value and shall not change due to subsequent variation(s) in the original contract value.
- e) The Performance Guarantee (PG) shall be released after physical completion of the work based on 'Completion Certificate' issued by the competent authority stating that the Contractor has completed the work in all respects satisfactorily.
- f) Whenever the contract is rescinded, the Performance Guarantee already submitted for the contract shall be encashed.
- g) The Engineer shall not make a claim under the Performance Guarantee except for amounts to which the President of India is entitled under the contract (notwithstanding and/or without prejudice to any other provisions in the contract agreement) in the event of:

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- i) Failure by the Contractor to extend the validity of the Performance Guarantee as described herein above, in which event the Engineer may claim the full amount of the Performance Guarantee.
- ii) Failure by the Contractor to pay the President of India any amount due, either as agreed by the Contractor or determined under any of the Clauses/Conditions of the Agreement, within 30 days of the service of notice to this effect by Engineer.
- iii) The Contract being determined or rescinded under clause 62 of these conditions.
- h) If a tender is accepted on the quoted rates of bidder which is below the advertised tender value, and additional performance security shall be submitted by the bidder as below:

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

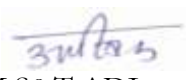
28.0 ENGAGEMENT OF QUALIFIED ENGINEER:

- i) The contractor shall also employ Qualified Graduate Engineer(s) or equivalent, or Qualified Diploma Holder Engineer(s), as prescribed in tender documents.
- ii) In case the contractor fails to employ the Engineer, as aforesaid in para (i), he shall be liable to pay liquidated damages at the rates, as prescribed in tender documents.
- iii) No. of qualified engineers required to be deployed by the contractor for various activities contained in the works contract shall be specified in the tender documents as 'special condition of the contract'.
- iv) Accordingly in terms of provision of clause (i) above, contractor shall also employ following qualified Engineers during the execution of allotted work
 - a) One qualified Graduate Engineer when the cost of work to be executed is Rs.200 lakh and above, and
 - b) One qualified Diploma Holder Engineer when the cost of work to be executed is more than Rs.25 lakh but less than Rs.200 lakh.
- v) Further, in case the contractor fails to employ the qualified Engineer, as aforesaid in para (iv) above, he in terms of provision of clause (ii) above, shall be liable to pay an amount of Rs.40,000/-and Rs.25,000/-for each month or part thereof for the default period for the provision, as contained in para [iv (i)] and [iv (ii)] above respectively.
 - a. The decision of the Engineer -in-charge as to the period of default and Amount shall be final and binding on the Contractor.**
- vi) The contractor during the entire course of the work shall abide by the Minimum Wages Act. 1948, Provisions of Apprentices Act, Provision of Payment of wages Act, Provision of Contract Labour Act, Provision of Workmen's Compensation Act, Provision of Mines Act and all Acts and Laws of the Land.
- vii) The contractor shall not employ men below the age of 18 years.
- viii) The deployed Technical Supervisory staff must be trained in railway signalling system and safety in General from Railway signalling Training institute, with valid certificate. In case the person is not found trained, He will be sent to SBI/STTC for training immediately at the cost of the contractor.

29.0 CONTRACT LABOUR ACT:

- a) The contractor shall observe all the provisions of the Contract Labour (Regulation and Abolition) Act, 1970 and Central Rules 1971 or any statutory modifications or re-engagements thereof for the time being in force and any rules and regulations made their under in respect of all the persons directly or through petty contractors or subcontractors employed by him under this contract and shall indemnify the Railway from and against

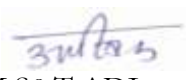
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For & on behalf of the President of India

any claims under the Contract Labour (Regulation and Abolition) Act 1970 and Central Rules 1971 or any further rules and regulations framed thereunder, by or on behalf of any person directly or through petty contractors or subcontractors employed by him or otherwise.

- b) The contractor shall obtain licence from the Licensing Officer specified in the Act, paying necessary licence fee as per section 12 of the Act, 1970 and Rules 26 of the Central Rules, 1971. In every case in which by virtue of section 20(2) and 21(4) of the Contract Labour (Regulation and Abolition) Act, 1970, the Railway is obliged to provide amenities or pay wages to Labour employed by the contractor in executing the work, the Railway will recover from the contractor the expenditure so incurred by the Railway or Wages so paid, and without prejudice to the right of the Railway under section 20(2) and 21(4) of the said Act, the Railway shall be at liberty to recover such amounts or part thereof by deducting it from the security deposit or from any sum due to the Railway by the contractor whether under this or any other contract/contracts.
- c) The attention of the tenderer is drawn to the Contract Labour (Regulation & Abolition) Act, 1970, Contract Labour (Regulation & Abolition) General Rules 1971 and clause 55(2)(i) of the NF Railway Engineering Department Regulation for dy.ccste Tenders and Contract, General Conditions of Contract 2022 and Standard Special Conditions of Contract with latest edition. Successful tenderer(s) shall comply with the provision of the said Act and Rules, the CSTE/Dy.CSTE being the principal employers under the said Act and Rules.
- d) The attention of the contractor is also drawn to the rules of the Inter State Migrant Workmen (Regulation of employment conditions of service) Central rules 1980. The successful tenderer(s) should comply with these rules as per the said Act/1079 (ACF No. 30 of 1979) with Central rules 1980.
- e) Provided that if any dispute arises as to the expenditure incurred by the Railway in the provision of amenities under the said Act, the decision of the Engineer thereon shall be final and binding.
- f) Building and Other Construction Workers Act, 1996 and : The salient features of the Act are as follows:-
- g) It applies to every establishment which employs, or had employed on any day of the preceding twelve months, ten or more building workers in any building or other construction work.
- h) The cess shall be levied and collected @ 1% of the cost of construction incurred by an employer.
- i) For the purpose of levy of cess, cost of construction shall include all expenditure incurred by an employer in connection with the building or other construction work but shall not include:
- j) cost of land; and
- k) any compensation paid or payable to a worker or his kin under the Workmen's Compensation Act, 1923.
- l) Every building worker who has been engaged in any building or other construction work for not less than 90 days during the preceding twelve months is required to be registered as a beneficiary under this Act.
- m) This will be applicable from the date of receipt of notice from the State Labour Commissioner/ Labour Department.
- n) The tenderer/contractor for carrying out any construction work in concern State must get themselves registered from the Registering Officer under Section-7 of the Building and Other Construction Workers Act, 1996 and rules made thereto by the concern State

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Government and submit certificate of Registration issued from the Registering Officer of the concern State Government (Labour Department). For enactment of this Act, the tenderer shall be required to pay cess @ 1% of cost of construction work to be deducted from each bill. Cost of material shall be outside the purview of cess, when supplied under a separate schedule item.

- o) Contractor is to abide by the provisions of Payment of Wages act & Minimum Wages act in terms of clause 54 and 55 of Indian Railways General Condition of Contract. In order to ensure the same, an application has been developed and hosted on website www.shramik-kalyan.indianrailways.gov.in. Contractor shall register his firm/company etc. and upload requisite details of labour and their payment in this portal. These details shall be available in the public domain. The Registration/updating of Portal shall be done as under:
- p) Contractor shall apply for onetime registration of his company/firm etc. in the Shramik-kalyan portal with requisite details subsequent to issue of Letter of Acceptance. Engineer shall approve the contractor's registration in the portal within 7 days of receipt of such request.
- q) Contractor once approved by any Engineer, can create a password with login ID (PAN No.) for subsequent use of the portal for all LoAs issued in his favour.
- r) The contractor once registered on the portal, shall provide details of his Letter of Acceptances (LoA) / Contract Agreements on shramik-kalyan portal within 15 days of issue of any LoA for approval of the concerned engineer. Engineer shall update (if required) and approve the details of LoA filled by the contractor within 7 days of receipt of such request.
- s) After approval of LoA by Engineer, contractor shall fill the salient details of contract labourers engaged in the contract and ensure updating of each wage payment to them on shramik kalyan portal on monthly basis.
- t) It shall be mandatory upon the contractor to ensure correct and prompt uploading of all salient details of engaged contractual labour & payments made thereof after each wage period.
- u) While processing payment of any 'On Account bill' or 'Final bill' or release of 'Advances' or 'Performance Guarantee / Security deposit', contractor shall submit a certificate to the Engineer or Engineer's representatives that "I have uploaded the correct details of contract labourers engaged in connection with this contract and payments made to them during the wage period in Railway's Shramikkalyan portal at 'www.shramikkalyan.indianrailways.gov.in' till ____ Month, ____ Year."

30.0 BONDED LABOUR Act:

The tenderer shall note that the bonded labour system is completely done away with on the Indian Railways including contractor's establishment on the Railway.

31.0 INSURANCE & EPF (Employees Provident Fund):

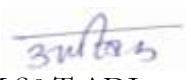
The Contractor shall purchase "All Risk Insurance Policy" of "Man and materials including machinery" with beneficiary as WR. The "All Risk Insurance Policy" shall be operative from the Date of commencement of work for the duration i.e. "Period of Completion of Work"

32.0 MOBILISATION ADVANCE: _ Mobilization Advance is applicable as per para 46.(4) (a) of GCC. (For tender value more than 20 Cr.)

33.0 ASPECT OF VITIATION:

The contract shall not be vitiated by any inadvertent error of any kind in the surveys, information, specification drawing or schedule of quantities. The aspect of vitiating of tender with respect to variation in quantities should be checked and avoided. As a result

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of variations, a contract shall be considered "vitiating" only when, the following percentage variation in contract value between tenderers are noticed to have been exceeded.

SN	Value of Contract	Percentage difference between present Contractor and new L-1 as a result of variation. (percentage shall be calculated with base as the revised contract quantities multiplied by the rates of the present contractor)
1	Small value contracts (Tender Value less than Rs 50 lakh)	10
2	Other than small value contracts (Tender Value equal to or more Rs 50 lakh)	5

33.1 When the percentage difference between present Contractor and new L-1 is noticed as becoming beyond the values specified above, the following action shall be taken.

The Railway administration should immediately examine whether it is practicable to bring in a new agency to carry out the extra quantity of work keeping in view the progress of the work in accordance with the original contract and the nature and lay-out of the work. If it is found that there will be no serious practical difficulty in meeting the additional quantity of work done by another agency, then fresh tenders for the extra quantity may be invited, otherwise negotiating the rate with the existing contractor for arriving at a reasonable rate for the additional quantities of work, may be adopted.

The above shall be regulated as under:

- The case shall be decided by the tender accepting authority (competent for the revised quantity) and shall not be treated as a case of single tender.
- These instructions will be similarly applicable to earning contracts with H-1, H-2 substituted for L-1, L-2 and so on.
- Executives while executing the work shall make all efforts to ensure that no vitiation takes place in normal circumstances. Vitiating should be an exception rather than a routine affair. Efforts should be made to invite bids on the basis of percentage above/below/at par.
- Vitiating should always be computed with respect to the items, rates, quantities and conditions as available at the time of Tender Opening and subsequent changes/ additions by way of new items will not be counted for computing Vitiating. [Ref: RB letter No. 2017/Trans/01/Policy Dated 08.02.2018].

34.0 PRICE VARIATION CLAUSE: (Not applicable)

34.1 The Price quoted by the contractor and accepted by the Railway shall hold good till the completion of the work. The tenderer should quote a firm price without any price variation.

Price Variation is not applicable in this tender, even in the extended period.

Price quoted by the Tenderer shall be firm during the bidder's performance of the contract and not subject to variation on any account. Any bid submitted with an adjustable price quotation will be treated as Non- responsive and rejected.

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35.0 SECURITY DEPOSIT:

[Also refer to Para 16 of GCC Part -II]

- 1.The Security Deposit shall be returned to the contractor after successful completion of the work as certified by the competent authority and 1-year Warranty Period.
- 2.The competent authority shall normally be the authority that is competent to sign the contract. If this competent authority is of the rank lower than JA grade, then a JA grade officer (concerned with the work) should issue the certificate.
- 3.The certificate, inter alia, should mention that the work contract has been satisfactorily completed in all respects and maintenance period or guarantee period or warranty period, if any, is completed satisfactorily and no dues are to be paid / recovered from the contractor and final bill has been passed and no Audit Objection / Vigilance / CBI / SPE / Arbitration case is pending against the contract. And that all the contractual obligations have been fulfilled by the contractor to Railways against the contract concerned.
- 4.Before releasing the Security Deposit and unconditional and unequivocal “No claim certificate” from the contractor concerned should be obtained. Railway shall not be liable to pay any kind of interest for the Bid Security
5. and Security Deposit.

36.0 PERFORMANCE OF CONTRACTOR:

Performance of the contractor will be judged in respect of the following items each carrying 1(one) mark for satisfactory performance and 0(zero) mark for unsatisfactory performance.

- i) Deployment of skilled and unskilled persons before Non Interlocking period. Where applicable.
- ii) Deployment of skilled and unskilled persons during Non-Interlocking period. Where applicable.
- iii) Deployment of supervisors.
- iv) Quality of work.
- v) Timely completion of the work.
- vi) Timely supply of critical items.
- vii) Timely compliance of deficiencies pointed out in joint inspection with open lines.
- viii) Timely submission of completion drawings.
- ix) Correctness of circuit diagrams and installations.
- x) Promptness in correspondence and Joint meeting called.

37.0 ARBITRATION:

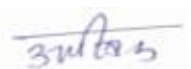
Arbitration and settlement of disputes shall be governed vide clause No. 63,64.1 to 64.7 of General Conditions of Contract 2022 with latest amendments subject to any corrections made prior to the opening of this tender.

38.0 JURISDICTION OF COURT:

The courts of the place from where the acceptance of tender has been issued shall alone have jurisdiction to decide any dispute arising out of or in respect of the contract.

The successful tenderer(s) shall have to sign the contract agreement only at the office from where the acceptance letter has been issued.

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39.0 LAWS GOVERNING THE CONTRACT:

This contract shall be governed by the Laws of India for the time being in force. Irrespective of place of working, the place of performance or place of payment under the contract, the contract shall be deemed to have been made at the place from which the acceptance of the tender has been issued.

40.0 ANNUAL MAINTENANCE CONTRACT: Not Applicable**41.0 SPECIAL CLAUSE:**

Subject as otherwise provided in this contract all notice to be given on behalf of the President of India and all other action to be taken on his behalf may be given or taken on his behalf by the *Sr. Divisional Signal & Telecommunication Engineer (Co), Ahmedabad Div, Western Railway*.

42.0 PENALTY CLAUSE:

If in the opinion of Engineer-in-Charge,

The contractor is not able to follow or execute or comply any instructions by Engineer or Engineer-in-Charge or any of his nominated representative at site, intimated to the contractor or his authorised representative from time to time through letter or email or telephone or through any other mode of communication, within seven days from intimation of such instruction, OR

If progress of the work being executed by the Contractor is not satisfactory.

Penalty may be imposed on the contractor and recovered from running bills at the following rate:

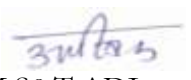
- a. In case of first instance, Penalty of Rs. 500/- (Five hundred) per day will be imposed on the contractor after seven days from intimation of instruction till complete execution or compliance of the same.
- b. In case of second instance, Penalty of Rs. 1000/- (One Thousand) per day will be imposed on the contractor after seven days from intimation of instruction till complete execution or compliance of the same.
- c. In case of third or more instances, Penalty as may be deemed fit by Engineer or Engineer-in-Charge, will be imposed on the contractor.
- d. Imposition of any Penalty amount shall be intimated to the contractor and recovered from running bills.

43.0 LETTER OF CREDIT :

The option of payment through LC has been enabled for all tenders whose value is equal to or greater than Rs.10 Lacs. Hence Letter of Credit is applicable in this Tender which can be availed as per board's letter no. 2018/CE-I/CT/9 dated 04.06.2018.

44.0 Offloading of Works: For Offloading of Work please refer to 40A of GCC 2022 (along with all correction slips).

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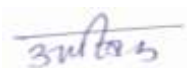
Chapter –IV
GENERAL CONDITIONS OF CONTRACT

General Condition of Contract Issued by Railway Board (Not included, may be downloaded from Railway Website)

“General Conditions of Contract” (GCC) of Western Railway in addition to and/or in part super-session up to latest correction slips” will be applicable.

Booklet of General Conditions of Contract (GCC) Works Hand Book April-2022 edition/latest edition **(with latest amendments)**, may be purchased by Tenderer(s) from Engineering Department of Western Railway at their own cost.

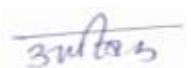
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SECTION – II**Important circulars, Appendix & Annexures.**

S N	Description	No/Link
1	GCC with correction slips	https://indianrailways.gov.in/railwayboard/view_section.jsp?lang=0&id=0,1,304,366,526,2624
2	Appendix 1&2 and the Annexures	Attachments2

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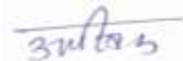

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SECTION - III

4 SCHEDULE FOR WORK

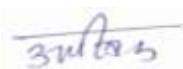
ALSO GIVEN ON IREPS WEBSITE AT DESIGNATED PLACE IN CONNECTION WITH THE ABOVE TENDER NOTICE AND TENDER NO.

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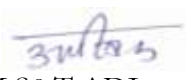
S.N	Description	Unit	Qty	Rate	Amount
Schedule-(A1) SOR Supply item					
1	Design, manufacture and supply of Hot Standby Architecture Electronic Interlocking (EI) system i.e. Distributed or Centralized as per requirement of zonal railway, complete as per RDSO specification and as per attached technical requirement & tentative approved Signalling Plans & Diagrams. This include Central Processing Equipment , Interface Equipment, All Interfacing Relays suitable for EI, In-built event Logger, interconnecting cables and Jumper wires, Required power supply converters for EI equipments, Housing for EI equipments & relay racks , fuses , screw less disconnecting type terminals, fixture mounting arrangements, Industrial grade maintenance Terminals (32" LED or higher size with UPS minimum 1 hr back up with Printer) and other necessary accessories to make the EI system functional as per approved signalling plan. All items shall be supplied as per, per functional bit/station for functioning of EI. Negative variation in functional bit not permitted and for positive variation card wise/Modules etc. breakup should furnish by tenderer. Technical Requirement:1. No of Bits Each station.2. Architecture-Minimum 2 out of 23. Non vital I/O- can be used only for accessories where SIL-4 condition required.4. Station less than 200 routes- RDSO/SPN/192/2019 Ver.2.0 with latest amendment.5.Station greater than 200 routes - RDSO/SPN/203/2011 Ver1 or latest. Supply of 10% Essential spares of the EI equipments subject to minimum one of each type mainly consisting of processor, cards/ module, interface relay, DC-DC Convertors, Moxa switch, OFC Connectors, etc. Item wise detailed break up with unit and quantity to be provided in separate annexure. (The quantity involves 10% spare).Note : Rate does not include cost of VDUs and Embedded PC . Dual operator Industrial Grade VDU panel and Embedded PC will be taken separately.	Per Functional Vital bit	1820	83238.19	151493505.80

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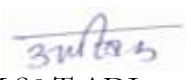
S.N	Description	Unit	Qty	Rate	Amount
2	Portable workstation for Data input & configuration with necessary software/ programs / Accessories, simulation and functional testing, diagnostics, and troubleshooting and commissioning of EI system. A suitable table and chair of a reputed make shall be supplied by the contractor. Note: The specification of the portable workstation shall be as per the Technical specification given in Annexure or higher version as approved by Engineer In-Charge. All the required software should be uploaded Licensed CD should be given along with the software. (Name of the reputed firm and technical specification shall be written in tender documents.)	Set	1	147350.87	147350.87
3	Instruments and Tool Kits required for Trouble Shooting and repair of hardware and software for the EI system should be supplied for stations as per schedule item 1 above. This includes tools required for EI maintenance sorts of crimping, insertion, removal. General purpose tools like screwdrivers, spanners, PCB extractor, temp. Controlled soldering iron, wire cutter, nose pliers, etc. Measuring instruments with carrying case/ holders/ cabinet for technicians/ J.E. for testing, Maintenance and repair at the site). Each set comprises the following: - 1. Crimping tool for all types of special cable assembly used in EI system. 2. Insertion tool for all types of special cable assembly used in EI system. 3 .Removal tool for all types of special cable assembly used in EI system. 4. Digital multimeter (Fluke 111 or better) 5. Steel cabinet/ Almira, Size: 1980mm height, 915 mm width and 485 mm depth (Godrej Make/Jalaram) of good quality to store tools, spare cards and documents.6. Clamp Earth Tester. 7. Clamp Current Meter.	Set	1	130201.33	130201.33

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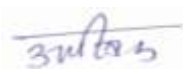
S.N	Description	Unit	Qty	Rate	Amount
4	Supply of Smart Cabinet/Rack for Housing of Various S&T equipments like KLCR, Reset Box, IPS Indication Panel, CA VA Unit for FACS, SP AU for Point Reversal, Crank Handle, Quad Cable Earth Sensing Unit along with Fixing of KLCR (KLCR will be provided by Railway) as per instruction of Site Engineer, Make RITTAL, SANTEL, VERO , PRESIDENT, APC Schneider or similar reputed make	Numbers	8	58030.77	464246.16
5	Rubber Mat for Power Equipment room. (5mm thick).	Kg	300	121.63	36489.00
6	Failure Analysis & Fault Diagnostic software for data logger of 1024 digital inputs /4096 digital inputs.	Set	4	52451.40	209805.60
7	Provision of T-Networking/Dual card E1 to Serial Port (RS-232) convertor suitable to insert in the data logger / FEP euro rack for Networking to the Data Logger equipments. This includes supply of all equipment/ accessories required for the purpose.	Set	4	29692.62	118770.48
8	750 VA Off line UPS with battery backup 3 Hours for Failure Analysis System of reputed make as per Engineer in-charge.	Numbers	4	33329.05	133316.20
9	Cable termination racks as per Drg. no. CSTE 5004, 5005, 5006 complete along with fitting arrangements and also with arrangement for fixing four 8-way terminal strips/ Screw less terminals on each row having 16 such rows. Supply of 8 way terminal strips/ Screw less terminals not covered under this item. Cable termination rack shall be Powder Coated.	Numbers	24	24008.12	576194.88
10	Miniature, Plug-in Type, DC Neutral Line AC Immunized Relay, Style QNA1, 24 V DC, 8F-8B/12F-4B Contact, Code ABDGH/ABDFH Spec: BRS: 931A; IRS S 34; IRS S 23; IRS S 60-78.	Numbers	400	5576.04	2230416.00
11	Key Lock Relay working on 24V DC, AC immunize with different ward combinations (Three ward plates to be supplied with each relay). Key ward shall be specified by engineer incharge as per requirement.	Numbers	50	9743.97	487198.50

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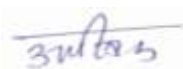
S.N	Description	Unit	Qty	Rate	Amount
12	Flexible cable (Power wire), multi-strand copper conductors cross section (1x16Sq.mm).101 Conductors each diameter 0.45 +/- 0.01 as per IS 694/2010 with insulation thickness of 1.2mm nominal conductor resistance 1.127 Ohms/Km and test parameters as per IRS(S) 76/89 or latest.	Kilometre	5	136063.55	680317.75
13	Flexible cable (Power wire), multi-strand copper conductor's cross section 25 Sq. mm (0.4x196) as per specn. IS 694/2010 with latest amendment, and test parameters as per IRS(S) 76/89.	Kilometre	2	132505.12	265010.24
14	Disconnect Terminal Block, Screw less type, as per RDSO Spec. No. RDSO/SPN/189/2004. With the latest amendments Disconnect Terminal Block, Screw less type, 4-wire front entry (Two input & Two out-put) The color will be decided by Engineer - in - Charge. (Preferably In Blue, Red & Grey Colors in the ratio of 1:2:3). as per RDSO Spec. No. RDSO/SPN/189/2004. With latest amendments. Note: Make to be approved by Railway before supply.	Numbers	10000	58.53	585300.00
15	Disconnect Terminal Block, Screw less type, as per RDSO Spec. No. RDSO/SPN/189/2004. With the latest amendments Supply of End plate 2.5mm/0.091 in thick as per site requirement.	Numbers	410	11.07	4538.70
16	Disconnect Terminal Block, Screw less type, as per RDSO Spec. No. RDSO/SPN/189/2004. With the latest amendments Supply of End Stopper 10mm/0.0394 in width as per site requirement.	Numbers	820	10.86	8905.20
17	Disconnect Terminal Block, Screw less type, as per RDSO Spec. No. RDSO/SPN/189/2004. With the latest amendments Supply of Carrier Rails for above 35mm x 7.5mm, 1mm/0.039 in thickness un-slotted type as per site requirement.	meter	100	113.88	11388.00

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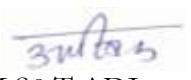
S.N	Description	Unit	Qty	Rate	Amount
18	Fuse auto changeover system for use in Railway Signaling System as per RDSO/SPN/209/2012 rev.1 with latest amendments. One Automatic changeover Unit comprises 32 nos. of external Non-Deteriorating Type or 'G' type fuses from 0.6 Amp to 4 Amp capacities which are in signaling circuits. The system shall have 8 cards with a monitoring arrangement of 4 fuses in one card.	Each Module	80	29743.63	2379490.40
19	Fuse auto changeover system for use in Railway Signaling System as per RDSO/SPN/209/2012 rev.1 with latest amendments. One Automatic changeover Unit comprises 24 nos. of external Non-Deteriorating Type or 'G' type fuses from 4 Amp to 10 Amp capacities which are in signaling circuits. The system shall have 6 cards with a monitoring arrangement of 4 fuses in one card.	Each Module	5	51953.78	259768.90
20	Supply of Standard Tools set.	Set	1	35317.28	35317.28
21	Office Revolving Chair Godrej Make Model No.9u02r Bravo Or Similar of reputed brand will be specified by Engineer in-charge.	Numbers	4	8188.30	32753.20
22	Office table with laminated top with three drawers on left hand side and one locker on the right hand side. Olive brown with duplicate keys. Make: Godrej Model T-9 or Similar of reputed brand will be specified by Engineer incharge.	Numbers	4	16052.54	64210.16
23	Steel Plain Almirah with 4 adjustable slaves Size: 1980mm height, 915 mm width and 485 mm depth. Make: Godrej Storewel Plain Large or Similar of reputed brand will be specified by Engineer in-charge.	Numbers	4	17036.67	68146.68
24	Data logger system for Railway S&T installation As per spec. IRS: S-99 2006 (Amdt-3) or latest. Central Monitoring Unit (Hardware Configuration as per Annexure) with UPS minimum 06 hrs battery backup and required Software tools. This also includes the supply of one no composite computer & printer table (Godrej workstation table) for keeping the Processor module and one no Godrej make operator chair model PCH7001. 1024 digital and 32 analog inputs.	Numbers	4	630312.50	2521250.00

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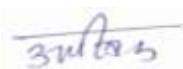
S.N	Description	Unit	Qty	Rate	Amount
25	Non Metallic (FRP) color light signal housing multi-unit type for railway signaling suitable for RE area TWO Aspects. Complete without lenses, lamps and signal transformer as per RDSO DRG. No. SA 23001/A/M Adv. Alt- S and as per SPEC. No. RDSO/SPN/194/2006 (Vol. 1.0) or latest and FRP material as per RDSO SPEC. No. RDSO/SPN/151/1997 or latest.	Numbers	27	28577.72	771598.44
26	Non Metallic (FRP) color light signal housing multi-unit type for railway signaling suitable for RE area THREE Aspects. Complete without lenses, lamps and signal transformer as per RDSO DRG. No. SA 23001/A/M Adv. Alt- S and as per SPEC. No. RDSO/SPN/194/2006 (Vol.1.0) or latest and FRP material as per RDSO SPEC. No. RDSO/SPN/151/1997 or latest.	Numbers	18	29823.91	536830.38
27	Non Metallic (FRP) color light signal housing multi-unit type for railway signalling suitable for RE area FOUR Aspects. Complete without lenses, lamps and signal transformer as per RDSO Drg.No. SA 23001/A/M Adv. Alt- Sand as per SPEC. No. RDSO/SPN/194/2006 (Vol. 1.0) or latest and FRP material as per RDSO SPEC. No. RDSO/SPN/151/1997 or latest.	Numbers	5	33303.86	166519.30
28	Supply of Multi lamp numeric indicator (LED Single/double digit) as per engineer in charge.	Numbers	6	62662.54	375975.24
29	Pad locks Godrej make, Hardened NavTal 7 lever, 65mm Dia with common key or similar product having same feature & technical data.	Numbers	500	196.79	98395.00
30	Supply Color Light Signal Accessories. Supply of signal no plate as per Drg no CSTE Drg No CSTE/6186.	Numbers	150	615.59	92338.50
31	Position Light Shunt Signal Unit Complete with Post (made of GI Pipe of 80 mm Diameter Medium Class IS Spec. No. IS: 1239 Pt. 1/1990) Base, Hood, and Cover, etc. as per Drg. No. SA-23840, Signal Number Plate, suitable for LED Signal Lighting Unit. (Supply of LED Unit is not covered in this item).	Numbers	24	4530.07	108721.68

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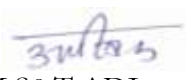
S.N	Description	Unit	Qty	Rate	Amount
32	Position Light Shunt Signal Unit Complete, with offset bracket, hood, Cover etc. as per Drg. No. SA-23840 suitable for LED Signal Lighting Unit. (Supply of LED Unit is not covered in this item).	Numbers	33	3359.74	110871.42
33	SS Location box made of Spl Grade SS 304 of size as per Drg. No. DRM/SG/948 dt. 26.04.2011 (Single app. Case) or latest. Manufacturer's certificate in regard to grade of stainless steel and its protection level shall be submitted at the time of supply.	Numbers	200	59855.98	11971196.00
34	SS Location box made of Spl Grade SS 304 of size as per Drg. No. DRM/SG/945 dtd 03.03.2011 (Half app. Case) or latest. Manufacturer's certificate in regard to grade of stainless steel and its protection level shall be submitted at the time of supply.	Numbers	75	51998.06	3899854.50
35	IS 13410: Glass Reinforced Polyester Sheet Moulding Compounds (SMC) Size of Sheet : 1000x1000x8	Numbers	275	5388.67	1481884.25
36	ARA Terminal blocks with links made of PBT Spec No.s/75/2006 (Rev - 2) with latest amendments and RDSO Drg.No.SA-23741A Alt.4.	Numbers	50000	75.00	3750000.00
37	Double Walled Corrugated (DWC) HDPE Pipe with associated collars etc. as per RDSO Specification No. RDSO/SPN/204/2011 or latest anti-rodent & anti-oxidant and non-flame propagating type in 6 meters straight length and of size 120 mm outer dia, & 103.5 mm inner dia. . One of the following coupling arrangements should also be supplied with each pipe as per the site requirement. 1) Suitable snap fit coupler with rubber 'O-Ring 2) Spacers 3) Tees 4) Bend, 5) Endcap (The total quantity of above items is equal to no. of pipes supplied.) DWC pipe shall be marked at every 1 mtr length in such a way that manufacturer's name, vender name and year of manufacture can be easily identified. Color -Bright Orange; Min Weight = 4kg. Test Check by Consignee & Sample check by JAG officer.	Numbers	300	1912.20	573660.00

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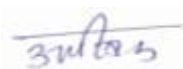
S.N	Description	Unit	Qty	Rate	Amount
38	Medium Class G.I. Pipes to IS: 1239 (Pt.)-2004 or latest; 100mm dia. (int. Dia) 3.65 mm thick or above with coupling. G.I. pipes shall have ISI mark on it and contractor should submit manufacturer's test certificate of G.I. pipes.	Running metre	1500	1170.28	1755420.00
39	Double Rail contact assembly with track side EJB for MSDAC. Each set shall consist of track side Electronic unit, Double rail contact with cable and mounting accessories. This item shall be procured from RDSO approved firm and inspected by RDSO.	Numbers	2	188187.55	376375.10
40	Supply of Tools Kit for Digital Axle Counter (Multi section/Single section). (MSDAC comply to the RDSO spec. No. RDSO/SPN/176/2013/Ver.3 or latest and manufacturer's specification and SSDAC comply to the RDSO/SPN/177/2012, Ver.3 or latest respectively). The tool kit shall be minimum equipped with the following equipments: (i) All mechanical tools shall be of reputed make like Taparia/Bosch etc. (ii) Digital multimeter true RMS type of make Fluke 189 or similar reputed make with probe set - 1 No. (iii) Adjustable torque wrenches 25-135 N/mtr with 13 mm and 19 mm inserts- 1 set (iv) Set of spanners screw drivers and soldering iron - 1 set (v) Dummy wheel - 1 No. (vi) Marking Jig - 1 No. (vii) Adapter card - 1 No. (viii) Extended wired socket to interface with diag No. stic plug - 1 No. (viii) Selector switch on panel base - 1 No. (ix) DAC EC card puller etc.	Set	1	144043.40	144043.40
41	Maintenance Free Earth Electrode of length 3m, including supply of 3 bags of Earth enhancement material for earthling (10KGs /bag) for each electrode & other accessories as per Drg. No. SDO / RDSO/ E&B/001 and RDSO Spec No. RDSO / SPN/197/2008.	Numbers	114	10403.08	1185951.12
42	Supply of Fiber/ SMC/FRP/RCC Earth Chamber.	Numbers	114	649.00	73986.00
43	Earth Electrode as per Drg. No. CSTE / 6091.	Numbers	270	2798.99	755727.30
44	Supply of Power Supply Distribution Box with MCB/Fuse as per specification and requirement given by Site Engineer, Make 3M, SNATEL, ABB	Numbers	4	22300.23	89200.92

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S.N	Description	Unit	Qty	Rate	Amount
45	Miniature, Plug in Type, DC Neutral ,Line Relay QSPA1, 24V DC, Slow to Pick up AC Immunized, 12F-4B/8F-4B Contact, Code ABDEJ Spec:BRS:933A ; IRS S 34 ; IRS S 23;IRS S 60-78.	Number	140	5421.40	758996.00
46	Cartridge fuse block made of PBT as per RDSO Drg No SA-23748 Alt 4 & Spec No IRS S 75/2006 with the latest amendment. The fuse block shall be suitable for round-head type voltage fuses. This also includes the supply of equivalent no of ND type Fuses of 2A capacity as per specification IRS S-78/92.	Numbers	1000	129.41	129410.00
47	PPTC fuse 12V GP 16-400 (2A) for TF/TR circuit, make Raychem, Epcos, Siemens	Numbers	500	10.42	5210.00
48	Supply of DC Track Circuit Accessories as follows :- Track feed battery chargers, 110V AC input, 2 to 6/10 V DC Output; as per Specn. No. IRS.S 89/ 2013 with latest amendments. Charger shall be suitable for charging 80 AH battery.	Numbers	140	3523.27	493257.80
49	Supply of DC Track Circuit Accessories as follows :- Choke Coil for Single Rail Track Circuit on 25 KV 50 Hz AC Electrified Section as per Spec No IRS S 65/1983 with latest amendments.	Numbers	280	2129.53	596268.40
50	Supply of DC Track Circuit Accessories as follows :- Adjustable Track Feed Resistance disc type 30 ohms as per RDSO Drg. No. SA 20166/M (Adv.) with latest amendments (with Phenolic molded base).	Numbers	140	978.46	136984.40
51	Provision of Field accessories of DC Track Circuits Track Lead Junction Boxes as per C.Rly Drg. No.RST 11509 made from fiber glass/SMC/FRP along with terminal blocks.	Numbers	840	1120.65	941346.00
52	Provision of Field accessories of DC Track Circuits GI wire 8 SWG (4mm Dia) suitable for track circuit rail bonding.	Kg	700	68.17	47719.00

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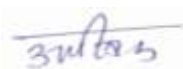
S.N	Description	Unit	Qty	Rate	Amount
53	Provision of Field accessories of DC Track Circuits Channel Pins MS (Galvanized) single groove, 7 mm suitable for 4mm Dia bonding wire as per spec No IRS S 17 & RDSO Drg No. S-69/M.	Numbers	7000	6.04	42280.00
54	Provision of Field accessories of DC Track Circuits PVC jacketed wire rope for Track Lead connections. PVC jacketed wire rope should be of Galvanized steel wire rope 6 mm Dia (6x19 stranded wire with a steel core of 6 mm Dia) sheathed with PVC 2mm wall thickness, the overall thickness is 10 mm. PVC sheath should be made of type 6 compound as per IS 5831 of 1970. Reclaimed or recycled material should not be used.	Kilometre	70	5553.17	388721.90
55	Miniature, Plug in Type, M to C, DC Neutral, Track relay, ACI, Style QTA2, 9 Ohm, 2F-1B contact, Code - FGHKX Spec : BRS :939-A & 966 (Appx-F2) & IRS : S-23, S-23,S-34 & 60.	Numbers	140	4878.90	683046.00
Total of Schedule A1					195485679.38
Schedule -A2-Non SOR Supply item.					
1	Supply of Ferrules of different colour, printing termination details/ functions in different colours as per Railway specification and installation in location box CTR and power board etc. All the materials required for the work shall be supplied by the contractor	Numbers	100000	11.00	1100000.00
2	Supply of Earth Leakage Detector (24 Channels) Level-2 as per RDSO Spec. No. RDSO/SPN/256/2025 Version 2.0.	Numbers	4	430000	1720000.00
3	Supply of Thermo shrinkable joint kit as per RDSO Spec. No. IRS/TC 77/2012 Rev-3 Amd.-1&2 or latest suitable for LC Gate RTSF suitable to 6 quad cable of spec. no. IRS TC -30/2005, Ver-1, Amd-5 or latest.	Numbers	30	3259.00	97770.00
4	Main Signal Post Tubular 140 mm Dia, 5.6 Mtr Length as per IRS: S-6/81 or Latest & RDSO Drg. No. SA-24625 (Advance).	Number	50	10895.41	544770.50
Total of Schedule A2					3462540.50

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S.N	Description	Unit	Qty	Rate	Amount
Schedule - A3-MSDAC					
1	Supply of Multi Section Digital Axle Counter (MSDAC) for mentioned detection Point by the purchased & track Section as per SIP, complete with all accessories, cable required with each track device & card viz. Axle detectors, Track Side Electronics/DAC field units, Central Evaluator (Central Evaluator unit should be housed in a pre-fabricated rack to be supplied along with the system), reset unit, Relay unit, Event Logger & Diagnostic terminals, etc. Required for different Detection Points & Track Sections as per RDSO Specifications No. RDSO/SPN/176/2013, Ver.3 or latest and OEM/ manufacturer's specification and as per Annexures. (Quantity 01 No. = 01 DP) Inspection Authority: RDSO. Note:- As per WR's Policy No 03/2024 Para No. 3.4.2 .e.iv "VDU/Reset box can be used for resetting. At Stations having more than 10 Track sections, the Railway propose to use a separate VDU-based resetting system. Such a VDU-based system if using a PC, it must be industrial grade".	Per Detection Point (DP)	105	338408.07	35532847.35
Total of Schedule-A3					35532847.35
Schedule - A4-Supply of IPS					
1	SMPS based Integrated Power Supply System for Electronic Interlocking as per RDSO/SPN/165/2012 version -3 or latest and Drg No. CSTE 6295 SHT. 2 OF 4. This includes transportation, installation and Commissioning of Integrated Power Supply System.	Numbers	4	1442756.70	5771026.80
Total of Schedule-A4					5771026.80
Total of Schedule-A1+A2+A3+A4					240252094.03
Schedule-C- Telecom Supply item.					
1	Supply of 48 Fibre ARMOURED OPTIC FIBRE CABLE as per RDSO /SPN/TC/110/2020 rev.0 or latest	Kilometre	12	92143.00	1105716.00

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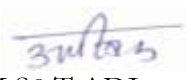
S.N	Description	Unit	Qty	Rate	Amount
2	Supply of 2 x 24 fiber optic fiber splice straight joint enclosure (SJC) complete with all accessories as per RDSO/SPN/TC/ 68/2014, Rev.3 or latest amendment.	Numbers	24	5439.00	130536.00
3	Supply of Pastorate pre-fabricated OFC jointing pits (RCC/PVC) size 0.6mx0.8mx1m. The material shall be supplied as per engineer in charge instructions.	Numbers	24	4835.00	116040.00
4	Supply of HDPE duct 40/33 mm as per RDSO/ SPN/TC/ 45 /2013/Rev. 2.0 with latest amendments as per specification.	Kilometre	12	62884.00	754608.00
5	Supply of Standard 19" Rack Mountable -48V DC Working Add-Drop STM-4 SDH Equipment.	Numbers	2	348072.00	696144.00
6	Supply of 2MB programmable primary digital drop insert multiplexer (webfil) as per RDSO specs. IRS-TC 68/2012 Amd 1 or latest	Numbers	1	193619.00	193619.00
7	Supply of Connectors/Pig Tail/Patch cords/MC/ LIU/ Patch Panels/Switch; with necessary accessories for termination/splicing of OFC cable as per technical specification	Numbers	10	11765.00	117650.00
8	Supply of CLI push button telephones suitable for connection with way side equipment and the system mentioned above as per DOT/TEC specifications	Numbers	20	870.00	17400.00
9	Supply of Single mode Optical Fiber cable 6 cores armoured.	Running metre	6000	30.00	180000.00
10	Supply of 25 mm dia. HDPE pipe (TEC spec. No. G/CDS-08/02, Nov'04 or latest) as per specification.	Running metre	6000	36.00	216000.00
11	Supply of SFTP CAT-6 Cable as per specification.	Running metre	3050	36.00	109800.00
12	Supply of Fiber Distribution management System (FDMS) as per Technical Specification.	Numbers	8	45739.00	365912.00
13	Supply of half RCC pipes of 150mm internal dia (2 meter long) along with collars as per IS No. 458/2003 of NP type (1meter x 2 Nos), as per technical specification.	Numbers	3500	271.00	948500.00
14	Supply of 10 pair/12 pair wago based box and termination of 6 Quad cable as per specification.	Numbers	20	1764.00	35280.00

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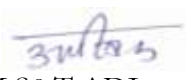
S.N	Description	Unit	Qty	Rate	Amount
15	Supply of Single mode LC-LC/LC-SC/SC-APC optical patch cord as per specification.	Numbers	100	134.35	13435.00
Total of Schedule C					5000640.00
Schedule B1-SOR Supply & Execution item					
1	Supply, Installation and Commissioning of EI VDU (Visual Display Unit, 4K with all suitable accessories Compatible to EI Interlocking in Safe Mode 24x7 at controlling station. The item must comply minimum following specification:- a) Screen Size (Diagonal):- As below b) Resolution :- 4K c) Viewing angle degree: - 178x178 degree d) Brightness :- 500 Nits e) contrast ratio 4000:1 f) Backlit :- Direct LED g) Jack Interface: - HDMI -3 no. 1.2 DP, DVI USB 2.0 -2 no. CI Slot RF In AV In Component In (RCA5 Type) Digital Audio Out RGB In (D-sub 15pin)- PC PC Audio Input RS232C (D-Sub 9pin) RJ45 Stereo mini jack. h) Optical Out :- Available Note: - Screen size will be decided as per instruction of engineer incharge. Approximate Screen size 75 inch	Numbers	8	195500.55	1564004.40
2	Supply and Installation of Modular power supply arrangement for VDU and industrial PC (Embedded PC) with input and output redundancy arrangement and Hot pluggable Modules as per RDSO specification. Make Gallant or similar. One set consists of 1. Input O- ring diode module with potential free -1 No contacts (PFC) for two 110 V DC sources from IPS and single 110 VDC bus Qty 1 No.2. Isolated Inverters (Master / slave) - Input-110 V DC Output: 120 V AC/220V A500VA - 02 Nos.3. Isolated DC-DC convertors- Input : 110 v DC Output : 24 V DC/ 10A,Qty -10No.s4. 3 U SS rack with back panel mother board /front panel power connectors inverter auto change over switch and all required over switch and all required protection circuits (3U height for main rack 132.5mm +/-10% & 1U height for mounting 44.5mm +/- 10%) Qty - 1 No. Make Gallant or similar.	Numbers	4	272862.00	1091448.00
3	Supply & installation of Industrial Grade Embedded PC as per RDSO TAN no. STS/E/TAN/3007 dated 2.11.12 or latest.	Numbers	2	179360.00	358720.00

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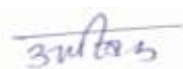
S.N	Description	Unit	Qty	Rate	Amount
4	<p>Installation, wiring, programming, testing and commissioning of EI equipment supplied as per supply item in schedule 'A' including transportation from Consignee's depot to site. The works and materials for installation, wiring, testing and commissioning, grouting, cutting of floors, walls, refilling of the same, re-plastering, required CC/ masonry works, fixing/ placing/ laying of insulated ladders/ casing-capping/ cable trays/ RCC/GI pipes / Cables, termination of cables with lugs/ connectors, painting, / lettering are to be provided/ done by the contractor for the equipments supplied vide Item of Schedule "A" of this contract. This also covers the networking of built in EI Data loggers of all the stations to monitor the system to any other places where desired by Engineer-in-charge. Note: Installation shall be comply with RDSO Technical Advisory Note No STE/E/TAN/3012 dtd. 28.08.2014 or latest. Installation, wiring, programming, testing and commissioning of Operator VDU in Hot stand-by with Redundancy. Any Equipments/cards/Modules required for Hot stand-by with Redundancy shall be supplied & Installed by the Contractor. This also include supply of one no Godrej make operator chair model PCH7001 or better , one no. of composite computer & printer table (Godrej work station table or better) for keeping MT , one no Godrej make operator chair model PCH7001 or better. Termination of indoor/ PIJF cables in relay room on relays, tag blocks, CT racks as per approved wiring diagram including alterations/ modifications as required at site. Soldering to be done at all required termination. Dressing/ lacing of wiring shall be done neatly with help of dressing thread / plastic self-lock strip of suitable size. The tools/ equipments/ materials/ simulation boards required for testing shall be supplied / fabricated by contractor. This included replacement of modules/ cards/ LEDs/ equipments going defective during testing. Necessary power supply boards with required capacity plugs, sockets, surge & lightning protection boxes</p>	Station	1	1252392.00	1252392.00

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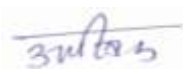
S.N	Description	Unit	Qty	Rate	Amount
	shall be supplied and installed by the contractor. 230V supply shall be arranged by Railways. In case supplies are required to be extended, from Power room / relay room then same shall be extended by the contractor with his own materials such as 1X16 sq. mm wires, cables, lugs, RCC/GI pipes, insulated ladders etc. After ST/LT testing, Factory Acceptance Tests (FAT) & Square Sheet testing system should be fault free while submitting to Railways, otherwise suitable necessary action can be taken by Engineer-in-charge With Object Controller				
5	Factory Acceptance Test / site acceptance test(FAT/SAT).	Station	1	570471.00	570471.00
6	Earthing of EI equipment, relay racks and Power equipment etc. to be done along with the supply of all requisite materials. Earthing shall be in the form of Ring Earth conforming to RDSO specification No. RDSO/SPN/197/2008 (with a min. of 6 maintenance free earth electrodes) & RDSO Drawing issued under Railway Board letter No. 2010/Sig./SGF/EI (Ansaldo) Dated 22.06.11, made using copper rings with earth resistance less than 1 ohm. The earthing shall be maintenance free & earth enhancement compound should be used. The ring earth shall be connected to copper flat of size 25x3 mm in the relay room and IPS room. This copper flat shall be fixed on the wall to the entire breadth of the Relay room and IPS room as an earth bus bar and all earth connections shall be taken from it. A, B, C, & D class protection shall be provided for all EI equipment. Note: - This will also cover the earthing& necessary protection of EI equipment as per details given in the scope of work of Special Condition of Contract and other requirement given in Chapter of tender document & Pre-commissioning check list of EI system.	Job	4	133269.46	533077.84

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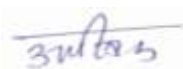
S.N	Description	Unit	Qty	Rate	Amount
7	Training of Officers for installation, Commissioning, Testing, and Repairs & Trouble shooting of the EI system. (Hard copies of training material/ course modules to be given to each participant).	Man-Days	5	1133.48	5667.40
8	Training of Technician/ Jr. Engineer for installation, Commissioning, Testing, Repairs & Troubleshooting alteration, design of EI system, as per details given in Special Condition of Contract. (Hard copies of training manuals/ course module to be given to each participant).	Man-Days	20	1219.30	24386.00
9	Design of SIP and submission of copy (three copy) for approval. More than four line station	Set	1	96149.76	96149.76
10	Design of ST/LT/TOC/Square sheet/RCC (Three copy) for approval. More than four line station	Set	1	36186.00	36186.00
11	Design of Circuit Diagrams consisting Wiring/ Logic diagram, contact analysis, fuse detail, Input/output bit chart, VDU diagram, Interface etc. submission of Three paper copies for approval More than 100 routes	Per Route	350	3702.00	1295700.00
12	Design of Miscellaneous diagram consist of Floor Plan of Relay Room , Battery Room, Power Equipment Room, Data logger room, Power Supply Diagrams along with power supply calculation, Earthing Diagram, Power panel diagram, IPS wiring diagram , Auto change over diagram , Block circuit wiring diagram, Digital Axle counter wiring diagram and all other relevant drawings (Three copy) for approval. More than four line station	Station	1	7697.00	7697.00
13	Design of Cable Route Plan submission of Three paper copies for approval.	Set	1	9873.00	9873.00
14	Supply of Completion SIP in Original tracing along with Auto CAD copy in Pen Drive and Six set copies after approval. More than four line station	Numbers	1	970.00	970.00
15	Supply of completions ST/LT/TOC in original tracing along with AutoCAD copies in Pen Drive and six set copies after approval. More than four line station	Numbers	1	1044.00	1044.00

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S.N	Description	Unit	Qty	Rate	Amount
16	Supply of Circuit Diagrams consisting wiring/Logic diagram, contact analysis, fuse detail, Input/output bit chart, VDU diagram, Interface in AutoCAD in Pen Drive and Six set of Copies after approval More than four line station	Station	1	35003.00	35003.00
17	Supply of diagrams consist of Floor Plan of Relay Room, Battery Room, Power Equipment Room, Data logger room, Power Supply Diagrams along with power supply calculation, Earthing Diagram, Power panel diagram, IPS wiring diagram, Auto change over diagram, Block circuit wiring diagram, Digital Axle counter wiring diagram and all other relevant drawing in original tracing along with AutoCAD in Pen Drive and six set copies after approval. More than four line station.	Station	1	3721.00	3721.00
18	Supply of final Cable Route Plan as per laid cable duly measured at every 30m clearly indicating distance of laid cable from fixed point of reference & indicating all track crossings and tail cables in original tracing along with Auto CAD in Pen Drive and Six set copies after approval.	Station	1	1580.00	1580.00
19	Design and supply of cable courage plan, location particulars, Cable termination rack particulars, cable meggering report, earth resistance particulars, Traction bonding diagram, 1/2 wire count sheet and any other drawing in AutoCAD in A3/A4 size. The contractor shall initially supply 3 sets of circuits complete for approval of Railways. Railways will return one set to the contractor duly approved with alterations/corrections, if any. The contractor shall incorporate Railway's alterations/corrections in the tracings without any deviation and submit all tracings complete in all respects to the Railways along with PENDRIVE & 4 sets of final approved drawings. This includes designing of cable coreage plan based upon I.P in consultation with engineer-in-charge For small/medium yards. Station	Station	1	63698.00	63698.00

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 For & on behalf of the President of India

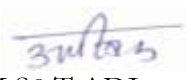
S.N	Description	Unit	Qty	Rate	Amount
20	Design and supply SWR Diagram on standard tracing paper of 95grams for each station. Corrected version of SWR plans after checked & approved by Rly's 25 Ferro copies will be supply for each of the plans. For stations having more than 4 lines	Numbers	1	53506.00	53506.00
21	Preparation of SWR including supply of SWR booklets (25 Nos. per station). For stations having more than 4 lines	Numbers	1	82691.00	82691.00
22	Preparation of Cable Route Plan of buried S & T Cables using Radio Detector 8200 GS or Similar model GPS Model,DGSP and Drone for Per Trench per Km. For existing cables as per the instruction of Engineer in-charge. Submission of Drone Reportin Hard Copy 1 set and DGPS output in KMZ File format.(Unit = Per Trench KM) In Yard Section	Kilometre	18	60413.00	1087434.00
23	Installation, wiring, testing, and commissioning of Data logger complete along with accessories using Contractors' own wiring & fixing materials as per the following configuration. (It includes loading of NETWORKING software, networking of data logger, installation of FEP & Fault diagnosis system). The requisite communication cable/channel for networking will be arranged by Railway. 1024 digital & 32 analog inputs/ 4096 digital & 32 analog inputs. (All the Indoor & outdoor gears wiring in cataloged included in this along with laying 230V supply cable from IPS room,12 core cable from auto change over for monitoring supplied.) Note :- It included logging of all gears as per site incharge.	Set	4	21176.39	84705.56
24	Commissioning of T-Networking suitable for Networking to the existing Data Logger equipments. This includes supply of all equipment / accessories required for the purpose.	Set	4	6111.47	24445.88
25	Installation of Cable Termination Racks Assembly complete including wall supports, scaffolding, 8 way/ARA terminals /Screw less connectors, Tag blocks & other necessary accessories etc. The work shall be done as per approved plan, extant practice on WR & the instruction of Rly engineer at site.	Numbers	24	9184.44	220426.56

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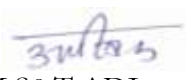
S.N	Description	Unit	Qty	Rate	Amount
26	Fixing of KLCR and its without this includes supply of MS sheet box for fixing of KLCR relay along with push button etc. (KLCR will be supplied by Railway).	Numbers	50	5186.41	259320.50
27	Fixing & wiring of QNA1 / QNA1K relays for GPR Circuit in apparatus case as per Standard practice. Fixing and wiring material shall be supplied by the contactor.	Numbers	400	366.58	146632.00
28	Installation wiring testing and commissioning of Fuse changeover system (FACS). This includes the provision of a common Buzzer & indication at the ASM Room & ESM Duty Room and the painting of fuse details. This also includes the fabrication of a frame for the installation of FACS at the Station/ LC gate where the installation of relay racks is not feasible.	Each Module	85	915.42	77810.70
29	Supply, installation, fixing, wiring, testing and commissioning of Common Audio-Visual Alarm Unit (CAVA)-for Fuse Auto Changeover system as per RDSO specification RDSO/SPN/209/2012 Rev. 2.0 or latest.	Numbers	16	2565.61	41049.76
30	Foundation, Erection & Installation of CLS without route indicator. (Additional Fixing of Route Indicator is given in Item No. 24) Erection of CLS Post with base and signal unit on top or on OFF set Bracket, fixing of front and back staging, ladder and guards with contractor's own brackets and fixing materials. This also includes erection of auxiliary signals like calling on, shunt signal if any... The work shall be done as per instructions of Rly engineer at site. It also includes provision & fixing of maintenance platform as per design given by Engineer -In-Charge at site. It also includes supply of padlock for signal units and cable termination box. X' arms to be provided by the contractor till the signals are introduced. The Item includes cutting of Signal post if required by Site In charge. 2/3/4 aspect signal unit mounted directly on signal post	Numbers	50	8338.74	416937.00

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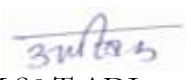
S.N	Description	Unit	Qty	Rate	Amount
31	Painting of two coats of synthetic enamel paint over one coat of primer on the following after scraping & cleaning surface wherever necessary with contractor's own supply of paints. Wherever required contractor shall apply coating of epoxy paint also as per instructions of site-in-charge. Epoxy paint will be supplied by Railways. NOTE: - The paint and primer should be from Asian Paints/ Nerolac / Dulux / Berger. The primer / enamel paints (Aluminum synthetic, black enamel, brilliant white and yellow) will be as per (IS 5660 of 1970) / (IS 2932 of 1974). Main Signal Post with Signal Units, Surface base and complete fittings as per Western Railways standard practice.	Numbers	50	382.17	19108.50
32	Painting of two coats of synthetic enamel paint over one coat of primer on the following after scraping & cleaning surface wherever necessary with contractor's own supply of paints. Wherever required contractor shall apply coating of epoxy paint also as per instructions of site-in-charge. Epoxy paint will be supplied by Railways. NOTE: - The paint and primer should be from Asian Paints/ Nerolac / Dulux / Berger. The primer / enamel paints (Aluminum synthetic, black enamel, brilliant white and yellow) will be as per (IS 5660 of 1970) / (IS 2932 of 1974). Shunt signal post with signal unit, surface base as per Western Railway's Standard Practice	Numbers	57	231.00	13167.00
33	Painting of two coats of synthetic enamel paint over one coat of primer on the following after scraping & cleaning surface wherever necessary with contractor's own supply of paints. Wherever required contractor shall apply coating of epoxy paint also as per instructions of site-in-charge. Epoxy paint will be supplied by Railways. NOTE: - The paint and primer should be from Asian Paints/ Nerolac / Dulux / Berger. The primer / enamel paints (Aluminum synthetic, black enamel, brilliant white and yellow) will be as per (IS 5660 of 1970) / (IS 2932 of 1974). Track Lead Junction Box. (Black enamel outside only).	Numbers	600	65.78	39468.00

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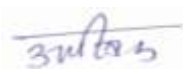
S.N	Description	Unit	Qty	Rate	Amount
34	Painting of two coats of synthetic enamel paint over one coat of primer on the following after scraping & cleaning surface wherever necessary with contractor's own supply of paints. Wherever required contractor shall apply coating of epoxy paint also as per instructions of site-in-charge. Epoxy paint will be supplied by Railways. NOTE: - The paint and primer should be from Asian Paints/ Nerolac / Dulux / Berger. The primer / enamel paints (Aluminum synthetic, black enamel, brilliant white and yellow) will be as per (IS 5660 of 1970) / (IS 2932 of 1974). Point Machine with ground connections complete (Point Machine with Black enamel only outside and ground connections with Red Oxide).	Numbers	50	112.56	5628.00
35	Fabrication and fixing of 'A' Marker (Drg No. CSTE/6180), 'AG' Marker (Drg No. CSTE/6181), 'P' Marker (Drg No. CSTE/6182), Arrow Marker (Drg No. CSTE/6183), 'G' Marker (Drg No. CSTE/6184), 'C' Marker (Drg No. CSTE/6185). Marker disk on signals as per standard practice All material required for this work shall be supplied by Contractor.	Set	150	1280.82	192123.00
36	Supply & Fixing of Stop Board, Block section limit Board, goods warning board and all other boards with contractors own material. The work shall be done as per instruction of Rly. Engineer incharge as per IRSEM.	Numbers	15	5732.92	85993.80
37	Foundation, Erection & Installation of Shunt Signal. Excavation and Casting of foundation for Shunt Signal as per Drg. No. CSTE/6090 with Contractor's own materials including Cement and Anchor Bolts of Standard Size. The required scaffolding, Ferma etc. for Casting of foundation will have to be brought by the Contractor at his own cost.	Numbers	24	6139.76	147354.24
38	Foundation, Erection & Installation of Shunt Signal. Erection of Position Light Shunt signal with Base, Post, and Signal unit. Wiring & Fixing of Number Plate .The work shall be done as per instructions of Rly engineer at site.	Numbers	24	4169.37	100064.88

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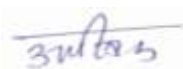
S.N	Description	Unit	Qty	Rate	Amount
39	Erection of Position Light shunt signal on Offset bracket on main signal.	Numbers	33	1930.03	63690.99
40	Excavation and Casting of Apparatus Case foundation with contractor's own materials including cement and anchor bolts of standard size. The required scaffolding Ferma etc. for Casting of foundation will have to be brought by the contractor at his own cost Single Case as per Drg No SK 748 or CSTE/5074 or SS Location	Numbers	200	7162.63	1432526.00
41	Excavation and Casting of Apparatus Case foundation with contractor's own materials including cement and anchor bolts of standard size. The required scaffolding Ferma etc. for Casting of foundation will have to be brought by the contractor at his own cost Half Case as per Drg No SK 747 or CSTE/5074 or SS Location.	Numbers	75	5487.86	411589.50
42	Fabrication and fixing of SMC sheet in location box by providing all fixtures as per Railway Drawing including fixing of PVC coated string rods at the back side for cable support with contractor's own materials. The work shall be done as per Drg and arrangement similar to SK 783-1/2. With latest alterations & as per instructions of Rly engineer at site. Note: SMC sheet will be taken in place of phenolic laminated sheet. Single Case	Numbers	200	2445.36	489072.00
43	Fabrication and fixing of SMC sheet in location box by providing all fixtures as per Railway Drawing including fixing of PVC coated string rods at the back side for cable support with contractor's own materials. The work shall be done as per Drg and arrangement similar to SK 783-1/2. With latest alterations & as per instructions of Rly engineer at site. Note: SMC sheet will be taken in place of phenolic laminated sheet. Half Case	Numbers	75	777.78	58333.50
44	Preparation and fixing of location box board on 03 mm ACP sheet with size 12 x 18 size A3 for location box including pasting of printed/ painted vinyl sheet and lamination (printing/painting of location detail on vinyl sheet covered in schedule item separately).	Numbers	500	239.73	119865.00

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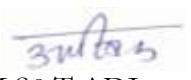
S.N	Description	Unit	Qty	Rate	Amount
45	Fixing of ARA Terminals /Screw less connectors and fuse blocks on phenolic laminated sheets and fixing by stainless steel/brass nuts & bolts. This includes provision of two additional holes on the board on either side for cable conductor entry.	Numbers	50000	22.75	1137500.00
46	Termination of outdoor cables, main cables laid in location boxes, Cable termination rack etc. at both ends on ARA terminal or on 8 way terminals or on screw less connectors. Both ends of a cable core terminated shall be counted as one terminal. This includes all associated works of pulling out the cable from underground, peeling off insulation, dressing of cable core supported on sting rod with contractor's own material. The work shall be done as per instructions of Rly engineer at site.	Numbers	100000	23.70	2370000.00
47	Cement concrete work for miscellaneous items in the ratio 1: 3: 6. Item includes excavation, ramming, curing and plastering with cement & sand mixture (aggregate not exceeding 3.8 cm.) (Aggregate cement & sand to be supplied by the contractor).	Cum	30	6259.00	187770.00
48	Installation of Apparatus Cases with miniature 'E' type lock on CC foundation. This includes filling of location foundations with river bed sand and plastering on top of the sand. 'E' Type lock will be provided by Railway. Single Case	Numbers	200	1076.29	215258.00
49	Installation of Apparatus Cases with miniature 'E' type lock on CC foundation. This includes filling of location foundations with river bed sand and plastering on top of the sand. 'E' Type lock will be provided by Railway. Half Case	Numbers	75	657.15	49286.25

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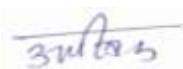
S.N	Description	Unit	Qty	Rate	Amount
50	Excavation of cable trench as per cable route plan, 1 Mtr. deep and of 0.3 Mtr. to 0.6 Mtr wide advised by Engineer-in-charge alongside the track in normal (all type) soil/strata, conforming to distances as per cable route plan and refilling. This work includes clearing of route from bushes etc., covering of cable laid in trench by loose soil for a layer of 50mm thickness approximately before covering by bricks. The work shall be done as per the extant practice on Western Railway and instructions of Railway Engineer at site. In case 1m depth of trench is not achievable due to site conditions, specific approval of JA grade officer will be required for each site where trench depth of 1m is not possible. Without the approval of JA Grade officer, no payment for trenching will be made for trench depth less than 1m.	Cum	6000	839.00	5034000.00
51	Horizontal direction drilling/boring without damage of surface road using Auger Machine. The bore shall be 150 mm Dia & shall be done at the depth of minimum 1200 mm from the ground level. The ground level shall be considered ignoring the bank height of the bank of the road. The length of the bore shall be minimum 4 Mtr long. The HDD with or without HDPE pipe as per direction of Engineer In charge. Note: HDPE pipe supply is taken as separate item. This item also includes cable laying (HDD boring).	Metre	4500	1187.85	5345325.00
52	Laying of S&T Cables of various cores/ pairs/ quads in trenches/ GI pipes/ RCC pipes/ DWC pipes/ Trucking. This also includes laying of cables in track crossings & road crossings. Item includes provision of labels of colored plastic adhesive tapes or any other identifiable material on each cable to give the cable number at each G.P.(Cables will be daggered before and after its laying by contractor under supervision of Railway Representative and he will submit the meggering report of each testing). Length of the cable laid includes the length of the cable coiled for termination purposes.	Running metre	459500	9.37	4305515.00

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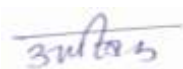
S.N	Description	Unit	Qty	Rate	Amount
53	Provision of AUTOMATIC FIRE DETECTION & ALARM SYSTEM as per RDSO/SPN/217/2021 version 2 or latest For Signalling System (Four Line station)	Station	4	914505.14	3658020.56
54	Placing of DWC/RCC pipes along with collars in trenches at places of track and road crossings, platform cuttings etc. also for straight cable laying. (Cable laying is covered separately.)	Running metre	1800	33.22	59796.00
55	Laying and fixing of Medium class GI pipes 100 mm Dia (4.5 mm thickness) as per IS 1239 (Part 1) 2004 or latest with coupling on culverts/bridges, perforated at a distance of 20 cm or less with 10 mm Dia hole, or at any other locations as decided by Site Engineer. The GI pipe is to be filled with chattered compound. It includes supply of all material required for fi Xing arrangement. Contractor will also supply flexible/corrugated HDPE pipe at the end of GI pipe to protect the cables from sharp edges and sudden bends. The e laying and fi Xing to be done as per RDSO drawings No. SDO/cable laying/011 and SDO/cable laying/012, issued vide RDSO document No. RDSO/SI/G/2010 Version 1.1 dated 04.02.2014, or latest.	Running metre	1500	418.07	627105.00
56	Digging of cable pit (min2x2x1m) as per instruction of Site Engineer, supplying and filling of sand before and after coiling the cables, covering top of the cable pit with stones and providing brick masonry on all four sides of the cable pit and plastering thereafter.	Numbers	10	12567.83	125678.30
57	Supply and installation of RCC cable route marker engraved and painted on both side along the route every 50mm and route diversion as per Drg. No 4014/00/CC4 or latest/ Stone marker.	Numbers	460	412.66	189823.60

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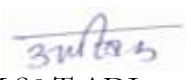
S.N	Description	Unit	Qty	Rate	Amount
58	Supply and fixing of polyolefin cable channel (Injection Moulded Plastic cable Duct) of size width 100/200 mm, height 155/230 internal/external, length 1 meter produced of polyolefin with fire, protection class K-1 in accordance with DIN 53438 part all for laying signaling/telecom cables, channel attachable to each other with male female swallowtail connectors and having suitable detachable cover including supply of allfixing materials like Brackets, etc. , as per RDSO STS/E/cable laying Precise Vol-IV and as per technical specifications	Metre	3500	1900.08	6650280.00
59	Installation of track device (double rail contact) including digging of trench, track crossing, laying of anti-rodent, anti-oxidant & non-flame propagating type Double Walled Corrugated (DWC) pipe as per IS- 14930 part- I or II or latest and all other accessories as per site requirement to be for laying of transmitter and receiver cable. The item also includes installation of EJB / Track side Electronics including foundation & earthing as per OEM's guidelines and Technical requirement & specification with their own material. NOTE: Installation / programming / configuration / commissioning of Axle counter equipment to be carried out in accordance with latest guidelines issued by Railways/RDSO preferably by Authorized representative of OEM.	Per Detection Point (DP)	105	15648.00	1643040.00

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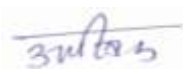
S.N	Description	Unit	Qty	Rate	Amount
60	Installation of Central Evaluator of axle Counter, wiring from CT rack to Central Evaluator, installation and wiring of the reset box, LV box (if required) and associated power supply wiring. This includes supply of shielded cable of required conductor size for wiring between CT rack to evaluator rack, all other wires, power supply cable and wiring materials. The power supply cable from power room to Central Evaluator should not be less than 10 sq.mm PVC wire. Earthing as per OEM's guidelines & specification with their own material. This also includes painting and writing work on evaluator as per site requirement. NOTE: Installation /programming / configuration / commissioning of Axle counter equipment to be carried out in accordance with latest guidelines issued by Railways/ RDSO preferably by Authorised representative of OEM.	Numbers	10	11984.00	119840.00
61	Installation of Maintenance Free Earth Electrode for Maintenance Free Earth spec of RDSO/SPN/197/2008.	Numbers	114	1456.79	166074.06
62	Installation of Earth Electrode including MS flat for clamp etc. and connection to signalling equipments, lever frames, apparatus cases, signal, relay rack, block instrument, etc. as per technical specification given. This item includes digging of pit in earth 3 M deep & fixing earth electrode pipe, casting of cement concrete enclosure & cover as per RDSO/SPN/ 197/2016. Soil treatment to be done as per std. practice. This item includes provision of MS Flat, Earth lead wires and Soldering of lead wires. The other end of the wire is to be connected to block equipment, power equipment, cable sheath, and signals etc. as per site requirements. 7strand GI wire shall be used as earth lead wire. Supply of earth electrode is covered in other Item').	Numbers	270	5579.77	1506537.90

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S.N	Description	Unit	Qty	Rate	Amount
63	Fixing of Electrical Point Machine on the extended sleepers at points as per std. practice and as per RDSO Drg No. SA 91 51-52 or 9710 or 9161 as per section of rails used. Item includes fixing switch extension bracket, providing insulation for switch extension bracket, fixing ground connection, adjusting opening of the switches and adjusting the point machine with crank handle. The item also includes : (i) Complete material for installation like groundconnections, switch extension brackets, point insulation material, I pipes, wiring materials, various fixing nuts & bolts including castle nuts, spring washers (ii) All smithy & fitting works required at site for complete installation. (iii) Installation of gauge tie plate & providing insulation for gauge tie plate (Insulation in William Stretcher Bar will be Provide by Railways). (iv) Wiring inside the point machine, insertion and termination of tail cable in point machine and junction boxes / location box /cable hut as per extent practice on WR and the instruction of Railway Engineer at site. (v) Supply and fixing of suitable size GI pipes with flange for taking cable into point machine. Note ; The ground connections shall be suitable to the Point Machines as specified by Engineer-in-charge and shall be suitable to the point lay out i.e. 60 Kg. / 52 Kg / 90R as per yard layout. Electrical Point Machine and M-6 / Screw less terminals will be supplied by Railways / covered in Schedule separately.	Numbers	50	22354.53	1117726.50

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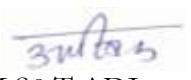
S.N	Description	Unit	Qty	Rate	Amount
64	Installation, Wiring and testing of Integrated Power Supply System. This includes power distribution connection to bus bars and relay racks in the room with contractor's own wiring materials and fabrication and fixing of AC/DC power distribution board made on 8mm thick SMC sheets or any standard make with connections suitable for 32 A. Wiring to be done considering site requirement, depending upon the load with suitable wires, lugs & glands as per instructions of Engineer-in-charge. The work includes installation of ELD's, fixing & wiring of change over switch(program switch) for selection of DG set supply (DG1 & DG2) and wiring of change over switch (program switch) for selection of mains or DG supply. This item also includes supply & fixing of ladder along the wall for carrying power supply wires/cables from IPS room to Relay room/power room etc. Any masonry work required will be carried out by contactors own material. For Station	Numbers	4	109014.46	436057.84
65	Fixing and wiring of DC track circuit equipments i.e. track feed charger, resistance, track relay, battery, PPTC fuses etc., in the Apparatus Case and battery box as per standard practice. Termination of tail cable on M 6 / Screw less terminals WAGO or FINOLEX or similar approved make terminals/ fuse blocks / HRC fuse. Item includes testing /commissioning of track circuit. Complete wiring material (including PPTC fuses) which are not covered in Schedule will be supplied by contractor. (Supply of Track feed battery charger, track feed battery, resistances & 'B' type choke & Track relays will be supplied by Railways / covered in Schedule separately).	Per Track Circuit	140	6667.03	933384.20

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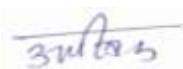
S.N	Description	Unit	Qty	Rate	Amount
66	Installation of DC track circuits covering points zones also. The item includes provision of continuity bonds of seven strand PVC jacketed wire/ GI wire 8 SWG on rail joints after drilling bond-hole of 7.0/7.1/7.2mm Dia (double bond with sleeves and rail clips are to be provided at each rail joint), insertion of insulated block joint, fixing of Track lead Junction box on MS angle two numbers of size 40X40X5 mm 1200 mm length for track feed/ jumper / track relay ends of track CCTs (as per double TLJB arrangements) and also for fixing jumper cables as per insulation diagram WR Drg No. CSTE/6055 and standard practice, making rail connections through suitable insulated sleeves from Track lead Junction box at TF, jumper & TR end with seven strand PVC jacketed wire /GI wire 8 SWG, rail clips for fixing bond wire on the TLJB as per standard practice, termination of tail cables on bootleg terminals etc. TF/TR wiring shall be fixed on the suitable arrangement on PRC sleepers with the help of hooks. Hooks shall be provided on PRC sleepers with the help of suitable steel bracket. This item also includes fixing & supply of channel pins etc. The item also includes supply of MS angles/ trestles, GI wire 8 SWG / seven strand PVC jacketed wire, hooks, rail clips etc.	set	140	7328.72	1026020.80
67	Charging of Lead Acid Batteries (2V 80AH) with contractors' own battery grade sulphuric acid and distilled water with a minimum of two charge discharge cycles, installation of charged batteries in groups & their connection & wiring. The work shall be done as per the extant practice of W. Rly & instruction of the Engineer-in-charge. Detailed measurements of initial charging shall be recorded jointly by the contractor & Rly's site-in-charge.	Numbers	420	376.10	157962.00

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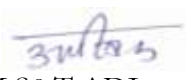
S.N	Description	Unit	Qty	Rate	Amount
68	Provision of bonding with GI wire 4mm Dia (8 SWG) for track jumper & fish plate joints bonds. This will include drilling of 7.0/7.1/7.2 mm Dia holes in rails (4 Nos.) and provision of two jumpers for each bond, clipping of bonds etc. with contractors own tools as per instruction of Rly. Engineer at site	Set	560	185.47	103863.20
69	Erection, Fitting and Rail connection of Track Lead Junction Box on two supports (M.S.angle) with contractor's fixing material and PVC jacketed wire for track lead connection including angles of size 40 x 40 x 5 mm 1200 mm length This will include drilling of holes for track lead/side connections on rail. The work shall be done as per Drg. No. S&T/Const./JHS/T 115 & instructions of Rly engineer at site.	Numbers	840	1391.31	1168700.40
Total of Schedule-B1					50959296.38
Schedule- B2-Non SOR Supply & Execution item.					
1	Excavation and Casting of foundation for main signal post as per CSTE/3122 (WR) with contractor's own materials including cement and anchor bolts of standard size. The required scaffolding Ferma etc. for Casting of foundation will have to be brought by the contractor at his own cost.	Numbers	50	12887.18	644359.00
2	Supply and installation of Panel cum/VDU Block Instrument table complete as per Drg. No. CSTE/6093. It includes any modification to it if required by Engineer-in-charge.	Numbers	4	70557.53	282230.12
3	Fabrication and supply of premium quality foam sheet 5mm thickness with vinyl printing of approximately size 2.5 feet x 4.5 feet with framing. This item also includes lettering/numbering of termination particulars, CTR contact details in relay room, relay hut, goomties etc. For CTR Board	Numbers	24	2450.00	58800.00
4	Installation & commissioning of Earth Leakage Detector (24 Nos. Channel) as per RDSO Spec. No. RDSO/SPN/256/2025 Version 2.0 or Latest.	Numbers	4	55333.33	221333.32

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Date


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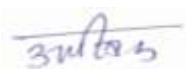
S.N	Description	Unit	Qty	Rate	Amount
5	Installation of Thermo-shrinkable joining kits for making (a) straight through joints without transformers for 6 quad Jelly filled cable (b) Derivation joint without transformer for 6 quad jelly filled cable, and (c) Straight Through joint without transformer for 10 Pr/20Pr. PIJF cables and construction of Brick chamber for protection of joints with contractor's all materials as per railway Drg. where VF transformers are not required. All the materials required for the work are to be arranged by the contractor himself at his own cost except Thermo shrinkable jointing kit which is already covered in supply portion of the tender. After jointing the cable through test such as insulation test, Continuity cable losses etc. to be carried out jointly with the Railway Engineer. If any defect or any damage observed during jointing, the contractor should be redo the joint free of cost.	Numbers	30	1295.00	38850.00
6	Supply & Installation of Fencing Work	Kg	100	284.88	28488.00
7	Complete painting and varnishing work of all S&T Gears at a station not covered else where in the schedule. This includes painting of signal posts and fittings, apparatus cases, point machines, junction boxes, signal machine, rail post etc. Complete	Station	2	35308.22	70616.44
8	Supply and fixing of cable truff of 4inch x 4 inch	Metre	500	339.92	169960.00
9	Complete painting and varnishing work of all S&T Gears	Station	1	34501.88	34501.88
10	Maintenes Booklet / Cards	Each	500	63.74	31870.00
11	Supply, Installation, testing & commissioning of Current referencing device, half effect based isolated series DC current measurement with hardware RS-485 with 5V power supply and 1ft USB-B type cable at distributed EI.	Numbers	4	37211.89	148847.56
12	Supply, Installation, testing & commissioning of Remont data Acquisition device with 3 digit 7-segment LCD Display with 5v Power supply and 1ft USB-B type cable at distributed EI.	Numbers	4	35067.48	140269.92

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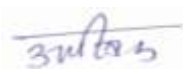
S.N	Description	Unit	Qty	Rate	Amount
13	Supply and placing of trunking and capping (RCC duct) of 300mm width & 700mm length as per DRG No. SDO/Cable laying/007(annexure-10 or latest) as detailed in document no. RDSO/SI/G/2010 Ver.1.1 or latest on guidelines on signalling cable laying.	Number	12800	1190.92	15243776.00
Total of Schedule B2					17113902.24
Total of Schedule B1+B2					68073198.62
Schedule -D -Telecom Execution item.					
1	Installation of Pastorate pre-fabricated OFC jointing pits (RCC/PVC) size 0.6mx0.8mx1m. The material shall be supplied as per engineer in charge instructions.	Numbers	24	1241.00	29784.00
2	Splicing of laid under above items OFC cable and making the splice joint in dust free environment with contractor's own equipments and labour. Straight joint enclosure (SJC) is covered under schedule 'A' remaining all required materials, tools, plants shall be arranged by the contractor. splicing shall be started from one end and each splicing shall be monitored after splicing and after closing the enclosure for all the fibers from one central location by contractor's engineer with his own OTDR and optic Talk set with railway engineer , trace for the fibers shall be taken and signed jointly, if any fibred splice shows high loss/lossy event, the same shall be redone before completion of splicing work. The splice loss shall be as per the policy/technical circulars issued by the railways from time to time.	Numbers	24	8320.00	199680.00
3	Transportation and Laying of HDPE pipe as per approved cable route plan in the excavated trench, taking due care while transporting and laying the same in the trenches or other protective works. Both the end of duct should be sealed with end plugs before laying and should remain sealed till blowing is done.	Kilometre	12	6851.00	82212.00

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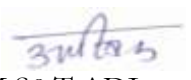
S.N	Description	Unit	Qty	Rate	Amount
4	Blowing of OFC through HDPE duct & protective work (elicited in above item) already provided. Where it is not feasible to blow OFC due to curves, road/track crossings, bridges or for any other reason, OFC shall be drawn or laid manually as per standard procedure. All the equipments and machinery required shall be arranged by the contractor at his own cost. In case OFC is to be laid adopting 'Direct in trench' method then this item shall be paid as per accepted rate of item no.(6 h) of this schedule. OFC and HDPE pipe shall be supplied by the railway	Kilometre	12	12349.00	148188.00
5	Installation of Connectors/Pig Tail/Patch cords/ MC/LIU/ Patch Panels/Switch; with necessary accessories for termination/splicing of OFC cable	Numbers	10	3054.00	30540.00
6	Supply, installation, testing and commissioning of ONT unit with 1PON port & 4 RJ45 Giga Ethernet,802. each, 1 xPOTS (RJ 11)Ports, 300mbpsWi-Fi, VLAN,IGMP, VoIP, QoS,auto-discovery/Link detection,Dual Band as per technical specification.	Numbers	10	8107.00	81070.00
7	Supply, Installation and commissioning of 4 PON port OLT as per technical specification	Numbers	5	97297.00	486485.00
8	Supply, Installation and commissioning of 2.5 Gig PON Port SFP Module for OLT as per technical specification	Numbers	10	6874.00	68740.00
9	Supply, installation, testing and commissioning of wall mount Out door 1:4 Optical splitter for PON with fusion Splicing termination as per technical specification/site requirement.	Numbers	10	4628.00	46280.00
10	Laying of OFC/Power cable/CAT-6/ PVC cable through HDPE pipe/casing capping/fall ceiling with laying/fixing of HDPE pipe/casing capping for interfacing various components and system integration. All materials for jointing and termination of power cable as per site requirement are to be supplied by contractor	Metre	9000	21.00	189000.00

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S.N	Description	Unit	Qty	Rate	Amount
11	Installation of fiber distribution management system (Supply covered Above) with all installation materials, restoration wall etc. to original condition , splicing and termination of 2 X 24 fiber cable (With all contractor's materials), routing/dressing fibers as per directions of Engineer in-charge	Numbers	8	3157.00	25256.00
12	Laying of half round RCC pipe after laying the cables in the trenches. (Cable laying is covered separately	Running metre	7290	20.00	145800.00
13	Installation of 10 pair/12 pair wago based box and termination of 6 Quad cable as per specification	Numbers	20	477.00	9540.00
Total of Schedule D					1542575.00
Total of Schedule A1+A2+A3+A4+C+B1+B2+D					314868507.65

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Section IV

Technical Specification

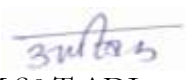
TECHNICAL REQUIREMENTS & SPECIFICATIONS FOR SIGNALING AND TELECOM ITEMS**(Work are to be executed as per the latest work policy of 03/2024 dated 15.04.2024)**

All information available in this section is for general understanding. Railways have tried to give complete information but some vital parameters may not be available in below furnished information. Bidders are required to survey the site, visit the office to understand requirements of the project. All information provided in this section shall be cross verified from site before taking final decision by Bidder on any technical & operational matters related to Bid.

TECHNICAL REQUIREMENTS & SPECIFICATIONS**TECHNICAL SPECIFICATIONS AND REQUIREMENT OF SCHEDULE**

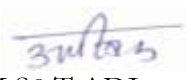
Item No.	Description
Schedule – A1- SOR Supply item	
1.	The work involves Design, Manufacture, Supply, Installation, Programming, Testing & Commissioning of Electronic Interlocking (EI) System conforming to Signaling Plans and RDSO specifications for Electronic Interlocking No. RDSO/SPN/192/2019 Version No: 2.0 with latest amendments as per scope of works given in Para 3.1, 3.2 & 3.3 of SCC, Schedule of Material & Works and Technical Requirements & Specifications given below:
1.1	General Requirement for circuit designing:
A	The circuit shall be designed as per the approved Signaling Plan, Table of Control.
B	The contractor shall also submit one copy of the square sheet. All the aspects covered in G&SR, SEM of Indian Railways shall be taken care off while designing the circuit. Contractor shall ask from the Railways about the design practice to be followed (British Practice). Whether EI or Relay Interlocking, the circuit shall be designed as per the practice of Route setting type interlocking.
C	While designing the circuit it shall be kept in mind until and otherwise advised by the Railways engineer in charge, one front contact of each and every relay shall be kept spare for data logger purposes.
D	For EI system the circuit shall be designed considering the interfacing relays in mind.
1.2	Technical Specifications for Circuit Designing
1.2.1	Interlocking and circuit Requirements
	The requirements given in IRS: S36-87, Signal Engineering Manual (of Indian Railway) for Route-setting type Relay interlocking with IDF shall be complied. Any other design practice followed by Western Railway as per Headquarter policy circular should also be incorporated. In addition, the following requirements shall also be met.
1.2.2	General Circuit requirements.
A	The internal circuits shall be suitably protected and electrically isolated from external circuits.
B	Signal circuits shall be so designed as to prevent display of signal aspect less restrictive than intended and also prevent setting up of unsafe conditions when signaling supply voltage or frequency fluctuates or the supply is restored following a failure of normal supply.

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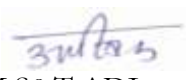
C	Cross-over between tracks and diamond crossings shall be provided with protection that will eliminate the possibility of a train, engine or wagon occupying the cross-over or diamond and signal on either track displaying other than the most restrictive indication.
D	Relays controlling double yellow and green aspects of signals shall have arrangements of cutting in relays similar to track repeater relay, where such relays are fed from outside locations.
F	With reference to Para 4.3.6 of IRS:S-36-87, Emergency full route / sub-route cancellation in case of track circuit failures with sealing facility and emergency operation for throwing signal to danger, shall be provided along with non-re-settable counters for recording the operation. It shall be ensured that the counter shall record the operation, just before the operation is affected. Emergency sub-route cancellation facility as referred in Para 4.3.6 of IRS: S-36-87 shall be provided. Also facility for Emergency operation of points (under track relay down condition) shall be provided which shall be counted with mechanical counters.
G	The circuit shall be so made that the vital operation of throwing back the cleared signal to the least restrictive aspect shall be possible and the circuits shall be so prepared to effect the operation, even if its original supply fuse is blown off.
H	The lamp lighting circuit for all lamps including shunt signals shall be on double cutting principle.
I	Care should be taken during design of circuits and installation, so as to contain repercussion of any failure to the minimum possible gears and equipments. The contractor shall be bound to amend his design, if the Railways suggest another design for achieving the above.
J	Initiation and cancellation circuits should be drawn as per geographical layout of the yard.
1.2.3	Route setting and interlocking circuit:
A	Setting of conflicting routes shall not be permitted.
B	Necessary back locking of the intended route shall become effective, when all concerned points have taken up their final position and route is set and approach track has been occupied and the signal is cleared or the 'Calling on' is lit.
C	Approach and time locking shall be provided for all controlled signals. Approach and time locking shall be continuously effective from the pre-determined point in rear of the signal concerned. Dead approach locking should be provided where no suitable track circuits are available in rear of the signal.
D	Time release for approach locking / dead approach locking shall be provided so that 2 minutes shall lapse after the signal has been put to 'ON' position, before the route can be released.
E	The overlaps shall set only when the last sub-route leading towards the overlap is set.
1.2.4	Route Release circuits:
A	Route release circuit shall be designed on the principle of automatic route release by the passage of the train as provided in (Para 4.3.1 of IRS: S-36-87).
B	Circuits which release routes for interlocking shall be controlled by slow operating relays, so that any inadvertent operation of track circuit due to a surge or other factors will not result in the release of the routes or the interlocking.
C	All circuits shall be designed in such a way, that the relays picked up for clearing any signal are proved to have de-energized or normalized before the route or route section restored to normal. Also it shall not be possible to re-clear the route, if the entire route or part of the route set is not released.

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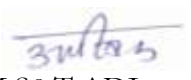
D	It shall be possible to release a route in emergency after suitable time delay, with the approach track occupied, provided the train has not passed the signal during the time interval. The operation of the time relay shall commence upon the operator restoring the signal or calling on signal to 'ON'. The emergency releases must be provided with electric counter.
E	It should be possible to release an entire route, including overlap portion, in emergency when all controlling track circuits (except berthing track circuit) are clear. This emergency operation should be counted in an electric counter.
F	It should be possible to release a complete route or individual sub-routes with controlling track circuits energized / de-energized with a separate emergency button which should be kept sealed. Such emergency operations will be counted on a separate electric counter.
G	The delay time as mentioned in Para 3.10.5.1 of IRS Specification no.S-36-87 shall be between 60 to 120 secs. Facility shall be provided to set the delay time in between 60 to 120 seconds.
H	It shall not be possible to cancel any set route or cancel any portions of the route by any button other than the signal button used to clear the route initially and by the emergency full route cancellation button.
I	Overlap points shall be released only after the lapse of two minutes of occupation and clearance of the last point track circuit on the route. On cancellation, the overlap points may be released simultaneously along with the main route.
1.2.5	Signal Control Circuits:
A	Signal control circuits should be so designed that after train passes a signal, the signal will resume 'ON' aspect and it will not clear again unless the conditions for clearing the signal are available.
B	Signal should not get clear unless - <ul style="list-style-type: none"> i) All points in the route isolation and overlap are correctly set and locked. ii) Concerned route is set and locked. iii) All tracks are clear not only up to the next signal ahead but also 120 mtr. beyond the next stop signal. iv) All concerned level crossing gates in the path and in the overlap are closed against the Road traffic. v) All other conditions of taking off signal as specified in GR & SR are fulfilled.
	In Junction Route Indicators the Yellow aspect of the signal applicable to the diverging route must be displayed only after proving that at least 3 out of 5 junction indicator bulbs/ route LED lamps are lit. The signal shall be maintained at, or returned to 'ON' aspect in case 3 or more lamps / route LED lamps are not lit.
C	<p>Calling on Signal</p> <p>Calling on signal shall be capable of being taken 'OFF' only when the main signal cannot be taken 'OFF' due to track relay not picking up due to any reason and the train has come to a stop and has been waiting for a pre-determined time of 2 minutes. The 'Calling on' signal shall comply with all conditions governing the clearing of a main signal, except the following:-</p> <p>Calling on signal should be capable of being taken 'OFF' without setting of points in the overlap.</p> <ul style="list-style-type: none"> i) Every operation to take 'OFF' the 'Calling on' signal shall be counted by an electric counter on the panel. ii) 'Calling on' signal shall be restored to 'ON' automatically when the track circuit immediately in rear of the stop signal below which the 'Calling on' signal is placed is

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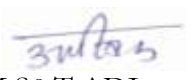
	<p>cleared by the train or all sub-routes over which the 'Calling on' reads have been released after the passage of the train. It shall not assume the 'OFF' aspect again unless the process of clearing it is repeated.</p> <p>iii) Calling on signal shall display miniature Yellow light for the 'OFF' aspect and shall show no light for 'ON' aspect.</p> <p>iv) The calling-on signals shall use the LED signal lamp as per latest RDSO specification RDSO/SPN/153/2011 (Rev.4.1) or latest with latest amendments.</p>
D	<p>Shunt Permitted Indicator (SPI)</p> <p>Shunt Permitted Indicators are used to facilitate un-interrupted shunting over a fixed route. It shall display no light both by day and night in each direction when shunting is prohibited. It shall exhibit an illuminated Yellow diagonal cross both by day and night in both directions when shunting is permitted.</p> <p>NOTE: In spite of what is contained in these specifications, if the Railway's desire anything in deviation to this, the same shall be conveyed to the contractor in writing and it shall be binding on the contractor to implement the same.</p>
E	<p>Main Signal Lighting:</p> <p>(I) Main Signal light supply shall be alternating current at 110 Volts 50 Hz. LED Signal Lamps as per RDSO specification RDSO/SPN/153/2011 (Rev 4.1) or latest with latest amendments shall be used for 'OFF' & 'ON' aspects respectively.</p> <p>(II) The circuits shall be so designed that -</p> <p>i) The failure of a lamp of a colour light signal shall always cause the signal to display a more restrictive aspect than intended. (Cascading).</p> <p>ii) In the event of a lamp of the Red aspect of the signal failing, the signal next in rear shall display a Red aspect. (Red lamp protection).</p>
F	All other requirements as per the manual of instructions for installation of S&T equipment on 25 KV 50 C/s electrified sections should be followed.
1.2.6	Point Interlocking, Control circuits and Interlocking of Emergency Point Crank Handle.
A	Individual operation of points shall be possible only when the interlocking is free and relevant point track circuit / circuits are / are clear. Individual operation of points shall also be possible when the interlocking is free and relevant point track circuit / circuits are / are de-energized. Such emergency operation of a point should be counted in an electric counter. This emergency point operation button should be provided with sealing facility.
B	Cross - over's will be operated by separate point machines, one at each end. The detection of setting and locking of the points at the two ends shall be connected in series, after the operation circuit is cut-off. The initiation of points should be staggered to avoid excessive drain on the power equipment.
C	Point circuitry shall ensure that once a point movement is initiated, it must be completed even if the controlling track circuit / circuits fail in the meantime.
D	While changing a point control relay or unit, if the points in the field and the control relay or unit in the relay room are not in correspondence, no operation of point should occur. To bring the point to the corresponding position, the operator shall have to operate the respective push button as in the case of individual operation of points.
E	The NX key for the point / points should be released from the control panel. The key lock relay to be used for this purpose, shall be located in the cabin ASM's office / in the field.
F	In case of power failure to EI/RR/PI systems, it should be possible to release crank handle through mechanical ECH as approved by CSTE/WR.

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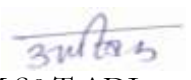
1.2.7	Interlocking of Crank Handles:
	The grouping of crank handles for point operation is as detailed in the Signaling plan. There shall be two common controlling buttons for each group for releasing control / taking back control.
1.2.8	Cross Protection:
	For all external circuits, cross protection with double cutting shall be provided to prevent unsafe operation due to a cross, break or both.
2.0	Specifications and Requirements for the supply of EI:
	The EI system shall be supplied as per the RDSO specifications numbered RDSO/SPN/192/2019 Version No: 2.0 with latest amendments . The system shall be supplied with the following minimum requirements. IN FUTURE THE WORK OF TPWS/ETCS MAY BE SANCTIONED; HENCE THE SYSTEM SHALL HAVE CAPABILITY TO INCORPORATE THESE FEATURES OF TPWS/ETCS NOW OR IN FUTURE WITH SOME OR NO ADDITIONAL INTERFACES AND SOFTWARE UPGRADATION.
A	ARCHITECTURE
I	The system shall be a microprocessor-based system with the configurations of redundancy as approved by the RDSO.
II	The system shall be supplied with Hot Standby Architecture complete as per RDSO Specification No. RDSO/SPN/192/2019 Version No: 2.0 with latest amendments .
III	The interlocking logic shall be implemented at the centralized unit only.
IV	The system shall be capable of working with the CCIP and /or with DUAL VDU.
V	It shall be possible to synchronize the RTC of EI system with external sources like Data Logger, STM equipments or any other source of clock.
VI	It should have space to expand minimum 15% I/O cards.
B	CONTROL TERMINALS WITH DUAL VDU
	Following minimum requirements shall be fulfilled by the Maintenance and control Terminals.
I	Embedded Industrial grade fan less PC with latest PC configuration shall be provided and suitable Compact Flash Disc memory space shall be catered for the backup requirements and inbuilt power backup .
II	Shall have Ethernet/OFC communication with the CIU either on copper cable or OFC, with suitable isolators.
III	It shall have key board/mouse operation.
IV	It shall be possible to disable the menus in case of emergency.
V	It shall synchronize the counters/clocks all the time and particularly when resuming from a failure.
VI	Shall support buzzers/alarms as in CCIP.
VII	The VDU shall be of 4K resolution, the minimum size of monitor shall be 55 inches minimum for Operator Console & 42 inches minimum for Maintenance Console.
VIII	A flashing indication shall be provided on the VDU to indicate healthy condition of the main system, communication channel.
IX	The current position/ status of various field equipments and track circuits shall be displayed on the VDU using different colors/ symbols.
X	Three dot markers in Red, Blue & Green colours respectively shall also be displayed prominently at conspicuous location on the VDU terminal to indicate that the colour monitor is healthy and all the three colours (Red, Blue & Green) are present in right proportion.

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XI	The control terminal shall work with 230V \pm 10%, 50Hz AC power supply, for which an UPS of adequate capacity shall be supplied along with the system.
XII	If VDU and CIU are in separate building (which is generally the case), then they shall be interfaced using FOM (Fiber Optic Modem) to protect against lightning and surges. Railway shall allow only underground OFC for its use if the CIU and VDU are in different rooms. Patch-cords shall be allowed only in case where both are in the same room.
XIII	Operation of signal gear shall not be possible simultaneously through both VDUs. In case of VDU's used in Hot standby, VDU switch over is required in the following conditions: a) VDU to EI communication failure. b) VDU computer failure. c) VDU monitors failure. d) One VDU is not controllable due to mouse failure.
XIV	To circumvent any unauthorized operation inadvertently, logic equivalent to Stop collar function of Panel system to be incorporated through software.
XV	As per WR's policy circular no. 192/2015 dtd:- 10.03.2015 Separate Key cum counter box with 2 VDUs in E.I to be provided. Key cum counter box shall be framed as per CSTE drg No. 6229 and comprises SM & RRB keys, Eight electromechanical counter (ERRB, EBPU, RRB, UOS, COGGB, COCYZ, ECHYZ) , one spare and ammeter with bypass switch.
XVI	MT consisting of a standard PC with printer from a reputed manufacturer (as per instructions of Railway's engineer in-charge) shall be provided for following Operations: Display of the current status of points, signals, controls etc. of the yard. ii) Storage of minimum one-month data or 10,00,000 events. iii) Display of recorded events and iv) Data transfer to floppy, CD, flash memory or any other storage media. v) Transfer of recorded events to external data logger.
C	WARRANTY (to be read along with clause 20.0 of Chapter-3)
I	The EI system including its equipment and subsystems shall be under warranty for One years from the date of commissioning of complete system.
II	During the Warranty period the contractor should make availability of service engineers of RDSO approved manufacturer of EI and spares at mutually agreed locations to achieve system availability. The maintenance engineer of the contractor will visit all the stations at least twice in a month for ensuring implementation of maintenance plan and attend to any fault on the systems. No separate charges shall be paid for visit of engineers for attending to faults and repairs or towards the supply of spare parts.
III	During the Warranty period, the system with standby must be maintained in such a manner that both the systems shall be available normally. In case of failure of one system, urgent & immediate action shall be taken to rectify that fault within 24 hours. In case there is complete breakdown of interlocking provided at a station, the contractor must arrange for rectification of the same within 3 hours, failing which a penalty of Rs. 5000/- per station for every additional hours will be imposed. The contractor must keep adequate spares as well as skilled manpower so that defects if any are rectified promptly.
D	INFORMATION TO BE FURNISHED BY THE RAILWAY
i	Tentative SIP with the tender. (Attached)
ii	CCIP is not required, VDU shall be DUAL VDU of requirements as defined in 2.0-B above.
iii	Signal Lamp lighting circuits shall use 110 Volts AC supply to light the LED units.

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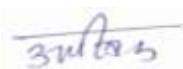
	iv	Size of VDU is as defined in 2.0-B above.				
	v	The point operation shall be on 110 Volt DC. Point circuit shall be implemented with QL1 relays and QBCA relays.				
	vi	All the cables connecting to the outdoor gears shall be either 1.5 sq mm copper signaling cables or quad cables as approved for the Railways.				
	Details Breakup of Item No. 1 of Schedule “A1” “Supply of Materials of Electronic Interlocking”					
	Sr. No.	Description of items	Units	Qty.	Base Rate	Total Amount
	A	Main EI System				
	B	Supply of 10% Essential spare of the EI equipments				
	Total Amount (Awarded cost)					
	This has to be submitted by successful bidder after issue of LOA and before signing of Contract Agreement.					
2.	SPECIFICATION FOR Portable Work Station for Data input & Configuration etc.					
	Configuration:-HP or Lenovo or Asus or Dell or sony or similar make. The higher version of the systems may be accepted with the approval of Engineer-in-charge.					
	a	Processor	:	Intel ® Core™ i9-8500U or latest with Intel®		
	b	Processor family	:	10 th Generation Intel ® Core™ i9 processor		
	c	Graphics	:	NVIDIA® GeForce® MX130(2GB DDR5 dedicated)		
	d	Memo	:	16GB DDR4 or latest RAM Expandable to 32GB.		
	e	Hard Disk	:	1TB HDD 5400rpm SATA.		
	f	Screen	:	15.6” LED		
	g	Keyboard	:	With extra Wireless keyboard.		
	h	Mouse	:	With extra Wireless Optical Mouse.		
	i	Ports	:	USB Ports, HDMI Port, Type-C port, 1AC power, RJ-45, Headphone/microphone combo, Memory Card.		
	j	DVD ROM	:	16X DVD Super multi drive.		
	k	Operating	:	Windows 10 Pro 64 or latest		
	l	Net Working facility	:	10/100/1000 on board integrated N/w port, Hybrid TV tuner card, 6 in one card reader, etc.		
	m	Warranty	:	36 months.		
	n	Software	:	MS Office Latest, Antivirus for Three years.		
	o	Printer	:	HP make Laser Colour Printer, Fax & Scanner along with 3 Sets(Black & Colours) of Spare toner besides supplied with printer. (Model to be approved by Engineer-In-Charge)		
	p	Hard Disk Drive	:	2.5” Portable HDD having capacity 1 TB or Higher with USB 3.0I/F and back up S/W		
3.	Tool Kits for EI					
	Instruments and Tool Kits required for Trouble Shooting and repair of hardware and software for EI					

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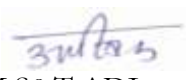
	system should be supplied for stations as per schedule item 1 above. (This includes tools required for EI maintenance sorts of crimping, insertion, removal, general purpose tools like screw drivers, spanners, PCB extractor, temp. controlled soldering iron, wire cutter, nose pliers etc. & measuring instruments with carrying case/holders/cabinet for technicians/J.E. for testing, Maintenance and repair at site). Each set comprises of the following:- *Crimping tool for all types of special cable assembly used in EI system. *Insertion tool for all types of special cable assembly used in EI system. * Removal tool for all types of special cable assembly used in EI system * Digital multimeter (Fluke 111 or better) * Steel cabinet/Almira, Size: 1980mm height, 915mm width and 485mm depth (Godrej Make/Neelkamal/Jalaram) of good quality of store tool, spare cards and documents. (Godrej Make/Neelkamal/Jalaram) *Digital Earth Tester. *Clamp Current Meter.
4.	Supply of Smart Cabinet/Rack for Housing of Various S&T equipments like KLCR, Reset Box, IPS Indication Panel, CA VA Unit for FACS, SP AU for Point Reversal, Crank Handle, Quad Cable Earth Sensing Unit along with Fixing of KLCR (KLCR will be provided by Railway) as per instruction of Site Engineer, Make RITTAL, SANTEL, VERO , PRESIDENT, APC Schneider or similar reputed make
5.	Rubber Mat for Power Equipment room. (5mm thick).
6.	Failure Analysis & Fault Diagnostic software for data logger of 1024 digital inputs /4096 digital inputs.
7.	Provision of T-Networking/Dual card E1 to Serial Port (RS-232) convertor suitable to insert in the data logger / FEP euro rack for Networking to the Data Logger equipments. This includes supply of all equipment/ accessories required for the purpose.
8.	750 VA Off line UPS with battery backup 3 Hours for Failure Analysis System of reputed make as per Engineer in-charge.
9.	<u>Specifications and Requirements for CT Racks:</u> The racks shall be supplied as per the CSTE's drawings. The drawings to be followed are: CSTE-6028 for relay rack, CSTE-5004, 5005, 5006 for CT rack. In addition to the drawing parameters following shall also be complied.
	Until and unless it is specifically mentioned, all the racks shall be supplied with IDF arrangements.
	IF THE CONTRCATOR WISH TO SUPPLY RELAYS OF M/s INTEGRA MAKE, THEN HE SHALL SUPPLY ADDITIONAL QUANTITY OF RELAY RACKS (1.2 TIMES QUANTITY IN THE SCHEDULE) AT HIS OWN COST AS THESE RELAYS REQUIRE MORE SPACE.
	The Scaffolding should include 20% extra (with minimum 2 Relay Rack positions).
	The G type fuse base and links in the fuse strips shall be of any of the following make MALNAD or RAPID or SYSTEM ENGINEERING WORKS.
	The value and ratings of resistances and capacitors shall be advised at the time of installation. The capacitors shall be RESCON make Long Life grade.
	All the cables shall be guided on proper ladders. All these ladders shall be supplied by the contractor.
	The cable supporting L-angles on the back side of the Relay Racks shall be of sufficient length (minimum 250 mm) to cover all the cables.
	For all the relay racks each row shall be supplied with one string rod (properly insulated by sleeves) for the cable dressings.
	All the guide plates for major groups shall be supplied by the contractor.
	The CT Racks shall also be supplied with proper size string rods to support cables at the back side.
10,11,45&56	<u>Relays:</u> In addition to the requirements of RDSO specification, the following requirements shall also be met.
A	The circuits should be developed using signal groups suitable for LED signal lamps, point groups, route groups, and shunt groups etc. which are already approved and are in use on the Railways.
B	The circuitry should take care detecting of the contingency of the contact welding.

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C	D.C. relays used in signal cabin, when controlled from an outside source, shall be wired on double cutting principle coupled with cross protection. Similarly D.C. relays located in the field shall be wired on double cutting principle coupled with cross protection.
D	A.C. immunized relays shall be used for controlling outside functions.
E	Relay shall be furnished with contact arrangements as approved by the Railway.
F	In case of A.C. Electrified areas, the Relays shall be in conformity with R.E. Manual.
G	The relays or relay groups shall be repeated suitable illuminated indicators the proper functioning or otherwise of each unit which it controls. This facility will be useful to the maintainer at a glance in the relay room to have a clear picture of the functioning of each unit at any stage. Such indications shall also include indications for failure or functions which are incomplete.
H	Where feasible all relays except track relays, shall have 10% of working contacts as spare subject to a minimum of one front and one back to facilitate addition and alteration to the circuits at a later date. Extra space to accommodate repeater relays shall be provided in the relay rack to cater for future expansion.
I	THE BASE PLATES FOR ALL THE RELAYS AND GROUPS SHOULD ALSO BE PURCHASED FROM THE OEM OF RELAY/GROUP.
12&13	<u>Specifications and Requirements for Indoor cables & Power Wire of Copper (multi-strand):</u> All the power wires shall be supplied as per IS specification no. IS 2465/1984 & IS 694/1990 with test parameters as per IRS (S) 76/89. All types of Indoor cables shall be supplied as per the specifications IRS (S) 76/89 (Amendment 3) or latest with latest amendments.
14 to 17.	Terminals Terminals shall be disconnecting terminal block as and as per RDSO spec RDSO/SPN/189/2004 Terminals shall be mounted so that they cannot be turned in base of frame to which applied. They shall be properly insulated from each other and other metallic parts. Terminals supporting the fixed parts of front and back contacts of relays shall be fastened in their supports, so as to preclude adjustments of any kind without first breaking the seal of the relay. Terminals shall be installed in an accessible position and neatly arranged on terminal boards in housings. The terminal blocks provided at the locations and other places shall be provided with suitable links to facilitate isolation of the two sides of the circuits which are connected through the terminal links.
18.	Fuse auto changeover system for use in Railway Signaling System as per RDSO/SPN/209/2012 rev.1 with latest amendments. One Automatic changeover Unit comprises 32 nos. of external Non-Deteriorating Type or 'G' type fuses from 0.6 Amp to 4 Amp capacities which are in signaling circuits. The system shall have 8 cards with a monitoring arrangement of 4 fuses in one card.
19.	Fuse auto changeover system for use in Railway Signaling System as per RDSO/SPN/209/2012 rev.1 with latest amendments. One Automatic changeover Unit comprises 24 nos. of external Non-Deteriorating Type or 'G' type fuses from 4 Amp to 10 Amp capacities which are in signaling circuits. The system shall have 6 cards with a monitoring arrangement of 4 fuses in one card.
20.	Signal maintainer's tool bag with tools.

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1.	DESCRIPTION	QTY	MAKE
2.	Combination pliers 200mm (Insulated)	1 No.	Good Quality
3.	Insulated Stripping pliers 150mm	1 No.	Good Quality
4.	Insulated Nose Pliers 160mm	2 No.	Good Quality
5.	Insulated side cutting pliers 150mm	1 No.	Good Quality
6.	Hammer with handle 300 gm	1 No.	Good Quality
7.	Adjustable Screw Wrench 5"	1 No.	Good Quality
8.	Adjustable Screw Wrench 8"	1 No.	Good Quality
9.	Adjustable Screw Wrench 12"	1 No.	Good Quality
10.	Auto Adjustable Wrench 09 to 32 mm	1 No.	Good Quality
11.	Double ended spanner 30/32	1 No.	Good Quality
12.	Double ended spanner 32/36	1 No.	Good Quality
13.	Spanner Open end 36 mm	1 No.	Good Quality
14.	Spanner Open End 50 mm	1 No.	Good Quality
15.	Ring Spanner 17/18 mm	1 No.	Good Quality
16.	Torque Wrench	1 No.	Good Quality
17.	Hacksaw frame with blade smaller size good Quality	1 No.	Good Quality
18.	Flat Chisel 100mm*20mm	1 No.	Good Quality
19.	Flat Chisel 175mm*20mm	1 No.	Good Quality
20.	Operating tool (Screw Driver Type) for wago terminal	1 No.	Good Quality
21.	Operating tool (Wire Stripper Type) for wago terminal	1 No.	Good Quality
22.	Q-Series Connector extractor	1 No.	Good Quality
23.	Cable Knife-4"	1 No.	Good Quality
24.	Steel measuring Tape 3 meter	1 No.	Good Quality
25.	Steel Scale 300 mm	1 No.	Good Quality
26.	TSR of Smaller size	1 No.	Good Quality
27.	Gauge for point testing	2 No.	Good Quality
28.	Filler gauge	1 No.	Good Quality
29.	Torch portable (08x05 inch) beam with adjustable height 1.0mt. chargeable (7Ah capacity) to work on point/Cable damage cases in night	1 No.	Good Quality
30.	Torch portable 150mm length with 2.5inch dia. Chargeable (3Ah capacity)	1 No.	Good Quality
31.	Tri color Torch 150mm length chargeable (3Ah capacity) RED/GREEN/ LIGHT YELLOW	1 No.	Good Quality
32.	Hand cutter Machine 110V/230V AC (Universal)	1 No.	Good Quality
33.	Digital Multimeter True RMS (Fluke 287)	1 No.	Good Quality
34.	Clamp Meter (Low current range for Signal)	1 No.	Good Quality

Note:

- | | |
|---|--|
| 1 | All Tools Shall be of the best manufacturer Rly. Reserve the right to reject the |
| 2 | The tools as listed above shall be supplied in a Tool Bag. |

21. Office Revolving Chair Godrej Make Model No.9u02r Bravo Or Similar of reputed brand will be specified by Engineer in-charge.
22. Office table with laminated top with three drawers on left hand side and one locker on the right hand side. Olive brown with duplicate keys. Make: Godrej Model T-9 or Similar of reputed brand will be specified by Engineer in-charge.
23. Steel Plain Almirah with 4 adjustable slaves Size: 1980mm height, 915 mm width and 485 mm depth. Make: Godrej Storewel Plain Large or Similar of reputed brand will be specified by Engineer in-charge.
24. **Specifications and Requirements for Data logger:**
1. Data logger shall be supplied as per RDSO specifications IRS: S-99/2006 (Amendment 3) or latest with latest amendments.
 2. Data logger shall be supplied for 1024 Digital inputs and 32 analog inputs as mentioned in the schedule of materials.
 3. Data logger shall be supplied for 1024 Digital inputs and 32 analog inputs as mentioned in the schedule of materials.

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4. While supplying the data logger it shall be kept in mind that only those data logger shall be supplied which can be programmed to be a part of network of the existing data loggers
5. Data loggers shall be supplied along with the online UPS .
6. Data loggers shall be supplied with the Fault diagnostic software and Failure analysis system as per the requirements issued by the HQ from time to time.
7. Data logger shall be supplied along-with the printer as mentioned below. The suitable connecting cable shall also be supplied for connecting the data logger with the printer
8. The Front end Processor shall be supplied along with the Data Logger IFF specifically has been asked in the schedule of materials.
9. **Specifications and Requirements for the Printers:** following are the minimum specifications, however actual should be confirmed before the supply from Officer in Charge. The printer shall be heavy duty printer with laser Black and White printing.
10. **Specifications and Requirements for the UPS:** The UPS system for the servers and Failure analysis system should be online UPS of reputed make. The UPS system for the Data Logger system should be able to supply minimum 6 Hrs. back-up.
11. **Specifications and Requirements OF FAULT DIAGNOSIS SOFTWARE:** Logic for Report generation are defined by RDSO & as per Western Railway Practice.
12. **Specification for desktop type central monitoring unit/ Failure analysis system :** CONFIGURATION: Reputed make with the approval of Engineer in charge. The higher version of the systems may be accepted with the prior approval of Engineer-in-Charge

(a)	CPU	Intel Core i7 or superior
(b)	Memo	8 GB or Latest RAM Expandable to 16GB.
(c)	Hard Disk Drive	1TB HDD or Higher Capacity
(d)	Screen	Minimum 24" LED
(e)	Keyboard	Wireless keyboard
(f)	Mouse	Wireless Optical Mouse with mouse pad
(g)	Ports	Minimum 2 USB Ports, 1 HDMI Port
(h)	Operating System	Windows 10 with genuine licenses Preloaded with Media.
(i)	Net Working facility	Integrated 10/100/1000 GbE LAN
(j)	Warranty	12 months.
(k)	Software	MS Office 2010 Standard or Latest, Antivirus for Three years and software to view yard simulation and report including fault reports particular to station
(l)	Printer	Reputed make Laser Black & White Printer cum Scanner cum copier loaded with 1 Set of toner. (Model to be approved by Engineer-In- Charge prior to supply)
(m)	Furniture for Operator	Computer cum printer table top size 1200 mm x 750 mm x 750 mm, 2 key boards pull out tray, Drawer & Shelf, Computer Chair as suggested by Engineer- in – charge.
(o)	Pen drive	Minimum 128 GB pen drive

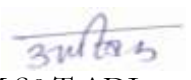
13. **Dual Card E1 to Serial Port Converter for networking of Data Logger**
Suitable to insert in the existing Data Logger/FEP Euro rack.
Features:
 - ✓ DTE SIDE: Asynchronous (RS232).

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	<ul style="list-style-type: none"> ✓ DCE SIDE: 4 wire E1 communications (G.703) Line speed 2.048 MBPS. ✓ 2 No's DTE Ports and 2 No's DCE Ports. ✓ Line Impedance: 120 Ohm (Balanced) ✓ LED Indications: Power, E1 Sync, Test, Error, TD, RD and Health. ✓ In built BERT tester. ✓ Supports following loop back tests for diagnostic purpose. ✓ Remote loop back test. ✓ Local loop back test. <p>E1 interface</p> <ul style="list-style-type: none"> ✓ Standards Compliance: ITU-T G.703. ✓ E1 Transceiver chipset should comply ITU-T G.736 and G.823. ✓ Interface rate: 2.048Mbps ± 50ppm. ✓ Line Coding: HDB3. ✓ Line Isolation: 1500V (RMS). <p>RS-232 port</p> <ul style="list-style-type: none"> ✓ Standards Compliance: EIA RS-232C ✓ Interface Types: RS-232 ✓ Signal: TXD, RXD, GND ✓ Baud Rate: Upto 57600bps (autobaud) ✓ Asynchronous serial <p>Electrical & Mechanical:</p> <ul style="list-style-type: none"> ✓ Input Voltage: 5V DC ✓ Power Consumption: less than 2W ✓ Operating Temperature: -10° C to +70° C ✓ Storage Temperature: -10° C to +70° C ✓ Euro rack insertable.
25.	Non Metallic (FRP) color light signal housing multi-unit type for railway signaling suitable for RE area TWO Aspects. Complete without lenses, lamps and signal transformer as per RDSO DRG. No. SA 23001/A/M Adv. Alt- S and as per SPEC. No. RDSO/SPN/194/2006 (Vol. 1.0) or latest and FRP material as per RDSO SPEC. No. RDSO/SPN/151/1997 or latest.
26.	Non Metallic (FRP) color light signal housing multi-unit type for railway signaling suitable for RE area THREE Aspects. Complete without lenses, lamps and signal transformer as per RDSO DRG. No. SA 23001/A/M Adv. Alt- S and as per SPEC. No. RDSO/SPN/194/2006 (Vol.1.0) or latest and FRP material as per RDSO SPEC. No. RDSO/SPN/151/1997 or latest.
27.	Non Metallic (FRP) color light signal housing multi-unit type for railway signalling suitable for RE area FOUR Aspects. Complete without lenses, lamps and signal transformer as per RDSO Drg.No. SA 23001/A/M Adv. Alt- Sand as per SPEC. No. RDSO/SPN/194/2006 (Vol. 1.0) or latest and FRP material as per RDSO SPEC. No. RDSO/SPN/151/1997 or latest.
28.	Supply of Multi lamp numeric indicator (LED Single/double digit) as per engineer in charge.
29.	Pad locks Godrej make, Hardened NavTal 7 lever, 65mm Dia with common key or similar product having same feature & technical data.
30.	Supply Color Light Signal Accessories. Supply of signal no plate as per Drg no CSTE Drg No CSTE/6186.
31.	Position Light Shunt Signal Unit Complete with Post (made of GI Pipe of 80 mm Diameter Medium Class IS Spec. No. IS: 1239 Pt. 1/1990) Base, Hood, and Cover, etc. as per Drg. No. SA-23840, Signal Number Plate, suitable for LED Signal Lighting Unit. (Supply of LED Unit is not covered in this item).
32.	Position Light Shunt Signal Unit Complete, with offset bracket, hood, Cover etc. as per Drg. No. SA-

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	23840 suitable for LED Signal Lighting Unit. (Supply of LED Unit is not covered in this item).
33.	SS Location box made of Spl Grade SS 304 of size as per Drg. No. DRM/SG/948 dt. 26.04.2011 (Single app. Case) or latest. Manufacturer's certificate in regard to grade of stainless steel and its protection level shall be submitted at the time of supply.
34.	SS Location box made of Spl Grade SS 304 of size as per Drg. No. DRM/SG/945 dtd 03.03.2011 (Half app. Case) or latest. Manufacturer's certificate in regard to grade of stainless steel and its protection level shall be submitted at the time of supply.
35.	IS 13410: Glass Reinforced Polyester Sheet Moulding Compounds (SMC) Size of Sheet : 1000x1000x8
36.	ARA Terminal's: - As per Spec No.IRS/75/2006 (Rev - 2) with latest amendments and RDSO Drg.No.SA-23741A Alt.4.
37.	Double Walled Corrugated (DWC) HDPE Pipe with associated collars etc. as per RDSO Specification No. RDSO/SPN/204/2011 or latest anti-rodent & anti-oxidant and non-flame propagating type in 6 meters straight length and of size 120 mm outer dia, & 103.5 mm inner dia. . One of the following coupling arrangements should also be supplied with each pipe as per the site requirement. 1) Suitable snap fit coupler with rubber 'O-Ring 2) Spacers 3) Tees 4) Bend, 5) End-cap (The total quantity of above items is equal to no. of pipes supplied.) DWC pipe shall be marked at every 1 mtr length in such a way that manufacturer's name, vender name and year of manufacture can be easily identified. Color -Bright Orange; Min Weight = 4kg. Test Check by Consignee & Sample check by JAG officer.
38.	GI Pipe: - As per specification IS: 1239 (Pt.I)-1990 or latest 100mm dia. (int.dia) 3.65 mm+/- 10% thick with coupling G.I. Pipes shall have ISI mark on it.
39.	Double Rail contact assembly with track side EJB for MSDAC. Each set shall consist of track side Electronic unit, Double rail contact with cable and mounting accessories. This item shall be procured from RDSO approved firm and inspected by RDSO.
40.	Supply of Tools Kit for Digital Axle Counter (Multi section/Single section). (MSDAC comply to the RDSO spec. No. RDSO/SPN/176/2013/Ver.3 or latest and manufacturer's specification and SSDAC comply to the RDSO/SPN/177/2012,Ver.3 or latest respectively). The tool kit shall be minimum equipped with the following equipments: (i) All mechanical tools shall be of reputed make like Taparia/Bosch etc. (ii) Digital multimeter true RMS type of make Fluke 189 or similar reputed make with probe set - 1 No. (iii) Adjustable torque wrenches 25-135 N/mtr with 13 mm and 19 mm inserts- 1 set (iv) Set of spanners screw drivers and soldering iron - 1 set (v) Dummy wheel - 1 No. (vi) Marking Jig - 1 No. (vii) Adapter card - 1 No. (viii) Extended wired socket to interface with diag No. stic plug - 1 No. (ix) Selector switch on panel base - 1 No. (ix) DAC EC card puller etc.
41.	Maintenance Free Earth Electrode of length 3m, including supply of 3 bags of Earth enhancement material for earthling (10KGs /bag) for each electrode & other accessories as per Drg. No. SDO / RDSO/ E&B/001 and RDSO Spec No. RDSO / SPN/197/2008.
42.	Supply of Fiber/ SMC/FRP/RCC Earth Chamber.
43.	<u>Specifications and Requirements for Earth Electrodes:</u>
	The normal Earth electrode shall be supplied as per the drawing no. CSTE- 6091 or latest with latest amendments.
	The Maintenance free earth electrode and Bonding Practices, associated compounds shall be supplied and executed as per the RDSO specifications no. RDSO/SPN/197/2008.
44.	Supply of Power Supply Distribution Box with MCB/Fuse as per specification and requirement given by Site Engineer, Make 3M, SNATEL,ABB
46.	Cartridge fuse block made of PBT as per RDSO Drg No SA-23748 Alt 4 & Spec No IRS S 75/2006 with the latest amendment. The fuse block shall be suitable for round-head type voltage fuses. This also includes the supply of equivalent no of ND type Fuses of 2A capacity as per specification IRS S-

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	78/92.
47.	PPTC fuse 12V GP 16-400 (2A) for TF/TR circuit, make Raychem, Epcos, Siemens
48.	Supply of DC Track Circuit Accessories as follows :- Track feed battery chargers, 110V AC input, 2 to 6/10 V DC Output; as per Specn. No. IRS.S 89/ 2013 with latest amendments. Charger shall be suitable for charging 80 AH battery.
49.	Supply of DC Track Circuit Accessories as follows :- Choke Coil for Single Rail Track Circuit on 25 KV 50 Hz AC Electrified Section as per Spec No IRS S 65/1983 with latest amendments.
50.	Supply of DC Track Circuit Accessories as follows :- Adjustable Track Feed Resistance disc type 30 ohms as per RDSO Drg. No. SA 20166/M (Adv.) with latest amendments (with Phenolic molded base).
51.	Provision of Field accessories of DC Track Circuits Track Lead Junction Boxes as per C.Rly Drg. No. RST 11509 made from fiber glass/SMC/FRP along with terminal blocks.
52.	Provision of Field accessories of DC Track Circuits GI wire 8 SWG (4mm Dia) suitable for track circuit rail bonding.
53.	Provision of Field accessories of DC Track Circuits Channel Pins MS (Galvanized) single groove, 7 mm suitable for 4mm Dia bonding wire as per spec No IRS S 17 & RDSO Drg No. S-69/M.
54.	Provision of Field accessories of DC Track Circuits PVC jacketed wire rope for Track Lead connections. PVC jacketed wire rope should be of Galvanized steel wire rope 6 mm Dia (6x19 stranded wire with a steel core of 6 mm Dia) sheathed with PVC 2mm wall thickness, the overall thickness is 10 mm. PVC sheath should be made of type 6 compound as per IS 5831 of 1970. Reclaimed or recycled material should not be used.

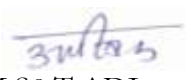
Schedule – A2-Non SOR Supply item.

1.	Supply of Ferrules of different colour, printinng termination detais/ functions in different colours as per Railway specification and installation in location box CTR and power board etc. All the materials required for the work shall be suplied by the contractor
2.	Supply of Earth Leakage Detector (24 Channels) Level-2 as per RDSO Spec. No. RDSO/SPN/256/2025 Version 2.0.
3.	Supply of Thermo shrinkable joint kit as per RDSO Spec. No. IRS/TC 77/2012 Rev-3 Amd.-1&2 or latest suitable for LC Gate RTSF suitable to 6 quad cable of spec. no. IRS TC -30/2005, Ver-1, Amd-5 or latest.
4.	Main Signal Post Tubular 140 mm Dia, 5.6 Mtr Length as per IRS: S-6/81 or Latest & RDSO Drg. No. SA-24625 (Advance).

Schedule – A3 MSDAC

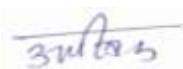
1.	Specifications and Requirements for MSDAC:-
1.1	Description of MSDAC for Supply
A	Multi section digital Axle Counter (MSDAC) system shall comprise of Axle detectors, DAC field unit, mushroom housing for track side electronics, Central evaluator, Reset unit, track clearance relay unit for each track section, event logger, diagnostic terminal and line verification box confirming to RDSO specification no. RDSO/SPN/176/2013, Ver.3 or latest (Inspection by RDSO).
B	For ease of maintenance, only one uniform make of MSDAC is to be supplied and installed in this Project. The vendor should be in the RDSO approved list of vendors. The successful bidder shall submit an undertaking from RDSO approved OEM of MSDAC, before the supply of material, to confirm compliance with extant RDSO guidelines, to meet contract specific requirements and to provide after-sales support required during the warranty period and beyond the warranty period.
C	MSDAC evaluator to evaluator connectivity shall be capable to work on Quad/OFC.

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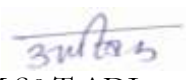
D	OEM supplied / certified Pre-fabricated Rack with power supply arrangement for Evaluator (inspection by RDSO) which is to be supplied along with the system as per RDSO specification no. RDSO/SPN/176/2013 Ver.3 or latest. Housing of Evaluators to be supplied as per station/auto hut specific requirement as per RDSO specification.
E	OEM supplied / certified Reset Box as per RDSO guidelines (inspection by RDSO). MSDAC system should be compatible for reset arrangement to be initiated through EI.
F	OEM supplied Line Verification Boxes as per drawing no. RDSO/S/20002. (Inspection by RDSO).
G	OEM supplied/ certified Mushroom cover/ Half apparatus case(s) (If required for installation) for track-side equipment/ each detection point housing (Inspection by RDSO for OEM supplied/ certified Mushroom cover; consignee for half apparatus case). Quantity of the Mushroom Cover/Half apparatus case shall be the same as that of detection points. However, if RDSO declines, it will be inspected by an authorised representative of the Railway's Engineer. Housing of track side electronics shall be as per RDSO specification. Due to space constraints between lines, track side electronics shall not be mounted in conventional location boxes used by Railways for cable terminations.
H	OEM recommended lightning and surge protection devices for all sub- systems as per RDSO specification no RDSO/SPN/144/2006. (Inspection by RDSO).
I	Housing of Evaluators ,Connectors, DC-DC converters, fixtures, Ethernet switches, surge protection device, Timer, Q series Relays, all necessary cable and clamps etc. and all other material required for VR relay pick up to be provided by the OEM.
J	The track section relays are available in the central evaluator of MSDAC. As the evaluators are to be kept at station or relay hut, the relays of controlling track section of various signals, will have to be repeated to adjacent station or relay hut. For inter signal aspect controlling, the aspect proving relay of a signal is required in the signal control circuit. For repeating the relay for ICC, UFSBI or FN mux or inbuilt SIL-4 MUX of the MSDAC or by suitable arrangement shall be used. Modems and suitable communication modules for exchange of data/information such as signal aspect, track occupancy status and any other vital information between evaluators at stations and auto huts for achieving the functional and circuitry requirement for Auto signaling system in the shall be provided by the OEM along with MSDAC schedule Note: Modems and suitable communication modules shall be capable to work on Quad/OFC.
K.	Supply of Event logger (In-Built) & diagnostic terminal with monitoring software Eight Sets of Computer System to be supplied) Event logger Diagnostic PC (Inspection by consignee) -as per following specification: <ul style="list-style-type: none"> o Processor: Intel Core i7, 3.1GHz Processor or Higher o RAM: 8 GB RAM o HDD: 512 GB SSD (Minimum),+1TB HDD internal +256GB External SSD. o Ports - 2 USB-3.0, 2 PCI slot o Screen: 24" 1920 x 1080 LED or better. Network interface: Integrated 10/100/1000 GbE LAN o Wireless: 802.11a/b/g/n Wi-Fi and Bluetooth o Keyboard & Optical mouse o Built in camera and Bluetooth o RS-232 Compatible in-built Modem o OS: Windows 10/11 with Antivirus for three years, with spare copy to cater

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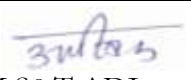
		<p>system breakdown.</p> <ul style="list-style-type: none"> o Furniture: Suitable computer table and chair for placing the above system (Firm must take prior approval before supply of furniture from consignee). o Warranty: 2 years' OEM warranty <p>Above mentioned is the basic minimum requirement; however, the system shall be as per actual requirement stated and approved by engineer in-charge prior to supply.</p> <p>NOTE: NMS software for MSDAC shall be provided for remote monitoring at CONTROL ROOM.</p>
	L	10% spare equipment's i.e. cards / modules / reset box/evaluator module/back plane/relays / TX Rx coils/track side junction box etc. shall be supplied for each station /auto section. (Fraction to be rounded off to the higher whole number)
	M	Materials, which are not in the list of RDSO, shall be inspected by the Consignee.
	N	<p>The warranty of the equipment should be in accordance with IRS specification No: S-23.</p> <ul style="list-style-type: none"> a. The contractor also guarantees that the said goods/stores/articles would continue to conform to the description and quality as aforesaid, for a period of 30 months after their delivery or 24 months from the date of placement in service whichever shall be sooner, and this warranty shall survive notwithstanding the fact that the goods/stores/articles may have been inspected, accepted and payment thereof by the purchaser. b. If during aforesaid period, the said goods /stores/articles be discovered not to conform to the description and quality aforesaid or have deteriorated, otherwise that by fair wear and tear the decision of the purchaser in that behalf being final and conclusive that the purchaser will be entitled to reject the said goods/stores/articles or such portions thereof as may be discovered not to conform to the said description and quality. On such rejection, the goods/stores/articles will be at the seller 's risk. c. During the period of warranty , the supplier shall remain responsible to arrange for replacement and for getting right at his own cost of any equipment supplied by him which is defective during manufacturing or defective in design or due to defective material component or due to any cause what's ever. <p>All replacement and repair and design change that the Railway shall call upon the supplier to perform under this warranty period within one month, properly and satisfactorily.</p>
	O	<p>Railway will supply the details of track sections and location of evaluator(s) to the supplier. The supplier will submit following documents along with the offer.</p> <ul style="list-style-type: none"> a. 6 quad cable lying plan b. Cable length of each track device shall be 5 meters/10 meters in the ratio of 50:50.
	P	<p>Supply of OEM toolkit (Three sets to be supplied)</p> <p>The toolkit should be supplied/certified by the OEM confirming to RDSO specification no. RDSO/SPN/176/2013 Ver.3 or latest.</p> <p>Note: 1.</p> <ul style="list-style-type: none"> a. One set consists of Digital meter Fluke Model No. 289 or similar, Torque Wrench, dummy wheel, sensor mounting tool, spanner, screw Driver set, all tools for mounting and adjustment of track equipment, Marking Jig for Drilling with each 30 DPs and any other specialized tools and measuring instruments required for safe and reliable adjustment and all types of maintenance of equipment as suggested by the OEM. <p>b. The list of tool kit shall be submitted by the OEM along with the offer.</p>
	Q	<p>Supply of documents:</p> <p>Two copies of the following shall be supplied:</p>

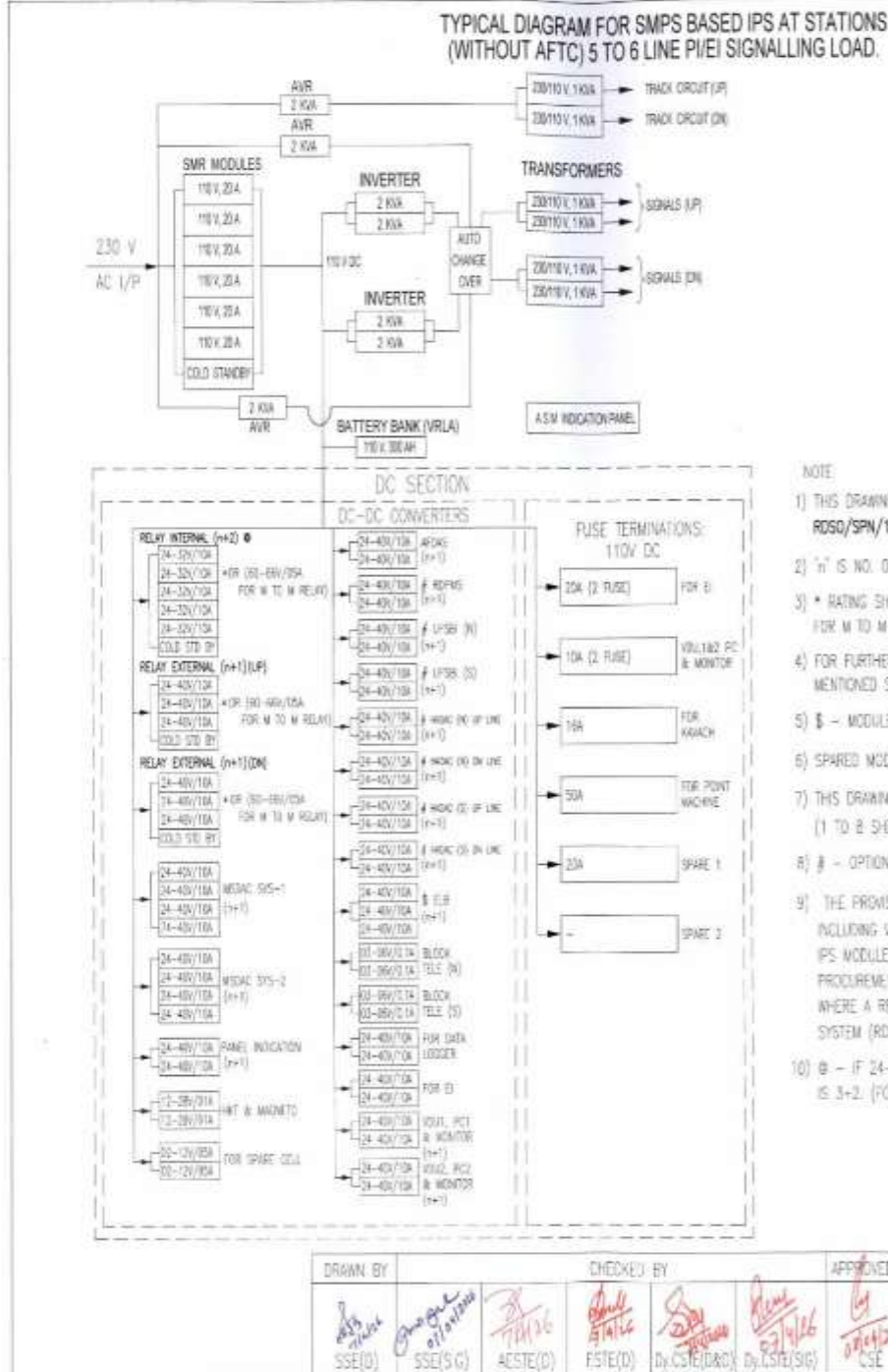
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		<ul style="list-style-type: none">a. Instruction Manual.b. Installation & maintenance manual including Dos & Don'ts.c. Mechanical drawings of each sub-system/rack.d. Schematic block diagram showing mounting arrangement of various components & details of each type of assembled PCB.e. Trouble shooting procedures along with test voltages and waveforms at various test points in the PCBs.f. Pre-commissioning checklist.g. OEM audit inspection certificate.
	R	<p>In addition to the documents supplied above following documents shall be submitted in Hard copy and soft copy in PDF format by the agency to the field unit for approval before commencement of actual work.</p> <ul style="list-style-type: none">a. Quad allocation plan.b. DP plan and rack wise central evaluator allotment plan based on SIP provided by Railways.c. Evaluator summary, DP summary and evaluator communication summary.d. Wiring Diagram.e. MSDAC DP connection between CTRs.f. Reset box disposition & resetting arrangement.g. Interface Diagramsh. For each track section, relay drive evaluator, direct DP and indirect DP connected to the evaluator to be shown in a tabular format. (Equipment layout, floor plan and details including cable troughs required (station/auto huts))i. Lightning, surge protection & earthing plan.j. Pre-commissioning check list , OEM audit inspection certificate and other technical information regarding MSDAC supplied (One copy for each evaluator)
1.2	<p>Training Requirement:</p> <ul style="list-style-type: none">a. Training on installations, maintenance & trouble shooting shall be imparted to Railway Personnel at site or at OEM's premises (10 man-days for 30 DPs or part thereof).b. Training shall be organized for OL and Project staff & officers through the OEM/agency before commencement of work and proper record shall be maintained.c. During programming, testing and commissioning one more round of training shall be organized for the OL staff to have better understanding of the product going to be commissioned. <p>During the training each of the attendee shall be given copy of the training manual and copies of the approved document without any exception.</p>	
Schedule – A4 IPS		
1.	SMPS based Integrated Power Supply System for Electronic Interlocking as per RDSO/SPN/165/2012 version -3 or latest and Drg No. CSTE 6295 SHT. 2 OF 4. This includes transportation, installation and Commissioning of Integrated Power Supply System.	

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Schedule – B1 SOR Supply & Execution item.

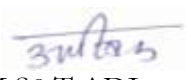
- | | |
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| 1. | Supply, Installation and Commissioning of EI VDU (Visual Display Unit, 4K with all suitable accessories Compatible to EI Interlocking in Safe Mode 24x7 at controlling station. The item must comply minimum following specification:- a) Screen Size (Diagonal):- As below b) Resolution :- 4K c) Viewing angle degree: - 178x178 degree d) Brightness :- 500 Nits e) contrast ratio 4000:1 f) Backlit :- Direct LED g) Jack Interface: - HDMI -3 no. 1.2 DP, DVI USB 2.0 -2 no. CI Slot RF In AV In Component In (RCA5 Type) Digital Audio Out RGB In (D-sub 15pin)-PC PC Audio Input RS232C (D-Sub 9pin) RJ45 Stereo mini jack. h) Optical Out :- Available Note: - Screen size will be decided as per instruction of engineer incharge. Approximate Screen size 75 inch |
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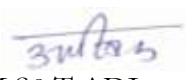
2.	Supply and Installation of Modular power supply arrangement for VDU and industrial PC (Embedded PC) with input and output redundancy arrangement and Hot pluggable Modules as per RDSO specification. Make Gallant or similar. One set consists of 1. Input O- ring diode module with potential free -1 No contacts (PFC) for two 110 V DC sources from IPS and single 110 VDC bus Qty 1 No. 2. Isolated Inverters (Master / slave) - Input-110 V DC Output: 120 V AC/220V A500VA - 02 Nos. 3. Isolated DC-DC convertors- Input : 110 v DC Output : 24 V DC/ 10A,Qty -10Nos 4. 3 U SS rack with back panel mother board /front panel power connectors inverter auto change over switch and all required over switch and all required protection circuits (3U height for main rack 132.5mm +/- 10% & 1U height for mounting 44.5mm +/- 10%) Qty - 1 No. Make Gallant or similar.
3.	Supply & installation of Industrial Grade Embedded PC as per RDSO TAN no. STS/E/TAN/3007 dated 2.11.12 or latest.
4.	General Requirements and Specifications for installation of EI system:
A	The design of the EI system shall be as per the Signaling plan issued to the contractor.
B	Railway shall provide approved diagrams like ESP, SIP, Table of Control.
C	Any alteration in the interlocking plan to be done during the course of execution shall be carried out by the contractor expeditiously without any extra cost.
D	The system shall be commissioned with HOT STANDBY configuration of all levels as approved by RDSO.
E	Until and unless specifically advised, the EI system shall be commissioned with the dual VDU for the operation of signaling gears.
F	All the execution/wiring of the system shall be carried out as per the standards defined by RDSO.
G	All the terminations on the Racks or back-plane, shall be tagged both ways i.e. the origin and destination of the wire can be understood.
H	The signal flow diagram for diagnostic purposes shall also be supplied along with the execution.
I	The Earthing shall be provided as per the latest standards of RDSO as mentioned in item 1 of 2.0.
J	All the cables connected to the EI system, O.C. (if any) shall be properly laced and described.
K	The optical fiber connecting the different subsystems shall be connected through FDMS (as mentioned in item no. 1 of 2.0). All these connections shall be housed in required telecom racks which are protected against interference and dust.
L	The contractor shall supply the AS MADE DOCUMENTS as per the clause 4.3.5.9 of the chapter-3.
M	Pre-commissioning checklist shall be jointly signed by the Railway's and OEM's representative.
N	In addition to para item No. 2.0-C, the warranty clause shall be operated as
(I)	The contractor shall inform names of qualified Service Engineers deputed at the location approved by Railway's Engineer and their contact numbers, so that they can be contacted during failure. The failure is to be attended and rectified within least possible time from the time of reporting of failure.
(II)	All replacement and repairs that Railway shall call upon the contractor to deliver or perform under this warranty shall be delivered and performed by the contractor promptly and satisfactorily, if the contractor so desires the replaced parts can be taken over by him, or his representative in India for disposal as he deems fit within a period of three months from the date of replacement of goods / parts. At the expiry of this period, no claim whatsoever shall lie on the Railway.
O	QUALITY AUDIT OF INSTALLATIONS:
	The Contractor shall arrange for a quality audit of installation by authorized representative of manufacturer for Electronic Equipments like Electronic Interlocking (EI), AXLE COUNTERS, AFTC, UFSBI, MUX, Data-logger etc. who will certify that the installation has been done as per OEM's specification & standard practices and pre-commissioning check list / guidelines issued by RDSO from time to time. The Contractor should also submit certificate issued by OEM Stating "That quality and integrity of the installation (Electronic Interlocking System) remain complete responsibility of the OEM, Any deficiency pointed out later should be rectified free of cost by OEM."

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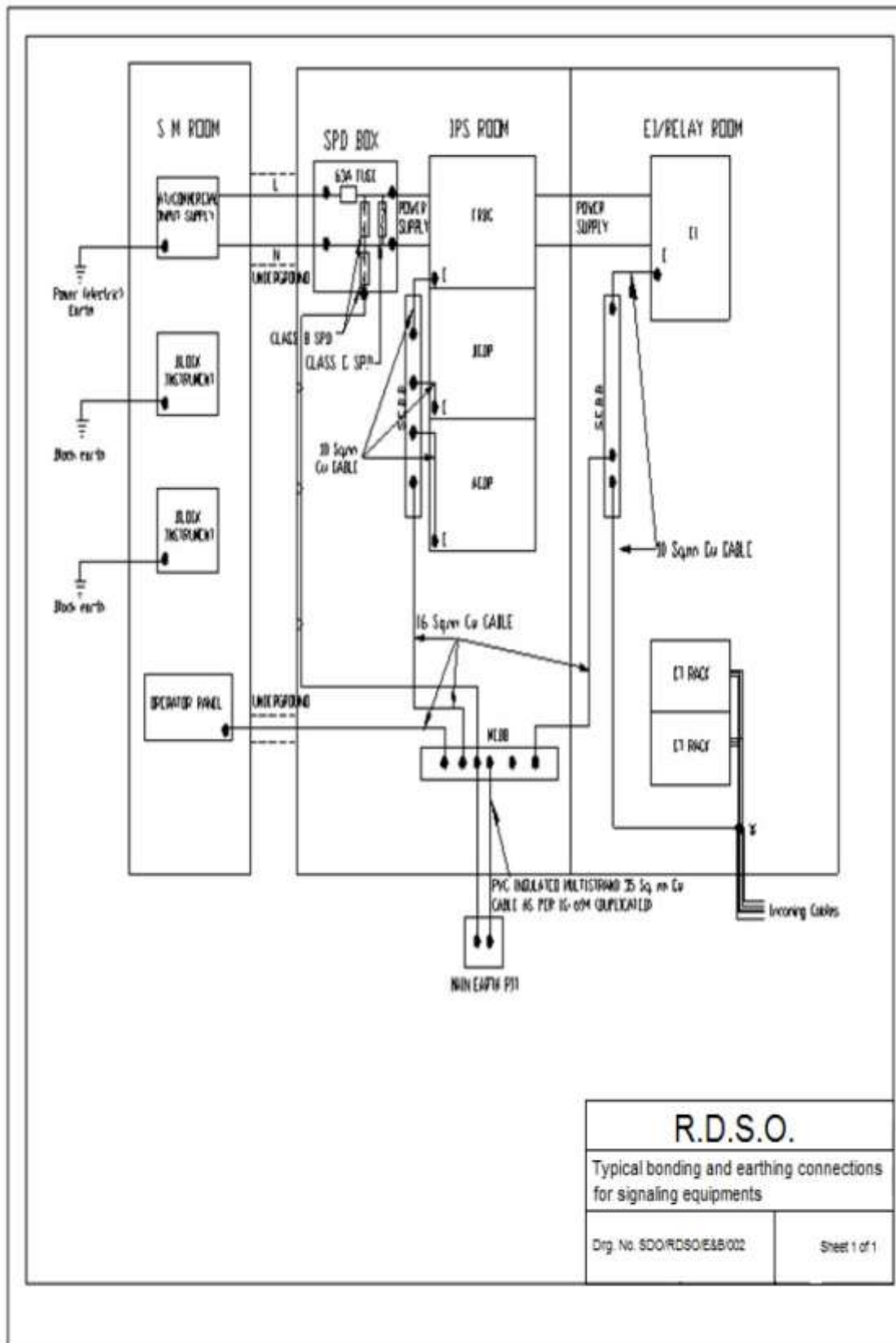

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P	Western Railways practice for installation of Q series relays should be adopt (leaving space after every two relays.)
Q	All contacts of Q series relays should be duplicated.
5.	Factory Acceptance Test / site acceptance test(FAT/SAT).
6.	Earthing of EI equipment, relay racks and Power equipment etc
	<p style="text-align: center;">Typical installation of Earth for S&T Installation</p> <p style="text-align: center;">RDSO Typical installation of earth for S&T Installations Drg. No. SDO / RDSO/ E&B/001 Sheet No. 1 of 1</p>

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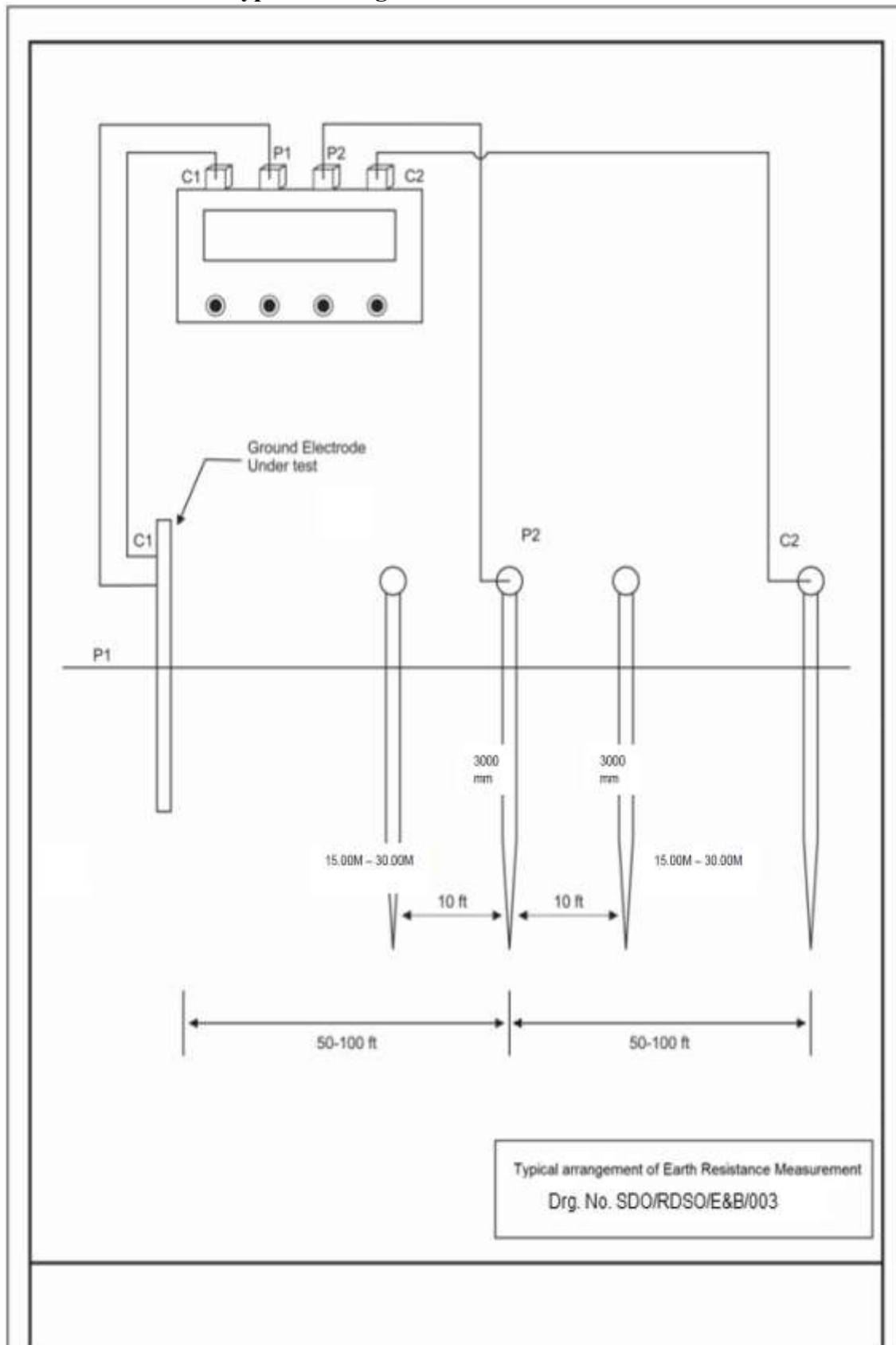
Typical Bonding and Earthing connection for Signalling Equipments



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Typical arrangement of Earth Resistance Measurement.

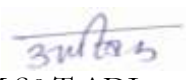


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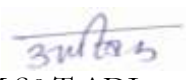
7.	Training of Officers for installation, Commissioning, Testing, and Repairs & Trouble shooting of the EI system. (Hard copies of training material/ course modules to be given to each participant).
8.	Training of Technician/ Jr. Engineer for installation, Commissioning, Testing, Repairs & Troubleshooting alteration, design of EI system, as per details given in Special Condition of Contract. (Hard copies of training manuals/ course module to be given to each participant).
9.	Design of SIP and submission of copy (three copy) for approval. More than four line station
10.	Design of ST/LT/TOC/Square sheet/RCC (Three copy) for approval. More than four line station
11.	Design of Circuit Diagrams consisting Wiring/ Logic diagram, contact analysis, fuse detail, Input/output bit chart, VDU diagram, Interface etc. submission of Three paper copies for approval 50 to 100 Routes
12.	Design of Miscellaneous diagram consist of Floor Plan of Relay Room , Battery Room, Power Equipment Room, Data logger room, Power Supply Diagrams along with power supply calculation, Earthing Diagram, Power panel diagram, IPS wiring diagram , Auto change over diagram , Block circuit wiring diagram, Digital Axle counter wiring diagram and all other relevant drawings (Three copy) for approval. More than four line station
13.	Design of Cable Route Plan submission of Three paper copies for approval.
14.	Supply of Completion SIP in Original tracing along with Auto CAD copy in Pen Drive and Six set copies after approval. More than four line station
15.	Supply of completions ST/LT/TOC in original tracing along with AutoCAD copies in Pen Drive and six set copies after approval. More than four line station
16.	Supply of Circuit Diagrams consisting wiring/Logic diagram, contact analysis, fuse detail, Input/output bit chart, VDU diagram, Interface in AutoCAD in Pen Drive and Six set of Copies after approval More than four line station
17.	Supply of diagrams consist of Floor Plan of Relay Room, Battery Room, Power Equipment Room, Data logger room, Power Supply Diagrams along with power supply calculation, Earthing Diagram, Power panel diagram, IPS wiring diagram, Auto change over diagram, Block circuit wiring diagram, Digital Axle counter wiring diagram and all other relevant drawing in original tracing along with AutoCAD in Pen Drive and six set copies after approval. More than four line station.
18.	Supply of final Cable Route Plan as per laid cable duly measured at every 30m clearly indicating distance of laid cable from fixed point of reference & indicating all track crossings and tail cables in original tracing along with Auto CAD in Pen Drive and Six set copies after approval.
19.	Design and supply of cable courage plan, location particulars, Cable termination rack particulars, cable meggering report, earth resistance particulars, Traction bonding diagram, 1/2 wire count sheet and any other drawing in AutoCAD in A3/A4 size. The contractor shall initially supply 3 sets of circuits complete for approval of Railways. Railways will return one set to the contractor duly approved with alterations/corrections, if any. The contractor shall incorporate Railway's alterations/corrections in the tracings without any deviation and submit all tracings complete in all respects to the Railways along with PENDRIVE & 4 sets of final approved drawings. This includes designing of cable coreage plan based upon I.P in consultation with engineer-in-charge For small/medium yards. Station
20.	Design and supply SWR Diagram on standard tracing paper of 95grams for each station. Corrected version of SWR plans after checked & approved by Rly's 25 Ferro copies will be supply for each of the plans. For stations having more than 4 lines
21.	Preparation of SWR including supply of SWR booklets (25 Nos. per station). For stations having more than 4 lines
22.	Preparation of Cable Route Plan of buried S & T Cables using Radio Detector 8200 GS or Similar model GPS Model,DGSP and Drone for Per Trench per Km. For existing cables as per the instruction of Engineer in-charge. Submission of Drone Report in Hard Copy 1 set and DGPS output in KMZ

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	File format. (Unit = Per Trench KM) In Yard Section
23.	Installation, wiring, testing, and commissioning of Data logger complete along with accessories using Contractors' own wiring & fixing materials as per the following configuration. (It includes loading of NETWORKING software, networking of data logger, installation of FEP & Fault diagnosis system). The requisite communication cable/channel for networking will be arranged by Railway. 1024 digital & 32 analog inputs/ 4096 digital & 32 analog inputs. (All the Indoor & outdoor gears wiring in cataloged included in this along with laying 230V supply cable from IPS room, 12 core cable from auto change over for monitoring supplied.) Note :- It included logging of all gears as per site incharge.
24.	Commissioning of T-Networking suitable for Networking to the existing Data Logger equipments. This includes supply of all equipment / accessories required for the purpose.
25.	Specification and requirement for the erection of relay rack and cable termination rack:
	All the relay racks shall be installed as per the scheme approved by the engineer in charge. All the erection fittings shall be supplied by the contractor as a part of installation.
	It is to be ensured that all the major groups shall be installed with proper guide plates. These guide plates shall be supplied by the contractor of its own.
	Full hylam board shall be used for the cable termination racks to fix the multi-way isolating blocks/ wago terminals.
	Outdoor Cable supporting rack shall be supplied (in numbers) and erected in such a manner that all the cables shall be terminated preferably in one layer. The termination can be done in maximum two layers.
	All the cables terminated with the cable supporting racks shall have armory earthed.
	The armory shall be made exposed at a point and a copper flexible twisted wire (total area 1.5 sq mm) shall be wrapped around the armory at one end and to the GI/copper rod at the other end.
	All the armories whether be a steel wires or GI sheets shall be bent at the end where cable is extracted so that it may not damage the cable conductors in the long run.
	At the cable armory end the copper wire shall be soldered in such a manner such that it is tied tightly and is not loose.
	At the other end also all these earth wires shall be soldered on the copper/GI rod.
	All these copper/GI rods shall be finally connected to the earthing terminal through 25/16 sq mm copper wire through an ARA terminal.
	The 25/16 sq mm copper wire shall be arranged by the Railway.
	The earthing and lacing if all the cables shall be done in such a way that each and every cable earth shall be separately identifiable.
	The area where all earthings of cables are terminated (i.e. area behind the CT rack) shall be filled with sand at the cable entry point. The sand shall be filled just upto bottom of cable terminations. All the earthing terminations shall be outside the sand and shall be clearly visible.
	Full hylam boards shall be fixed on the front side of the CT rack. The hylam boards are covered in the schedule of supply. On the hylam board the holes shall be done to suit the fixing of wago/other terminals.
	On the back side of the hylam board the cable conductors shall be supported by the string rod on which insulation sleeves have been provided. The string rods with insulation sleeves shall not be covered in supply items separately. The string rods with insulation sleeve shall be supplied by the contractor as a part of installation of CT rack.
	Sufficient space as per site in-charge shall be left between two rows of cable terminations so that description-writing work can be furnished.
	The tag blocks shall be fixed on the Racks, as per requirement.
26.	Fixing of KLCR relays in field in half location boxes/Almirah. Item includes supply and fixing of MS sheet and wiring of push buttons and LEDs for KLCR circuit. The KLCR relays, push buttons, LEDs

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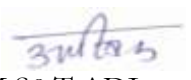
	to be fixed on a MS sheet of min. 3mm in the half location box. The MS sheet should cover the full length and breadth of the half location box/Almirah and can be in two pieces of approx 48cm x 46cm and 80cm x 46cm. The first piece to be fitted on top and will contain the KLCR relays, LEDs and push buttons. The second piece to be fitted below the first piece to divide the two halves of the location box.
27.	Fixing & wiring of QNA1 / QNA1K relays for GPR Circuit in apparatus case as per Standard practice. Fixing and wiring material shall be supplied by the contractor.
28.	Installation wiring testing and commissioning of Fuse changeover system (FACS). This includes the provision of a common Buzzer & indication at the ASM Room & ESM Duty Room and the painting of fuse details. This also includes the fabrication of a frame for the installation of FACS at the Station/ LC gate where the installation of relay racks is not feasible.
29.	Supply, installation, fixing, wiring, testing and commissioning of Common Audio-Visual Alarm Unit (CAVA)-for Fuse Auto Changeover system as per RDSO specification RDSO/SPN/209/2012 Rev. 2.0 or latest.
30,37, 38,39 & B1-1	Specifications and Requirements for the foundation for the signal post: The foundations shall be made as per the standard drawing issued to contractor. The drawings for reference are as Foundation for Main Signal- CSTE-3122. Foundation for Shunt Signal-CSTE-6090. Before starting the digging work for foundation the location of the foundation shall be jointly verified and signed by the representatives of Railways and Contractor.
	While finalizing the location of foundation it must be taken care that the schedule of dimensions is strictly adhered to.
	It must be taken care that the foundation of signal shall not be in any case on the banking of the terrain.
	If it is not feasible at site for the foundation to be on bank portion, the signal foundation should be shifted on the RHS of the concerned track.
	While shifting the signal foundation to the RHS of the concerned track, the schedule of dimensions must be strictly adhered to. The outermost portion/part of the complete signal shall be minimum 2.36 meter away from the centre of tracks of both sides.
	While erecting the signal foundation the GI bolts of proper size should be grouted.
	Item includes curing and plastering with 1 : 4 cement - sand mixture (Aggregate not exceeding 3 : 8 cm).
	Aggregate, cement, sand and holding down bolts, nuts shall be supplied by the contractor.
	Due to local condition in very special circumstances if the size of the foundation for all the above items required be increasing / decreasing, the extra payment /deduction for variation of the CC work shall be calculated on volumetric basis and paid to the contractor from the schedule of cement concreting.
	Specifications and Requirements for Installation of Signal Post & CLS Unit.
	The item includes erection of colour light signal post with CI base, LED based colour light signal unit (CLS units suitable for LED Signal Lamps will be supplied by Railway), ladder with its base, ladder guards, platform and MS supporting bracket in the middle of the ladder, hoods, protective screens front staging for maintenance Platform, expanded metal cover on front. Also includes fixing of LED lighting units along with all accessories and arrangement of extra accessories for pinnacles, offset brackets. Junction type route indicators (if any) – 5 or 3 or 4 or 2 or 1 way etc. LED units & LED Signal Units will be supplied by Railways. The item also includes termination of cable and wiring inside the signal unit as per standard practice. The cable shall be inserted in such a way that it is not bent sharply. The armoury of the

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	<p>cable shall be peeled off at the base of the signal unit. After that all the conductors shall be terminated on the ARA terminals/Disconnecting terminal blocks connectors. From these terminals the colour coded flexible wires shall be taken to the respective LED unit/signal lamp. The flexible wire shall be provided by the Railways.</p> <p>Item also includes supply of number plates with photo luminescent paint/strips.</p> <p>Wire mesh covering Red and Yellow aspect as per standard practice on this railway and wherever if required the screen shall also be provided on the side of signal post /signal unit adjacent to the centenary. The fixing of screen and its connection to the earth shall be done as per RE area standard.</p> <p>Height of the post 3.5 mtr. For loop line starters, advance starters, distance signals, 4.5 mtr for mainline starters and Home 5 mtr. for Home signal on curves. Decision of site in charge regarding height of posts as required by site in charge and fixing of CLS units on the existing posts with or without offset as required by Site In charge. (I) 2/3/4 aspect signal unit mounted directly on signal post or with offset bracket.</p> <p>'X' arms to be provided by the contractor till the signals are introduced.</p> <p>Item includes supply and fixing of arrow on signal units for signals placed on the wrong side and blanking of ladder if so required by site in charge.</p> <p>All the clamps and angles shall be as per the drawings or as advised by the engineer in charge The ladder should be grouted in the ground properly.</p> <p>Supply of colour light signal post tubular 140 mm dia complete with CI base, ladder with base, ladder guard platform, MS supporting bracket to support ladder, pinnacle with offset bracket etc. shall be IRS Specification no. S-6/81 (latest) and RDSO diagram No. SA-24625 (Advance) is covered under Schedule "A".</p>
31 to 34, B2-7&9	<p><u>Specifications and Requirements for complete Painting, Varnishing and writing works.</u></p> <p>All the equipment which need painting shall be fixed/ installed with coating of Red Oxide i.e. Red Oxide should be coated before fixing/installation. After fixing/installations one coat of paint shall be applied on all the location boxes, signal units, signal posts etc. The final coat of paint shall be applied just before the commissioning.</p> <p>The description writing work shall be carried out before the commissioning of the station. This description writing work includes writing the details in the Relay Room and Location boxes.</p> <p>All the location boxes and the signal posts shall be painted with the distance of installation from the centre of the track.</p> <p>The colour & painting scheme as per provisions of SEM and Western Railway practice should be adopted.</p> <p>Lettering / Numbering Termination particulars in Full & Half Apparatus case, equipment names etc., legibly and neatly inside location boxes. This includes supply of paints of Asian Paints/ Nerolac / Dulux / Berger make.</p> <p>NOTE:- The paint and primer should be from Asian Paints/ Nerolac / Dulux / Berger. The primer / enamel paints (Aluminum synthetic, black enamel, brilliant white and yellow) will be as per (IS 5660 of 1970) / (IS 2932 of 1974)."" (vii)Point Machine with ground connections complete (Point Machine with Black enamel only outside and ground connections with Red Oxide)"</p> <p>Note:- Guidelines regarding Signalling Gears Description Writing</p> <ol style="list-style-type: none"> 1. Identification marker (Ferrules with printed letters / PVC sleeve with printed details of the core / Signalling function) to be provided on each cable conductor with Yellow sleeve and black description 2. The Row of Screwless Disconnect Terminal / M6 Terminal / ARA Terminal shall be serially

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- numbered as A, B, C, D..... from top and in each row, terminals shall also be serially numbered starting from 1.
3. After every cable terminated in a row, there should be a gap equivalent to 1-2 ARA terminal or minimum 06 Screwless Disconnect Terminals.
 4. The Cable Termination Details of Location Box (Location Termination Particulars) shall be prepared in AutoCAD/ any suitable software. One copy of Cable Termination details shall be fixed in the respective location box duly printed on a board and another copy may also be kept in laminated sheet.
 5. Inside the Location Box, minimum clearance of the bottom most terminal shall be 300mm from the base of the location box. The Centre to Centre Distance between two rows of Screwless Disconnect Terminal / ARA Terminal shall be 18 cm to 20cm.
 6. Location Box shall be numbered from its front side as well as Back side and functions shall be written on the door with yellow on black background.
 7. The cable armours and the Location Box shall be earthed using GI flat as shown in installation photographs given in IRSEM Appendix-II.
 8. The Cables terminated on Location Box shall be identified by punched labels / Cable Identification Tag tied on each cable.

Policy Circular No.02/2024

Function description & and writing work for signalling installation.

It is extremely important to write clear and accurate descriptions of the functions on outdoor location boxes and termination racks (CTR) in relay rooms, relay huts, and Goormies. This is necessary for the purposes of maintenance, testing, and attending to failures. Currently, both indoor and outdoor writing work is mostly done through manual painting. However, it has been observed that updating the writing or painting is difficult when transferring functions from defective cable conductors due to a lack of painters. Although updating function details on CTR and location boxes must be done permanently through manual painting for legibility, there is a need to implement better writing practices throughout the Western Railway to ensure accuracy, efficiency, and safety.

A. Indoor:

1. Colour Coding for Function:

Function identification marker to be provided on each cable conductor. The coloured scheme for Ferrule and laminated tape for stickers/cable flaps at CTR and LOC boxes is as under:

SN	Name of function	Color coding of sticker/ Ferrule	Color of Writing	Sample
1.	Signal (RG & ICC)	Red	White	
2.	Signal (HG/ HHG & ICC)	Yellow	Black	
3.	Signal (DG & ICC)	Green	Black	
3.	Route, Co,"A" Sign & its ICC,LC , CH, slot & other circuit	White	Black	
4.	Point	Dark Navy blue for Operation Light Blue for Detection	Operation - White Detection - black	

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SN	Name of function	Color coding of sticker/ Ferrule	Color of Writing	Sample
5.	Track/Axle counter (TPR & Charger)	Light orange	Black	<div>101 TPR</div> <div>12B AXTPR</div> <div>Tx</div> <div>110BX Track CH</div> <div>Rx</div>
6.	Spare	Grey	black	SPARE
7.	Cable details (location from to)	Yellow	Black	2403 JB-3 to PT-103
8.	Defective Core	White	red	Defective (12/01)
9.	Jumper	Yellow	Black	From Cable no. XXXX (A,B) to XXXX(C,D)

2. Conductor/Wire labelling:

2.1 For existing installation

Each cable conductor must be marked with a function identification tag according to the color scheme specified above.

- 2.1.1. Ferrules with printed letters (as per colour coding) shall be provided on spare conductors. (Ref- pic-1)
- 2.1.2. PVC sleeve/Flip with printed details (as per color coding) shall be provided on live conductors. (Ref pic-2)
- 2.1.3. An appropriate font size for the description that ensures comfortable reading by S&T staff shall be decided as per the site requirement and gear description details.
- 2.1.4. If available, wago of different colors as per color coding, may be used along with ferrules.

2.2 for new installations

In new installations, Ferrules with printed function identification as per the color coding must be provided to every cable conductor to streamline writing practices.

3. Description details of the terminal on CTR

3.1 Numbering of the cable termination racks. (Ref Pic-3)

- 3.1.1 The cable termination racks should be numbered sequentially from left to right as CTR-1, CTR-2, and so on.

- 3.1.2 Each row of Wago/ARA terminals should be numbered sequentially in capital letters i.e. A, B, C, D, and so on from top to bottom.
- 3.1.3 Each wago terminal in the block of 12 terminals (as clarified in para 3.1.3) shall be numbered as 1 to 12 from left to right, After no 12, adequate space shall be provided, and the next block shall be numbered from 13 to 24 and so on.
- 3.2 The Centre-to-Centre distance between two rows of wago/ARA terminals should be adequate. After each cable termination in a row, there should be a minimum gap equivalent to one terminal or two spacers/dummy terminals.
- 3.3 Screwless Disconnection Terminal or any other RDSO-approved terminal shall be used for cable termination.
- 3.4 The cables terminated on the CT rack shall be identified by punched labels or cable identification tags tied on each end of the cable for correct identification.
- 3.5 As per para 15.1.2. (c) of IRSEM, cables shall be provided line-wise and function-wise.
- 3.6 The minimum clearance of the bottommost terminal in the CT rack shall be normally 300mm from the ground.
- 3.7 CT Racks Particulars (i.e. Function wiring and termination details) shall be provided in a convenient way as per the number of K racks and availability of space on the wall. It shall be fixed in such a way that signal staff can refer to the same to view the CT rack in case of urgency. Some of the suggestions are given below,
- May be made in A3 size either using Vinyl Printing or Flex Printing on 300 GSM PVC banner roll. The same can be fixed on the wall through a suitable wooden/metallic frame (CT Board) adjacent to the CT rack. In case two sheets are to be displayed simultaneously, a sliding frame mechanism & multiple leaf mechanism can be utilized where two sheets can be displayed in the front and the remaining can be available in the back. Sheets in the back may be viewed by sliding the front frame.
 - K-Rack details may be printed and laminated on separate A3 sheets and kept in a single U-Channel slot fixed on the nearest wall.

4. The process of shifting a defective cable core:

Please follow the instructions below to shift a defective cable core:

- 4.1 First, refer to the K-rack chart and locate row K, column A, S/12 RG core no. 7 and 8 of cable no. 1278 which is defective and shows low insulation.
- 4.2 Next, remove the defective conductor and attach a "Defective Tag" Ferrule on it.
- 4.3 Then, take appropriate lengths of jumper cable and attach them between cable no. 1278 and 1279.
- 4.4 Finally, label the tag with "From cable - 1278 (7,8) to 1279 (7,8)" to indicate the transfer from the defective core of cable no. 1278 to the core no. 7 and 8 of cable no. 1279.
- Please make sure to label the function name on the K-Rack before leaving the relay room where the function has been transferred. (Ref pic- 4, *Please note that the jumpers must be provided behind the CT rack shown in the image)
- 4.5 It is important to conduct a cable test before transferring the cable conductor, even if there is a cable description tag present on it. After the transfer, a correspondence test should also be carried out before making the reconnection.

5. Periodical Verification & Validation: -

5.1 it is essential to conduct regular verification and validation of cable termination before the commencement of the monsoon season, particularly during cable meggering.

5.2 After the monsoon season, the person in charge of the SSE or Signal section should verify and update any changes in cable or wiring termination details. They should also replace or update the description boards accordingly.

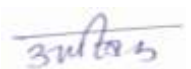
This practice should be followed for all future installations and as much as possible in existing installations. This has been issued with the approval of the Board (Member/Infra).

If more than 10 corrections are made in the K-Rack chart, a fresh and updated chart must be provided in the relay room with updating date.

B. Outdoor:

1. Writing descriptions of functions on outdoor location boxes are the same as mentioned in Indoor practices. If possible, like CT rack details, cable details chart kept or mounted in location boxes.
2. In the location boxes, all cable addresses must be tagged by providing a printed flip. The respective location/equipment names between laid cables must be printed on the flip. (Ref pic-5)
3. The cable termination details may be printed in color on suitable paper and kept in a plastic pack inside the location box.
4. The cable termination details are printed on a flex board or any board suitable for local weather conditions and mounted on the location box door with the same color coding as possible. (Ref- Pic-6)
5. To address the issue of cable failures, the conductors shall be transferred to healthy wires. It is recommended that all Sr. DSTEs shall ensure to update the cable core chart on board. If there are 10 or more corrections made to the location chart, a fresh and updated chart should be provided in the location boxes.

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	<p>The description writing work shall be carried out before the commissioning of the station. This description writing work includes writing the details in the Relay Room and Location boxes.</p> <p>All the location boxes and the signal posts shall be painted with the distance of installation from the centre of the track.</p> <p>The colour& painting scheme as per provisions of SEM and Western Railway practice should be adopted.</p>
35.	Fabrication and fixing of 'A' Marker (Drg No. CSTE/6180), 'AG' Marker (Drg No. CSTE/6181), 'P' Marker (Drg No. CSTE/6182), Arrow Marker (Drg No. CSTE/6183), 'G' Marker (Drg No. CSTE/6184), 'C' Marker (Drg No. CSTE/6185). Marker disk on signals as per standard practice All material required for this work shall be supplied by Contractor.
36.	Supply & Fixing of Stop Board, Block section limit Board, goods warning board and all other boards with contractors own material. The work shall be done as per instruction of Rly. Engineer incharge as per IRSEM.
40 & 41, 48 & 49	<p>Specifications and Requirements for the Casting of CC foundation for apparatus case.</p> <p>The foundations shall be made as per the standard drawing issued to contractor. Before starting the digging work for foundation the location of the foundation shall be jointly verified and signed by the representatives of Railways and Contractor. While finalizing the location of foundation it must be taken care that the schedule of dimensions and other provisions of SEM are strictly adhered to. The distance of apparatus case with door fully opened should be minimum 2.36 meter from the centre of tracks on all sides. The foundation of apparatus case shall not be on the banking of the terrain. If the foundation on the bank is unavoidable (only in exceptional circumstances) due to site conditions, necessary supports should be provided as approved by Engineer-in Charge. The pit around the apparatus case shall be dug so that the top of the cable is minimum 0.5 meter below the ground surface level i.e the depth of the pit near the apparatus case shall be increased as per the site requirement. Once cables are put inside the location boxes, the bottom portion of the location shall be filled with sand and a layer of PCC shall be done to prevent entry of rodents and reptiles. In addition to this if the required depth is not available, then as per approved scheme by Engineer-in Charge; the contractor shall make a brick chamber like structure and fill the chamber with sand. The whole pit shall be covered with concreting. For this activity the concreting and brick work shall be paid by Railways as actual from the scheduled quantity of items.</p>
	Specifications and Requirements for the Installation of All Type of Apparatus Case.
	<p>The apparatus case shall be first rubbed to remove the rust in a complete way both inside, outside and all the interiors and corners. Then one coat of red oxide shall be painted on the complete body of the apparatus case including the abse are. The apparatus case shall be fixed properly carefully without damaging it. Angles shall be properly fixed for complete length of the apparatus case with the help of angles and clamps. One coat of silver paint on the outer side of the walls of apparatus case and one coat of white/silver paint on the interior sides shall be painted before fixing the hylum board. Both E-type locks shall be fitted before the painting. If some how both E type locks are not covered in schedule due to some reason, the other side hole shall be covered with GI sheet of minimum 3mm thickness to prevent entry of rodents and other reptiles. The piece of sheet shall be supplied by the contractor. The holder and good quality location lighting switch shall be fixed on a piece of Hylum sheet. This piece of hylum sheet shall be supplied by the Railways.</p>
42.	Fabrication and fixing of SMC sheet in location box by providing all fixtures as per Railway Drawing including fixing of PVC coated string rods at the back side for cable support with contractor's own materials. The work shall be done as per Drg and arrangement similar to SK 783-1/2. With latest alterations & as per instructions of Rly engineer at site. Note: SMC sheet will be taken in place of phenolic laminated sheet. Single Case
43.	Fabrication and fixing of SMC sheet in location box by providing all fixtures as per Railway Drawing including fixing of PVC coated string rods at the back side for cable support with contractor's own

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	materials. The work shall be done as per Drg and arrangement similar to SK 783-1/2. With latest alterations & as per instructions of Rly engineer at site. Note: SMC sheet will be taken in place of phenolic laminated sheet. Half Case
44.	Preparation and fixing of location box board on 03 mm ACP sheet with size 12 x 18 size A3 for location box including pasting of printed/ painted vinyl sheet and lamination (printing/painting of location detail on vinyl sheet covered in schedule item separately).
45.	Fixing of ARA:- As per Standard practice& as per instruction of Engineer incharge.
46.	Specifications and Requirements for Termination of the Cables: All the cables shall be terminated on the Disconnecting terminal block/ARA terminals as schedule and as per as per approved scheme by Site in charge of Railways. Te scheme and number of cable to be terminated in different Location Boxes shall be approved by site – in – charge of Railways. While termination the cables it shall be ensured that the cables incoming to the location from one side shall be taken and dressed in one side (i.e. LHS or RHS) in the back side of the location. The cables going out of the locations shall be taken and dressed in the opposite side to the upper one in the back side of the location. All the cables shall be neatly dressed and terminated with help of proper support. It shall be ensured that the cable conductors shall be supported by string rods at each row of the cables in the back side. The string rods for the above shall be supplied by the contractor along-with insulation sleeves. All the conductors of the cables shall be dressed by threads also. At the bottom of the location box/Relay Rack/CT rack, all the cables shall be dressed in one row only. No jumble of cable is allowed to be formed. Each and every cable should be separately identifiable. At the bottom side the armoury of all the cables shall be removed and bent outwards so that no sharp edge of the aroury is in direct contact of the cable. All the cable cores shall be meggered at the time of terminations. A report shall be submitted to the Railways in proper format of Railways. At the front side of the location, sufficient space should be left between two rows; so that cable details may be painted (the painting item is separately covered under other schedule item.
47.	Cement concrete work for miscellaneous items in the ratio 1: 3: 6. Item includes excavation, ramming, curing and plastering with cement & sand mixture (aggregate not exceeding 3.8 cm.) (Aggregate cement & sand to be supplied by the contractor).
50.	Specifications and requirements for Digging of Trenches in the Soft Soils, Asphalted area and Track Crossings. <ul style="list-style-type: none"> The contractor shall depute proper and competent supervisor for trenching and cable laying work. Before starting the trenching foot by foot survey shall be done along with the Railway's representative. The cable route shall be jointly finalized by the contractor's and Railway's representatives. The proposed cable route plan shall be submitted to the Engineer-in-Charge and it shall be got approved. In addition to the main cable plan, a track crossing plan shall also be got approved before starting the work. The cable shall be laid at the Railway's boundary(one meter inside the outermost boundary). While trenching it shall be kept in mind the depth of the trench shall be 1meter until and otherwise specified by the engineer in charge. All the payments shall be made in cubic meter accordingly. The preparation of trench shall include the clearing of roots of tree and bushes and removal of any minor obstruction in the path of trenches. It also includes clearance of any concrete foundation like foundation for OHE mast etc. If it is not feasible to clear the route the route shall be diverted accordingly with the prior permission of the engineer in-charge. Railway decision will be final. All excavated earth shall be staked by the contractor away from the track and not on ballast or shoulders. The contractor shall take written permission from the Supervisor –in-charge or from the person authorized by him, before trenching work is commenced. Any permission for trenching and laying of cable from the Municipal Corporation or any other authority including Railway if

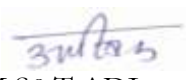
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required, will be obtained by the Railway. At the discretion of the Engineer-in-charge, the trenching and laying of the cable will have to be undertaken simultaneously at more than one location.

- In case digging is to be done in between tracks the excavated earth shall be carried manually beyond the adjacent track/tracks and stacked completely outside.
- In case the trench gets filled up with water from the surrounding are due to rain etc, the Contractor shall have to make his own arrangement to pump it out without any extra charges payable for the same.
- If during the trenching, any cable markers, obstruction such as pipes or cables or any bricks or warning covers which appear to be deliberately placed in the location is noticed, the digging should be stopped immediately and the Railways Supervisor should be called. Further excavation will be done in his presence very carefully with the help of wire claws and digging can be further resumed only with the permission of the Engineer/Supervisor-in-charge.
- Where the cable route is on uneven ground, reasonably long section of consistent grounding shall be dug, rather than following every undulation of the ground.
- **The width/depth of cable trench will be as per guidelines of CSE/CCG's letter no. SG 217/9 Vol. V dated 10/8/2010.**
- Trenching for track crossing and laying of cables across the track shall be done only in presence of the Engineer's representative. No digging shall be done below the sleepers. Digging while crossing a track shall be done between sleepers in the presence of a Railways representative. Before the track crossing it shall be ensured that a commencement notice shall be given to P-way supervisor.
- Before starting the trenching in the asphalted area the contractor shall got prior approval of competent authority. During the trenching and cabling work in the asphalted areas the contractor shall cordon off the area with proper means of barricading and warning board for the area. After the cabling or the laying of suitable pipes or ducts the asphalted area shall be restored back to its earlier state to surface by proper means. While restoring back the contractor shall take care that the level of this area must match with the nearby areas. The trench shall be leveled with soft soil, rammed and platform re-asphalt. The item includes covering of cables laid in trench by soft soil for a depth of 5 c before covering by protection. Levelling of trenches excavated and restoring the original surface is the responsibility of the contractors. During trenching the muck in the form of soil or ballast shall be filled in gunny bags and kept away from the track area.
- **The contractor shall keep one additional man to look for the trains while the trenching and cabling work is being done in track areas. The duties of this person shall be to look for the trains and warn the labours working in the track areas. Railway shall in any case not be responsible for any mis-happaning on the track areas.** The contractor shall ensure that all safety features have been arranged for its labour. The contractor shall also apply for and got issue the ID card for its labour supervisor and associated labour.
- The trenching should be done in a straight route as far as possible except where curve has to be negotiated. Where the direction of the trench is to change, it should be done in a gentle cure and not at sharp angle. The change in the level of the cable when laid shall be gradual and uniform while negotiating the ups and downs encountered in the terrain. Normally trench shall be dug at a distance, from the center of the track to center of trench of 2500 mm for MG and 3100 mm for BG, as shown in Drawing No. CSTE/3644 Page No. 1. However, depending upon site conditions, the decision of the Engineer-in-charge of the Railways shall be final & binding. Digging of trenches will be done in all types of soil including soft rocky and semi rocky soils as per cable route plan and back filing after laying of cables.
- The wok shall be done in accordance with CSTE's Drg. No. CSTE/3644 and latest policy circulars

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issued by Western Railway Headquarters and RB with conventional method in force as per instructions of the Engineer. Digging of cable trench and laying of cables on rocky surface/asphalt platform shall be as per drawing No. CSTE/3644 page 4. Digging of cable trench one mtr. Deep below bottom of sleeper/road level shall be done for track/road crossing as per drawing No. CSTE/3644 page 7 and latest policy circulars issued by Western Railway Headquarters and RB.

- The trench shall be leveled with soft soil, rammed and platform re-asphalt. The item includes covering of cable laid in trench by soft soil for a depth of 5 cm before covering by bricks. Leveling of trenches excavated and restoring the original surface is the responsibility of the contractors.
- **Any cable cut occurred during execution of contractor work penalty will be imposed for damage as per Telecom Circular No. 17/2013 dated 24.06.2013 and Railway board letter no. 2021/Tele/5(2)/3-Part (1) (3425647) dated 12.06.2023.**
- **Penalty to be imposed for damages to cable shall be as under:**

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

Penalty should be levied on the contractor when they work without permission or resort to careless working without making arrangements for protecting cables and other utilities.

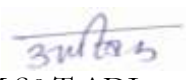
51. **Horizontal Auger boring: -As per Standard practice& as per instruction of Engineer incharge.**

52. **Laying of S&T Cables.**

General Requirements.

- All the cables shall be transported to the site by the contractor by its own means. The cables at site shall be stored properly, fully protected against harsh environmental conditions like rains etc.
- The cables shall be meggered before and after it is laid by the contractor under the supervision of Railway representative and contractor will submit meggering test report for each cable.
- Cable shall be laid in trench/culverts/track crossing only after the inspection by engineering in-charge.
- Cable drums mounted Jackscrew stand shall be used for cable laying to avoid any kinks or pressure on the cable during cable laying. Sufficient manpower should be arranged by the contractor to lay the cable manually so that it does not rub on the ground. If the firm fails to lay the cable with jackscrew and type arrangement, a penalty equivalent to 50% of accepted cost of cable laying for the work carried shall be levied on the contractor. Cable shall be laid with due caution so as not to cause any damage due to rough handling. While laying the cable, precautions shall be taken to avoid any kind of pressure on the cable and also to avoid any twist in the cable.
- The cable drums always be kept i.e axle being kept parallel to the ground. The drums shall not be subjected to jerks, but shall be handed slowly with care. The Side plates of the cable drum should not be damaged while laying the cable, precautions shall be taken to avoid any kind of pressure on the cable.
- After laying of the cables before the terminations in the location boxes it shall be ensured that all the cables are covered with insulating tape/cap at their ends. All the cables shall be taken inside the location boxes marked for the concerned cables. While entering the location boxes it shall be ensured that the pit near the location box is of sufficient size such that after

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burying the cable, the uppermost portion(top) of the cables is at least 0.5meter below the surface level.

- As a matter of practice, until and otherwise, not more than 2-3 meter of coils are left for all the cables as a loop after considering the length required for the termination.
- Before the back filling is done, the cable markers will be provided in such a way as to keep the top portion visible after filling. The marker should be so placed as to be clearly visible and shall not project above rail level of the nearest track and shall not be more than 200mm from the top surface of ground level. There will be one cable marker at every thirty meters interval in addition to additional cable markers to be provided at bends and at such other locations which will be indicated by the supervisor-incharge.
 - (i) One cable route markers shall be placed at the point of divergence.
 - (ii) One cable marker at either end shall be placed at each track crossing.
 - (iii) One cable marker at each side of culvert/bridge etc.

- When Signalling and Main Telecom cables are laid in the same trench, a distance of 100mm is to be maintained between them. When Signalling and L.T. or H.T. power cables are placed in the same trench; they must be separated by a row of bricks between them.

Note: These instructions apply to power cables from 230V to 660V. For higher voltage, larger separation is required and for lower voltage, no separation is required.

In case several cables of different Categories are laid in the same trench, they should be placed in the following order starting from the main track end, so that in case of accidents the maintenance staff may easily recognize the damaged cables from Sight

1stMain Telecom cable.

2ndSignaling Cable.

3rdL.T. Power cable.

4thH.T. Power cable.

In case of Signalling cable running parallel to H.T. or L.T. Power cables in different trenches, minimum horizontal distance of 0.30 metres between Signalling and Power cables should be maintained. At the point of crossing, a minimum distance of 0.20 metres should be maintained between the two cables.

The cable shall be laid in trenches with due caution so as not to cause any damage due to rough handling.

While laying the cable, precautions shall be taken to avoid any kind of pressure on the cable. Instructions of the Engineer- in charge in connection with the laying of cable shall be strictly adhered to. Certain additional precautions for special circumstances are as under:

Laying of Cable Direct in Trech.

For direct laying, the bottom surface of trench should be made free of corrosive elements and the cable to be laid on the bedding of the soft earth of the trench. Depth of trench shall be minimum 1M prior to laying of cable and depth should be measured from the ground level to the bottom of trench. Drawing No. CSTE/3644 page 2 issued should be generally adopted for this method of cable laying. However, the depth of cable trench should be 1meter in lieu of 800mm as mentioned in the drawing.

In case two layers of the cables are to be laid in same trench, the first layer will be covered with soft sand or sieved soil of 25mm before the second layer is laid. In no case, more than two layers of cables to be provided, providing two layer should be avoided as far as possible.

Laying of Cables for Track/Road Crossing

The general arrangement of cable laying shall be as per Drawing No. CSTE/3644 page7 and the cable shall be laid 1 meter below bottom of the sleeper/road levels for rail/road crossing. Jointing of G.I pipe shall be by means of G.I. collars. The ballast disturbed while digging shall be screened and dressed up as required by engineer in charge and the road tarred

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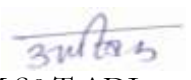
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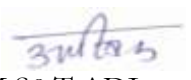
	<p>immediately after the pipe are laid. The work of laying of RCC pipe while crossing the track shall be done under the railway officials's supervision.</p> <p>Cable Laying on Rocky Soil.</p> <p>Cable laying arrangement shall be as per Drawing No. CSTE/3644 page4.</p> <p>RCC trunking will be laid after trench has been inspected by the Engineer's representative. The cable will then be laid with due caution and earth/sand will be filled in the trunking. Capping will be placed in position and back filling of the trench done. Any earth/stones etc. which might have fallen into the RCC trunking should be removed before the same is filled. The RCC capping shall be placed on the trunking only after the supervisor –in charge has approved the cable position in the trunking and sand filling.</p> <p>Any damage to the RCC capping either during the transport or during laying be to any reason whatsoever will be to the account of the contractor and broken RCC capping will not be allowed to be installed.</p> <p>NOTE:- Policy letter no. 01/2024 –dt. 08.01.2024 regarding shifting and laying of signal & telecom cable must be strictly adhere to falling to observe this policy will attached penalty as per policy letter no. No. 2003/Tele/RCIL/1 Pt. IX , New Delhi dated 24.06.2013. Both policy are attached here by for ready reference.</p>
53	<p>AUTOMATIC FIRE DETECTION & ALARM SYSTEM</p> <p>(Conforming to RDSO SPECIFICATION No. RDSO/SPN/217/2021 Version No. 3)</p> <p>1.0 GENERAL REQUIREMENTS</p> <p>1.1 Automatic Fire Detection & Alarm System (AFDAS) shall consist of all or any of the following.</p> <ol style="list-style-type: none"> Probe type Bimetallic Heat detectors for Diesel Generator enclosure. UV & IR flame detectors for Diesel Oil Storage room. Heat and Smoke multi sensors for Diesel generator room, Power Supply Room, non-air conditioned Relay Rooms, ASM Room, and other rooms connected with signaling Installations as required. Heat and smoke multi sensors for CCTC control & equipment Rooms, way side station OFC Room/Quad Repeaters and other rooms connected with Telecom installation as required. Linear Heat Sensing (LHS) cable along with its interface module (for cable trays, cable troughs & cable bunch etc.) <p>Or</p> <p>Linear heat detection system with its interface module (for cable trays, cable troughs & cable bunch etc.)</p> <ol style="list-style-type: none"> Aspirating (air sampling) type smoke detector for air-conditioned Relay Room. Aspirating (air sampling) type smoke detector for Major Telephone Exchanges, Satellite Hubs, Data centre location & Main Switching Center (MSC), Base Station controller (BSC) for MTRC, Test Room/Telecom Control Room and Main OFC Junction Equipment Room. Control Panel – For reading the signals from sensors/detectors, giving audio/visual alarms. Other Items (OI) – like Manual call Points at the entry and exit of various

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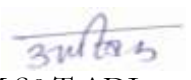
	rooms, connecting cables, relays, Audio Visual alarm etc. necessary for commissioning & reliable operation of the AFDAS.
1.2	The AFDAS shall be modular in structure, so that any fault in any of the modules can be set right by simply replacing the Faulty Module with a spare.
1.3	The AFDAS shall be self –checking & diagnostic type. It shall continuously monitor the health of the sensor/detectors & the complete system including battery. The data regarding health & event shall be logged in the system with date & time stamp, which can be downloaded to a PC laptop at later stage. The system should have capacity to store data for up to minimum of 512 fire events and other events. The control panel shall be networkable to the Zonal Divisional Railway headquarters preferably over TCP/IP and shall have clock synchronization facility.
1.4	The detectors shall be suitable for installation in electrical cabinets, transformers, invertors, cable trays, electronic equipments, power equipment rooms, relay rooms, or any other enclosed areas, which are vulnerable for fire as deemed fit by Indian Railways.
1.5	The system shall be suitable to detect fire/fire like situation in relay room, power equipment room, Diesel generator room, Oil storage room, ASM Room (inside Operating/Maintainer Panel and change over panel) other rooms pertaining to S&T installation, electronic equipment, electrical wiring etc. and generate audio visual alarm.
1.6	The AFDS shall work satisfactorily & reliably over the entire range of following environmental parameters.
1.6.1	Temperature range: -10 ⁰ C to 70 ⁰ C
1.6.2	Humidity :- 0 to 85%
1.6.3	In dusty, sandy, and desert conditions, the OEMs shall specify the frequency for cleaning of the detectors, after installation to avoid false alarms.
1.7	Loop controllers shall have built in interference nullifier so that separate EMI control circuit is not required. The loop distance may be a minimum of 1.2KM as per the recommendation of the manufacturer.
	Or
	Radio frequency/electromagnetic interference and electromagnetic compatibility must be available. The limits for EMI shall be 2KV (±10%), 5KHz (±20%) for Power supply ports and 1KV (±10%), 5KHz (±20%) for input/output signal, data and control ports (IEC 61000 4-4).
1.8	In case it is felt necessary by the railways to add more or additional sensors to the existing Fire Alarm System, the sensors/detectors covered in this specification shall be backward and forward compatible for future expansions.
1.9	The Automatic Fire Detection and Alarm System covered in this specification shall also be able to generate requisite commands to activate “Automatic Fire Suppression System”, where provided.
1.10	It shall be possible to extend the alarm to remote location.
1.11	The working of the equipment shall not cause interference to other electrical/ electronic circuits/systems.

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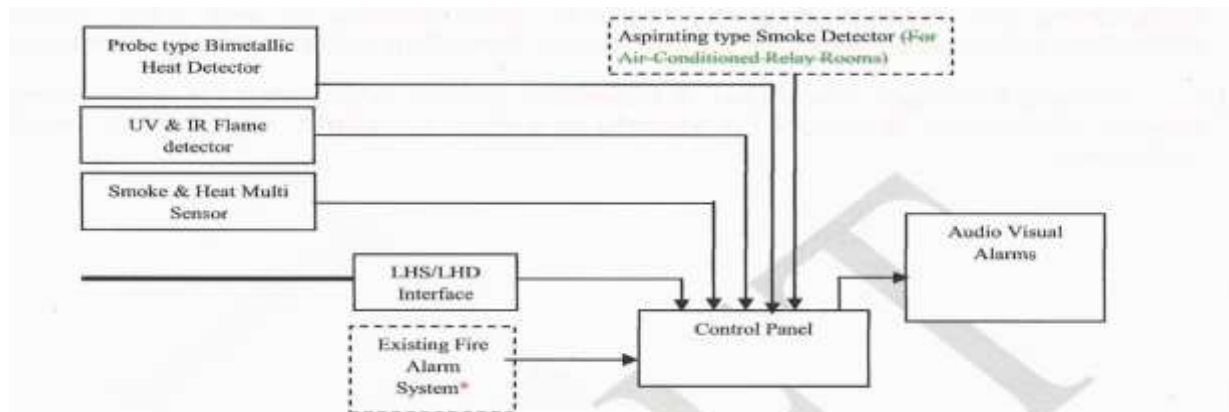

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1.12	The AFDAS shall have provision to provide sufficient sets of Programmable Potential Free NO/NC contracts (minimum 3 NO and 3NC for each room where AFSS installed); to trigger the Automatic Fire suppression system through logical function as per RDSO/SPN/218/2016 or latest pertaining to Signaling Installations. If provided switching off the power supply of power equipment/ relay room (if required) and for interfacing with the existing Data Logger system. The Current carrying capacity of NO and NC contacts shall be at least 500mA.
1.13	The system shall not degrade the performance of relays, power equipments, wiring, cables etc. when subjected to Fire Detection & Alarm process.
1.14	The system shall be capable of working in non- air conditioned environment in the installation except for Aspirating (air sampling) type smoke detector. It shall be suitable for installation of AC/DC electrified and non – electrified sections. It shall be suitable in all areas including where locomotives having thyristor controlled single phase or 3-phase induction motors haul passenger or freight trains and where chopper controlled EMU stocks are operated.
1.15	The general principles of the Automatic Fire Detection & Alarm System (AFDAS) shall be as follows:-
1.15.1	The response time for alarm generation from the time of detection by sensors/detectors shall not exceed ten seconds (NFPA 72 Edition 2016 Para 10.11.1). It shall reliably transmit the detected signal to the control Panel, so that it can translate this detected signal into suitable alarm signal and warn the railway personal for taking corrective action.
1.15.2	It shall indicate or display the location of fire, status of detectors with all stages of alarms.
1.15.3	It shall be possible to expand the system by minimum 20% in future in terms of various types of sensors subject to minimum of two sensors in each category.
1.16	Power Supply Arrangements for AFDAS: The primary source of supply shall be 110V/230V AC to be given by Railways. In case, failure of primary power supply the system shall work on Secondary power source (battery backup) as part of the system. The minimum cut off voltage for primary shall be specified by OEM. Whenever the primary power supply fails to provide minimum voltage required for operation, the secondary source of power supply shall automatically provide power within 10 seconds (Clause 10.6.6.1 of NFPA 72 Edition 2016).
1.17	The System design shall not incorporate use of any radioactive material. A declaration shall be submitted by the supplier in this regard at the time of product approval.
1.18	It should be feasible to cover both Signaling & Telecom installations with Single Automatic Fire Alarm & Detection System and common control panel where both installations are located close by like way side stations or any other location. Otherwise independent Automatic Fire Alarm & Detection System shall be provided.
1.19	In case Automatic Fire Alarm & Detection System is provided for a signaling or telecom installation, it should be feasible to extend to nearby signaling or telecom installation.

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2.0 GENERAL ARRANGEMENT OR AUTOMATIC FIRE DETECTION & ALARM SYSTEM (AFDAS):



- The existing Fire Alarm System may be any system conventional or addressable, if already provided, prior to this scheme.

3.0 TECHNICAL REQUIREMENTS

3.1 GENERAL

3.1.1 The AFDAS may consist of Probe type Bimetallic Heat Detectors, UV&IR Flame Detectors and Heat & Smoke Multi Sensors which shall be installed, at critical locations to detect smoke, temperature rise & absolute temperature & send the signal to control Panel. The AFDAS shall be an addressable system with facility to program cross zoning of detectors. In addition, Linear heat Sensing cable shall be laid in cable trays, battery boxes, power equipments etc. for heat detection & sending the signal to the Control Panel through an interface. On getting the signal from above detectors/sensors, Control Panel shall give Audio Visual Alarm to the railway personnel to actuate Fire Extinguishing System manually. The AFDAS shall also have a feature to trigger 'Automatic Fire Suppression System' (if provided) when the suppression system is interfaced with AFDAS.

3.2 DETECTORS IN DIESEL GENERATOR ENCLOSURE/OIL STORAGE ROOM

3.3 PROBE TYPE BI-METALLIC HEAT DETECTOR FOR DIESEL GENERATOR ENCLOSURE.

- Probe type bi-metallic resettable type heat detectors shall be used for diesel generator enclosure.
- The actuating temperature shall be as per the model number offered by the manufacturer, same shall be considered in type/acceptance test. The manufacturer may specify as many models as possible. The probe type bi-metallic heat detector shall be chosen by the purchaser such that the temperature rating of the detector shall be at least 11⁰C above the maximum operating temperature of the diesel generator.

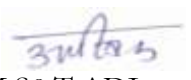
(Ref: Clause no. 17.6.2.3 of NFPA 72-2016).

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	<ul style="list-style-type: none"> c. It shall be able to detect temperature and shall communicate alarm signal to Control Panel when temperature rises above the defined value. d. The insulation resistance of the detector shall not be less than 10M ohm.
3.4	<p>UV and IR FLAME DETECTORS FOR OIL STORAGE ROOM.</p> <ul style="list-style-type: none"> a. Diesel Oil Storage room shall be provided with UV and IR flame detector to facilitate diesel fire detection. b. The range of flame detector shall be at least 10m. c. The response time of the flame detector shall be less than 10 seconds. d. The flame detector shall be resettable. e. It shall not give false alarm under solar or electrical light conditions. f. It shall be UL/FM/VDS/LPCB approved/listed. g. The flame detector shall be able to communicate the fault and fire event to the control panel. h. The flame detector shall be suitable for operation in a temperature range of 0-49°C. i. The insulation resistance of the flame detector shall not be less than 10M ohm.
3.5	<p>HEAT & SMOKE MULTI SENSOR FOR POWR EQUIPMENT ROOM, BATTERY ROOM, ASM ROOM, NON-AIRCONDITIONED RELAY ROOMS, DIESEL GENERATOR ROOMS.</p>
3.5.1	Heat & Smoke multi sensor shall be robust, rugged, & suitable for surface mounting.
3.5.2	Heat & Smoke multi sensor shall incorporate state of art optical chamber providing efficient & accurate detection of fire with high level of reliability & high immunity to spurious signal. The sensitivity of the Heat & Smoke multi sensor shall vary with the ambient conditions including dust particles to reduce false alarms.
3.5.3	Heat & Smoke multi sensor shall incorporate integral LED indicator to show the status of the detector.
3.5.4	Each Heat & Smoke multi sensor shall have suitable indications for indicating Normal Healthy Mode & Alarm Indication mode.
3.5.5	The detector's alarm condition shall be visible from a distance of 6 meters and shall be visually different from the indications of the other conditions.
3.5.6	The insulation resistance of the detector shall not be less than 10M ohm.
3.5.7	Failure of any indicator shall not prevent the detector from emitting fire signal indicating the existence of fire.
3.5.8	The Detector/devices must have inbuilt fault isolator or alternate arrangement at detector level which shall isolate the detector in case of short circuit or open circuit in the loop.
3.5.9	The detectors shall be addressable and resettable type.

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- 3.5.10 It shall detect the fixed heat above 58⁰C and the rate of temperature rise (between 6⁰ to 11.1⁰C/minute) independently in addition to the photo electric smoke detection.
- 3.5.11 The detectors shall be provided with means for mounting (on ceiling/wall) securely and independent of any support from the attached wiring.
- 3.5.12 Plastic, if used for detector, shall not start softening, deforming, or melting at a temperature lower than 95⁰C as per Clause 4.2 of IS: 2175-1988
- 3.5.13 Smoke detector in this multi –sensor shall be able to detect smoke and shall communicate alarm signal to Control Panel when optical density of smoke/obscuration fall within the limit as follows:

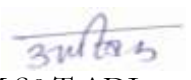
Limit	% obs/m	%obs/ft
Lower	1.6	0.5
Upper	12.5	4.0

- 3.5.14 The ratio of highest r.t.v and lowest r.t.v shall not exceed 1.6 in the least favorable direction, i.e. the direction opposite to the beam of LED.
- 3.5.15 The smoke and heat multi sensors can be provided in power equipment room, battery room, ASM room, non air-conditioned relay rooms, diesel generator rooms, CCTV Control & Equipment Rooms, Way side Station OFC Room/Quad Repeaters and other rooms of S&T installation, as required.

3.6 ASPIRATING (AIR SAMPLING) TYPE SMOKE DETECTOR.

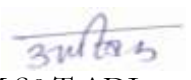
- 3.6.1 The air sampling—type detector system shall be able to withstand dusty environments by onboard monitored air filtering, Auto cleaning facility in optical chamber, electronic discrimination of particle size, or other listed methods or combinations thereof. The detector should be capable of providing time delays (< 10 seconds) of alarm outputs to eliminate nuisance alarms due to transient smoke conditions. The detector should also provide facilities for the connection of monitoring equipment for the recording of background smoke level information necessary in setting alert and alarm levels and delays. It shall have event logging facility with date and time stamp.
- 3.6.2 Air Sampling Type detector shall use LASER or High power LED. This type of detector shall use piping or tubing distribution network that shall run from the detector to the areas to be protected. The aspiration fan in the detector housing shall draw air from the protected area and back to the detector through air sampling ports, piping, or tubing. At the detector, the air shall be analyzed for fire products.
- 3.6.3 The detector shall have the capability of generating four alarm signals depending upon level of smoke detected, for example,
Example (1) :- Stage 1 – 0.5 to 0.95% obs/m
Stage 2 – 1.0 to 1.45% obs/m
Stage 3 – 1.5 to 1.95% obs/m
Stage 4 – ≥2.0% obs/m

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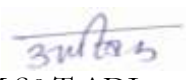
	<p>Example (2) :- Stage 1 – 30% of alarm stage 4</p> <p>Stage 2 – 50% of alarm stage 4</p> <p>Stage 3 – 70% of alarm stage 4</p> <p>Stage 4 – $\geq 2.0\%$ obs/m</p>
3.6.4	The value of the smoke levels may be adjusted depending upon the site conditions
3.6.5	The piping or tubing to air sampling ports shall be laid depending upon the floor area. detailed as below:
3.6.5.1	Required number of sampling point shall be provided on either side of each - relay rack, cable termination rack, Air Conditioner, 230V AC Used and unused points etc.
3.6.5.2	Maximum transport time from the most remote port to the detection unit of an air sampling system shall not exceed 60 seconds.
3.6.5.3	Minimum sensitivity settings above ambient airborne levels for the air sampling system installed shall be as follows:
3.6.5.4	Alert condition: 0.2 percent per foot obscuration (effective sensitivity at each port). Alarm condition 1.0 percent per foot obscuration (effective sensitivity at each port).
3.6.6	It shall be suitable for operation in a temperature range of 0-49°C.
3.6.7	The aspiration type smoke detector should be UL or FM or Vds or LPCB listed/approved.
3.7	PIPING STANDARDS
3.7.1	The pipes used in the pipe network shall be made of CPVC and shall be listed/approved by UL or FM or Vds or LPCB or tested with appropriate equivalent standard to cater for ceiling temperature of 69°C. The pipe and their assemblies such as couplings, unions, elbows, tees, end caps, capillary tubes, sampling ports, mounting brackets shall be as per the recommendation of manufacturer of Aspiring (Air Sampling) type smoke detector.
3.7.2	All distribution piping shall be installed by qualified individuals using accepted practices and quality procedures.
3.7.3	In cabinet and above cabinet sampling shall also be planned as per request of the purchaser.
3.7.4	The system integrator shall carry out the piping design and validate the same with a hydraulic flow calculation generated by using the UL or FM or Vds or LPCB approved software. The appropriate fill density shall be arrived at based on the same.
3.7.5	The design & calculation shall be checked & certified by manufacturer/manufacturer trained design engineer.
3.7.6	Plans and calculations shall be approved prior to installation.
3.8	LINEAR HEAT SENSING (LHS) CABLE

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3.8.1	Temperature sensitive cable also known as Linear Heat Sensing Cable shall be laid in all cable trays located in Power Equipment room and relay room and Telecom Room. Signal about alarm temperature shall be sent to Control Panel by LHS interface module attached with cable system.
3.8.2	Linear Heat Sensing cables shall be of temperature sensitive insulated wire type.
3.8.3	This linear heat sensing shall be in the form of continuous cables consisting of conductors / cores and shall be of analogue type.
3.8.4	Each core of analogue Linear Heat Sensing cable shall be insulated with a negative temperature coefficient material. (Clause 5.1.1.4 of IS: 2189-2008). An outer sheath of high temperature, flame retardant PVC insulation, shall protect the cores. The outer sheath or metallic braid shall not affect the performance of the heat sensor.
3.8.5	The Linear Heat Sensing cable for each zone/room shall be connected to an electronic interface module, which shall sense the temperature variations by continuously monitoring the resistance of the negative temperature coefficient core insulation. The electronic interface module shall be located suitably in the area being protected.
3.8.6	The analogue linear heat sensing cable of every zone shall be continuously monitored for open and short circuit. A breakage, disconnection or a short between cores shall initiate a FAULT alarm on the fire alarm panel of Control Panel.
3.8.7	LHS cable shall be resettable type.
3.8.8	The design of the analogue, linear heat sensing cable and corresponding electronic sensing circuits shall be such that the cable length and the number of required loops should be set up to provide optimal coverage for the desired region with cable length ranging from 10m to 200 m. The system shall be designed to have an optimum sensitivity.
3.8.9	For a given length of sensing cables it shall be possible to set the alarm temperature at 70°C with an Interface Module and with a tolerance not to exceed $\pm 8.3^\circ\text{C}\%$.
3.8.10	The Linear heat sensing cable should have strong capability to withstand the mechanical damage, tensile, water, corrosion and electromagnetic interference.
3.8.11	Linear heat sensing cable should be brought from UL or FM or Vds or LPCB approved/ listed.
3.9	LINEAR HEAT SENSING (LHS) INTERFACE MODULE
3.9.1	LHS Interface should be a microprocessor based device that communicates between LHS Cable and Control Panel. It should be an intelligent device that will monitor LHS cable for continuity and over temperature fire signatures. Performance of the linear heat sensing cable along with its interface module shall be immune to changes in ambient temperature.
3.9.2	An increase in temperature at any location along the LHS cable's length shall lower the resistance between conductors in the cable. The change in resistance shall be detected by the interface module, which will trigger an alarm at the

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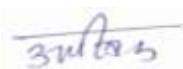
	Control Panel if the temperature rises above a preset threshold.
3.9.3	The LHS interface shall be able to distinguish between a Short Circuit Condition & an Actual Fire Event in order to prevent unwanted activation of fire alarm system, in case of an accidental short circuit fault by damage to the sensor or field wiring.
3.9.4	The LHS interface shall supervise the sensing cable for alarm temperature condition, open & short circuit to generate a fault condition which shall be displayed on the interface module faceplate by the 2 LED indicators: FIRE LED & FAULT LED.
3.9.5	The LHS interface module shall be suitable for operation in a temperature range of 0-49°C.
3.9.6	Linear heat interface module should be UL or FM or Vds or LPCB approved/listed.
3.10	CONTROL PANEL
3.10.1	Detection, actuation, and control system shall have provision for automatic as well as manual operation. Where they are automatic, provision shall also be made for manual operation.
3.10.2	The Control Panel shall be the central processing unit of the system, receiving and analyzing signals from Probe type bimetallic heat detectors, UV&IR flame detectors, Heat and Smoke multi sensors, LHS Interface and Manual Call Points, providing audible and visual information to the user.
3.10.3	It shall have suitable audio visual alarms for drawing attention/indicating various events.
3.10.4	It shall also have the capability to electronically/electrically activate and release Fire Extinguishing System, if used any.
3.10.5	The Control Panel should be located in Station Master's Room as per requirement of purchaser.
3.10.6	The Control Panel shall have sufficient input ports for connecting various sensors/detectors along with their interfaces, if any, & shall have sufficient output ports for controlling fire extinguishing system, operating/switching off electrical units and shall have provision for remote monitoring in network. The system shall be approved by UL/EN/FM/Vds/LPCB. The software shall be able to monitor the health of each detector and other devices along with control panel. It shall also have clock synchronization facility.
3.10.7	There shall be preferably one Control Panel for a station. However, at stations having bigger relay room & power equipment room deploying more number of sensors/ detectors, more than one Control Panels can be provided but there shall be a main Control Panel also to control fire extinguishers, to provide alarms, for user interaction etc. of the entire installation through the individual Control Panels.
3.10.8	The control panel shall be designed to work on power supply of 110V/230V AC +10%,-15% with DC battery backup of adequate capacity. The control panel shall have in-built charging facility for DC battery backup for at least 24 hours for operating the system at quotient load and then 15

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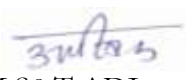
	minute under fire or emergency condition at maximum connected load (CI 10.6.7.2.1.2 of NFPA 72 Edition 2016). Addressable modules can be used if required to connect electronics of LHS interface module and Aspiration Type Smoke Detector to the control panel.
3.10.9	The Control Panel shall have means for the user to visualize and interact with the complete Automatic Fire Detection and Alarm System layout through a user friendly software executable on a standard Windows based Personal Computer.
3.10.10	The front panel of the Control Panel shall have the facility of buzzer silence, alarm silence and alarm activate, lamp test & reset. The front panel shall also indicate the status like fire, fault, disable, test, supply, primary supply fault, battery fault, secondary supply fault, and earth fault by respective LEDs/other suitable means.
3.10.11	In case of lo/ w battery, the system shall give audio visual indication in the control panel.
3.10.12	The Control Panel shall be able to communicate and display the exact number of the sensor, which has activated the fire detection system, for pinpoint location of the seat of fire.
3.10.13	It shall be possible to download data or extend alarms from Control Panel through suitable ports like RS232/USB or TCP/IP into a PC/Laptop/remote location operating on Windows platform. The software for downloading and analyzing fault data shall be provided & shall be compatible with the latest windows operating system.
3.10.14	Audio Visual Indication shall be provided on the control panel and get activated in case of fire/smoke, trouble/fault and for supervisory function. The audio indication may be from piezo electric buzzer and visual indication may be LED indication and / or LCD display.
3.10.15	Operating devices such as system isolate switches and ancillary equipment; including shutdown equipment; dampers and door closures, required for successful system performance should be considered integral parts of the system. All ancillaries should incorporate manual reset facilities. The exact number of controls required shall be specified by the purchaser as per the site conditions.
3.10.16	The software preferably should have the capability for the following 4 levels of actions:
3.10.16.1	Level 1 – When Stage 1 signal is received from aspirating type smoke detector or an alarm is received from single detector wired in cross zoned manner, it shall activate an audio visual indication in control panel.
3.10.16.2	Level 2 – When Stage 2 signal is received from aspirating type smoke detector it shall activate visual and audio alarm in the SM Room.
3.10.16.3	Level 3 – When Stage 3 signal is received from aspirating type smoke detector it shall activate an alarm condition in the Fire Alarm Control Panel to initiate Railway Staff for extinguishing the fire and shutting off the power supply to signalling system, if required.
3.10.16.4	Level 4 –When Stage 4 signal is received from aspirating type smoke detector or an alarm is received from any other detector such as cross zoned multi sensor, cross zoned probe type bimetallic heat sensor, cross zoned UV&IR Flame detector

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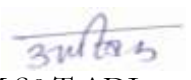
	and independent LHS module, the automatic suppression system, if provided shall get activated after a time delay adjustable by user up to 10 minutes in multiples of 0.5 minutes.
3.10.17	The control panel should have a GSM module and the system(s) shall send SMSs on GSM network to not less than 5 preselected GSM mobile numbers in case of Level 2, Level 3 and Level 4 signals or as desired by the user . The mobile numbers shall be configurable. SMS shall be generated within 30 seconds of the control panel receiving the detection signals and if the sending fails, subsequent sending of SMS shall be tried by the system immediately. The SIM required for the GSM modem shall be provided by the purchaser. The GSM modem shall be from reputed make and compatible to Quad-band GSM 850, 900, 1800 and 1900 MHz. It shall support GPRS class 10 and shall work on power supply of the AFDAS with suitable power supply adapter. It shall be able to withstand operating temperature 0°C to 49°C and humidity up to 85%. The GSM Module shall be an optional item and shall be supplied as per request of the purchaser.
3.10.18	The Alarm of Control Panel shall have means to indicate the room i.e. Relay Room or Power Equipment Room or DG Room etc., from where the alarm situation has been reported and shall also indicate the location of sensor in that room which has reported the alarm situation. The Control Panel shall activate the fire extinguisher, if used any, of that room only for extinguishing the fire.
3.10.19	The front panel shall have character display (LED/LCD) and alphanumeric keyboard. The control panel shall also work in degrade mode, i.e., the failure of the control panel shall operate the audio-visual and other output devices in case of an alarm detected.
3.10.20	For Signaling installations at smaller yards (less than 400 routes and important junction stations) control panel must have the provision for working in degrade mode. i.e. during the failure of communication between loop control circuitry and CPU of the control panel shall operate the audio- visual and other output device in case of an alarm is detected.
3.11	AUDIO VISUAL ALARM:
3.11.1	Audio visual alarm (Hooter and strobe) shall be provided with Control Panel where required.
3.11.2	Audio visual alarm system shall get activated in Control Panel in case of fire/smoke.
3.11.3	Visual Alarm (strobe) It shall be preferably flashing type RED /WHITE color.
3.11.4	Audio visual alarm (hooter) :- It shall be preferably with Piezo electric type sounder. The sound level shall be preferably adjustable type up to 90db at a distance of 1m.
3.11.5	Visual Alarms: It shall work on 24V DC and shall be preferably flashing type RED Color.
3.11.6	Audio and Visual alarms (Hooter and strobe) can be extended to ESM duty room, subject to condition that it shall not be beyond the maximum loop distance.
3.12	FIRE SURVIVAL CIRCUIT INTEGRITY CABLES

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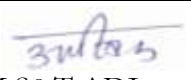
3.12.1	The electrical characteristics of all cable, such as voltage drop, current carrying capacity, impedance and, where appropriate, ability to transmit data shall be suitable for the system.
3.12.2	The Circuit Integrity cable specification for AFDAS is as follows:
3.12.3	Armored copper cables of minimum 2 Core x 1.5 sq.mm having cross linkable Low smoke halogen free insulation, inner & outer sheath, 1000V rated, twisted shall be used when the entire circuit is not within the same building.
3.12.4	Unarmored copper cables of minimum 2 Core x 1.5 sq.mm having cross linkable Low smoke halogen free insulation and sheath, 500V rated, twisted with ATC un insulated circuit protective conductor of 1.5 sq.mm, aluminum tape screening shall be used when the entire circuit is within the same building.
3.12.5	Armored and unarmored shall have anti-rodent outer sheath with Low Smoke Properties.
3.12.6	Armored & unarmored (CI) cables should meet fire performance test under simultaneous action of Flame, water stress and impacts on single sample at 950°C for minimum 2 hours, certified by LPCB or equivalent. Vendor shall submit certificate for the same.
3.12.7	The cables used shall be exclusively for fire detection system. The multi-core cables shall not be shared for other low voltage or high voltage circuits.
3.12.8	Cables connected to detectors shall be given 'S' loop on both the sides of the detectors which shall be properly clamped to the ceiling. Loop shall also be left where cables connect sounders, panels, dampers, etc. Appropriate 2 hours fire rated glands shall be provided where the cable enters the junction box.
3.12.9	All the cables and wires shall be tagged with colour band for proper identification.
3.12.10	The cable manufacturer should provide test certificate related to the manufacturing of fire resistant wires & cables from UL/FM/EN/Vds/LPCB/ BRE Global or any recognized lab by Government of India. The vendor shall also give self certification in this regard.
3.13	MANUAL CALL POINTS
3.13.1	Manual call points must be mounted visibly along escape and rescue routes (e.g. exits, passageways, stairwells) and be easily accessible.
3.13.2	It shall be installed at a height of 1400 mm \pm 200 mm measured from the middle of the manual call point to the floor.
3.13.3	Manual call points must be sufficiently lit with daylight or another light source (including emergency lighting). Lighting shall be provided by the purchaser.
3.13.4	It shall be addressable & resettable.
3.13.5	Visual indication of normal operation and activated operation shall be available.
3.13.6	It shall have inbuilt fault isolator or alternate arrangement which shall isolate the Manual Call Point in case of open/short circuit fault within it.
3.14	CROSS ZONING
a.	Two adjacent detectors at a particular location shall be addressed for different

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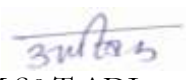
	<p>zones.</p> <p>b. If only one detector is triggering the control panel, it shall give audio visible indication in the control panel.</p> <p>c. If Air Sampling type Detector is provided in the relay room, then stage-3 signal shall be considered as fire like situation. Cross zoning is not applicable for this detection system.</p> <p>d. If both the adjacent detectors are triggering the control panel, then fire like situation shall be accepted and fire alarm system shall act accordingly.</p>
3.15	<p>SITING AND SPACING OF DETECTORS</p> <p>a. A minimum of two probe type bi-metallic heat detectors shall be provided inside the Diesel Generator enclosure. Each detector shall be addressed /wired in cross zoning manner.</p> <p>b. A minimum of two UV&IR flame detectors shall be provided in the Diesel Oil storage rooms. The inter-distance between two UV&IR detectors shall be at 10m subject to a minimum of two numbers in a room. Each detector shall be addressed /wired in cross zoning manner.</p> <p>c. One number Smoke and heat multi sensor shall be provided on either side of each – one way relay rack, cable termination rack, each IPS equipment, each power panel, Change over panels, Operating Panel, Maintainer Panel, 230V AC Points used or unused, above Air Conditioner and other locations where fire like situation can arise. Each sensor shall be wired/addressed in different zones. If one detector only identifies fire like situation, then control panel shall provide only visual alarm. If both the adjacent detector provides the trigger for alarm, then the control panel shall treat as fire like situation.</p> <p>d. Manual call points shall be provided at each entrance/exit.</p>
3.16	<p>REQUIREMENTS TO BE FULFILLED BY MANUFACTURER/ SUPPLIER:</p> <p>Certificates/ Approvals/ Experience of the product / manufacturer</p> <p>a. The manufacturer must be certified with ISO 9001 (the scope of the ISO Certification has to specifically refer to the manufacturing of the products related to AFDAS). The copy of the certification shall be provided by the manufacturer. The manufacturer in this specification shall at least manufacture the Control Panel, Heat and Smoke Multi Sensor, Audio Visual alarms and Manual Call Point. The manufacturer may outsource the left over items of AFDAS from other firms, but shall be responsible for the complete system functioning. The outsourced firms shall be ISO 9001 certified and the certification shall refer to the manufacturing of products being outsourced.</p> <p>b. Manufacturer shall guarantee for supply of spares during life of the equipment & extend maintenance support, if required by the Railway/purchaser.</p> <p>c. The supplier shall supply detailed instructions for proper installation of the system. The supplier shall depute his engineers/supervisors to purchaser's site during installation of the equipment.</p> <p>d. The supplier shall associate themselves during commissioning, testing and field trials of the system.</p>

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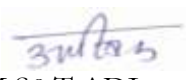
	<ul style="list-style-type: none"> e. The supplier will also offer special tools and instruments separately, which may be required for maintenance. (1 no per 3 Station) f. The supplier shall submit recommended list of spares required for satisfactory maintenance and operation of the AFDAS. g. The supplier shall submit design manual for the system containing detail functioning of each item and its sub-assembly giving following details about: - h. Testing procedure i. Diagram & layout. j. Write up on the working of fire and smoke detection system. k. The supplier shall supply the user's manual for maintenance and trouble shooting. <p>3.17 Testing:</p> <ul style="list-style-type: none"> a. Type, routine and acceptance tests on for the system will be conducted by nominated agencies as per RDSO guidelines. b. Automatic Fire Detection and Alarm System (AFDAS) is shall be able to detect and respond as per the following conditions. c. When a Diesel fire like situation is created at a distance of 10m for UV and IR flame detector shall respond within 10 seconds. d. When temperature exceeds 55°C for Probe type bi-metallic heat detectors. e. When the rate of temperature rise at the heat and smoke multi sensor exceeds 10°C per minute regardless of the actual temperature. f. When temperature at the heat and smoke multi sensor exceeds a pre-determined value of 58°C. g. When optical density of smoke exceeds 0.1db/m (10 m visibility) at the heat and smoke multi sensor. h. When LHS cable senses temperature beyond 70°C. i. When Manual Call Point is actuated j. All the above detectors shall have provision for fault isolation (in-built or alternate arrangement). <p>3.18 TRAINING: The supplier shall impart suitable training in operation & maintenance inspection & testing of the AFDAS as per para.</p> <p>3.19 INSPECTION:</p> <p>Items mentioned in Schedule will be inspected by RDSO.</p>
54.	Specifications and Requirements for placing of various pipes/RCC ducts in trenches
	All the pipes/ducts to be placed in the trenches for laying of cables shall be transported to site by the contractor by its own means.
	All the trenches shall be properly and thoroughly cleaned before laying the pipes/ducts.

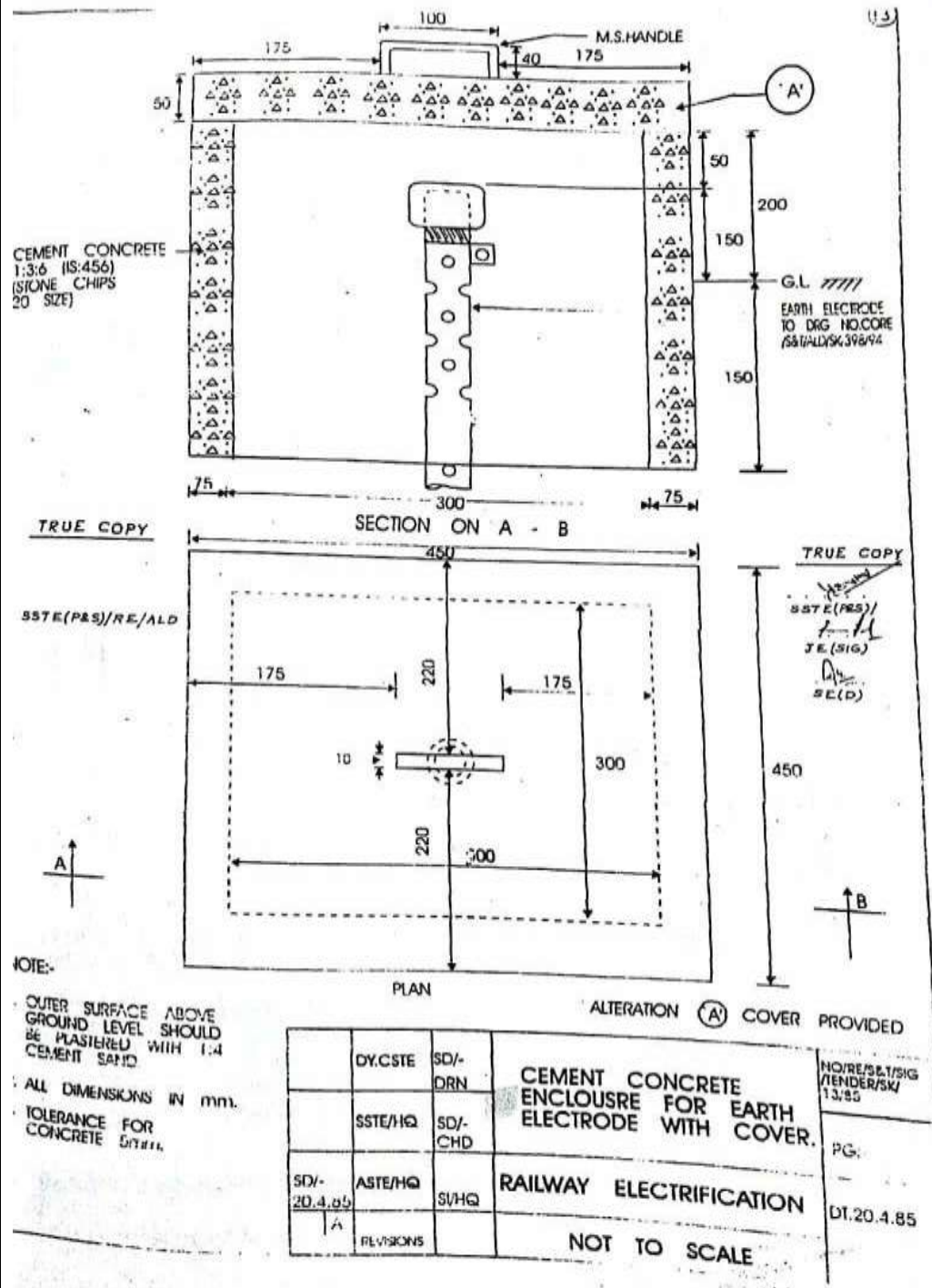
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	While laying of ducts it shall be utterly cared that there is no damage to the duct due to mishandling.
	If more than one pipe or duct, are to be laid in the same trench then both should be laid side by side.
55.	Laying and fixing of Medium class GI pipes 100 mm Dia (4.5 mm thickness) as per IS 1239 (Part 1) 2004 or latest with coupling on culverts/bridges, perforated at a distance of 20 cm or less with 10 mm Dia hole, or at any other locations as decided by Site Engineer. The GI pipe is to be filled with chattered compound. It includes supply of all material required for fi Xing arrangement. Contractor will also supply flexible/corrugated HDPE pipe at the end of GI pipe to protect the cables from sharp edges and sudden bends. The e laying and fi Xing to be done as per RDSO drawings No. SDO/cable laying/011 and SDO/cable laying/012, issued vide RDSO document No. RDSO/SI/G/2010 Version 1.1 dated 04.02.2014, or latest.
56.	Digging of cable pit (min2x2x1m) as per instruction of Site Engineer, supplying and filling of sand before and after coiling the cables, covering top of the cable pit with stones and providing brick masonry on all four sides of the cable pit and plastering thereafter.
57.	Supply and installation of RCC cable route marker engraved and painted on both side along the route every 50mm and route diversion as per Drg. No 4014/00/CC4 or latest/ Stone marker.
58.	Supply and fixing of polyolefin cable channel (Injection Moulded Plastic cable Duct) of size width 100/200 mm, height 155/230 internal/external, length 1 meter produced of polyolefin with fire, protection class K-1 in accordance with DIN 53438 part all for laying signaling/telecom cables, channel attachable to each other with male female swallowtail connectors and having suitable detachable cover including supply of all fixing materials like Brackets, etc. , as per RDSO STS/E/cable laying Precise Vol-IV and as per technical specifications
59.	Installation of track device (double rail contact) including digging of trench, track crossing, laying of anti-rodent, anti-oxidant & non-flame propagating type Double Walled Corrugated (DWC) pipe as per IS- 14930 part- I or II or latest and all other accessories as per site requirement to be for laying of transmitter and receiver cable. The item also includes installation of EJB / Track side Electronics including foundation & earthing as per OEM's guidelines and Technical requirement & specification with their own material. NOTE: Installation / programming / configuration / commissioning of Axle counter equipment to be carried out in accordance with latest guidelines issued by Railways/RDSO preferably by Authorized representative of OEM.
60.	Installation of Central Evaluator of axle Counter, wiring from CT rack to Central Evaluator, installation and wiring of the reset box, LV box (if required) and associated power supply wiring. This includes supply of shielded cable of required conductor size for wiring between CT rack to evaluator rack, all other wires, power supply cable and wiring materials. The power supply cable from power room to Central Evaluator should not be less than 10 sq.mm PVC wire. Earthing as per OEM's guidelines & specification with their own material. This also includes painting and writing work on evaluator as per site requirement. NOTE: Installation /programming / configuration / commissioning of Axle counter equipment to be carried out in accordance with latest guidelines issued by Railways/RDSO preferably by Authorised representative of OEM.
61.	Installation of Maintenance Free Earth Electrode as per Std. Practice as directed in specification RDSO/SPN/197/2008.
62.	Installation of earth electrode as per std. practice and connecting it to equipments to be earthed. This item includes digging of pit in earth 3 m deep & fixing earth electrode pipe, casting of cement concrete enclosure & cover as per attached drg. Soil treatment to be done as per std. practice. This item includes provision of earth lead wires and soldering of lead wires. The other end of the wire is to be connected to block equipment, power equipment, cable sheath, signals etc. as per site requirements. 7strand GI wire shall be used as earth lead wire. (Supply of earth electrode is covered in Sch. 'A1').

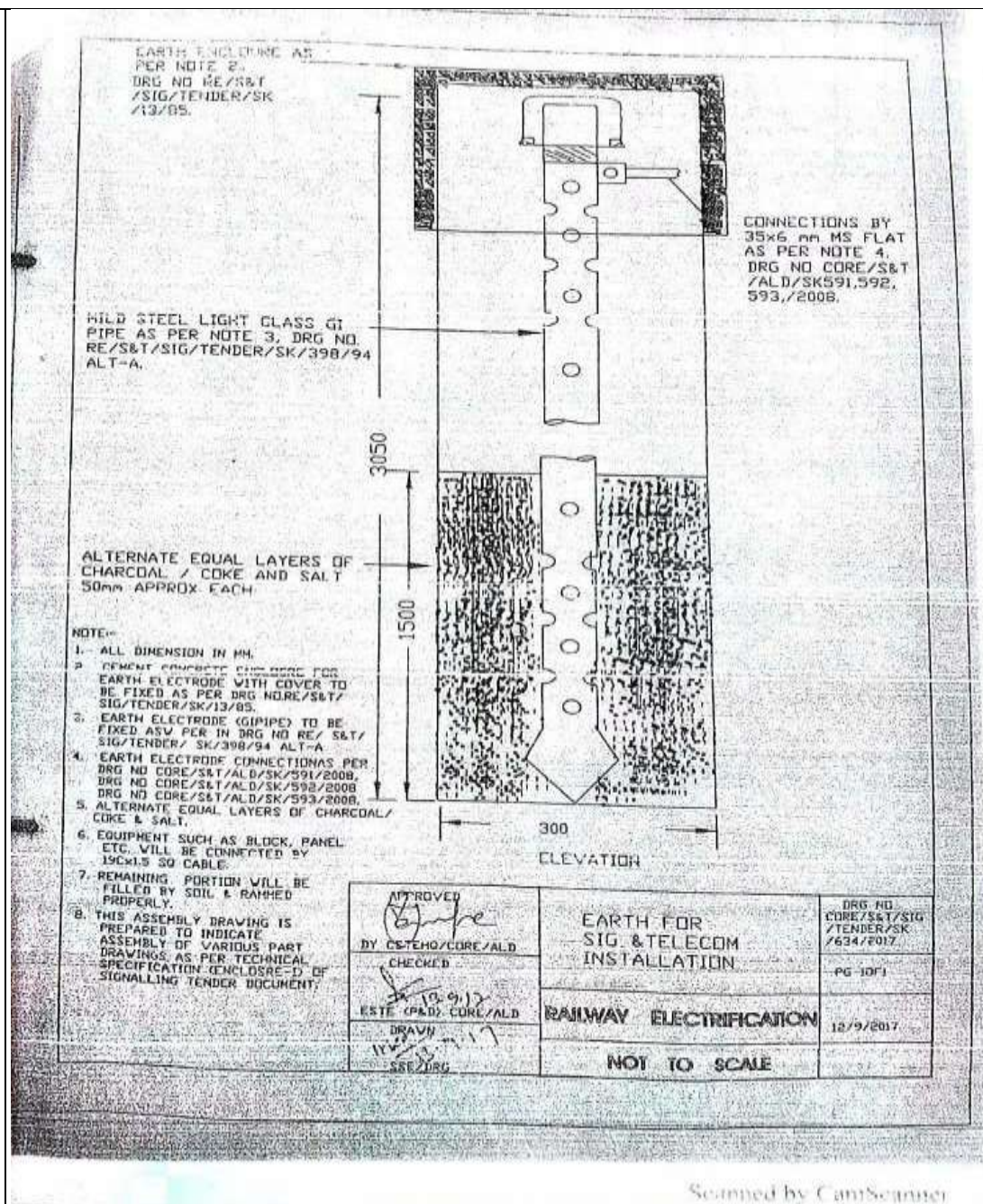
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- 63 **Fixing of Electrical Point Machine** on the extended sleepers at points as per std. practice and as per RDSO Drg No. SA 91 51-52 or 9710 or 9161 as per section of rails used. Item includes fixing switch extension bracket, providing insulation for switch extension bracket, fixing ground connection, adjusting opening of the switches and adjusting the point machine with crank handle.
- The item also includes :
- (i) Complete material for installation like ground-connections, switch extension brackets, point insulation material, I pipes, wiring materials, various fixing nuts & bolts including castle nuts, spring washers.
 - (ii) All smithy & fitting works required at site for complete installation.
 - (iii) Installation of gauge tie plate & providing insulation for gauge tie plate (Insulation in William Stretcher Bar will be Provide by Railways).
 - (iv) Wiring inside the point machine, insertion and termination of tail cable in point machine and junction boxes / location box /cable hut as per extent practice on WR and the

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	<p>instruction of Railway Engineer at site.</p> <p>(v) Supply and fixing of suitable size GI pipes with flange for taking cable into point machine.</p> <p>Note ; The ground connections shall be suitable to the Point Machines as specified by Engineer-in-charge and shall be suitable to the point layout i.e. 60 Kg. / 52 Kg / 90R as per yard layout. Electrical Point Machine and M-6 / Screw less terminals will be supplied by Railways / covered in Schedule separately</p>
64.	<p>Installation, Wiring and testing of Integrated Power Supply System. This includes power distribution connection to bus bars and relay rack in the room with contractor's own wiring materials and fabrication and fixing of AC/DC power distribution board made on 10mm thick Phenolic hylam sheets or any standard make with connections suitable for 32A. Wiring to be done considering site requirement, depending upon the load with suitable wires, lugs & glands as per instruction of Engineer-in-charge. The work includes installation of Thermo flasher relay, ELD's, fixing & wiring of change over switch (program switch) for selection of DG set supply (DG1& DG2) and wiring of change over switch (program switch) for selection of mains or DG supply. This item also includes supply & fixing of ladder along the wall for carrying power supply wires/cables from IPS room to Relay room/power room etc. For LC any masonry work required will be carried out by contractors own material.</p>
65.	<p>Fixing and wiring of DC track circuit equipments i.e. track feed charger, resistance, track relay, battery, PPTC fuses etc., in the Apparatus Case and battery box as per standard practice. Termination of tail cable on M 6 / Screw less terminals WAGO or FINOLEX or similar approved make terminals/ fuse blocks / HRC fuse. Item includes testing /commissioning of track circuit. Complete wiring material (including PPTC fuses) which are not covered in Schedule will be supplied by contractor. (Supply of Track feed battery charger, track feed battery, resistances & 'B' type choke & Track relays will be supplied by Railways / covered in Schedule separately).</p>
66.	<p>Installation of DC track circuits covering points zones also. The item includes provision of continuity bonds of seven strand PVC jacketed wire/ GI wire 8 SWG on rail joints after drilling bond-hole of 7.0/7.1/7.2mm Dia (double bond with sleeves and rail clips are to be provided at each rail joint), insertion of insulated block joint, fixing of Track lead Junction box on MS angle two numbers of size 40X40X5 mm 1200 mm length for track feed/ jumper / track relay ends of track CCTs (as per double TLJB arrangements) and also for fixing jumper cables as per insulation diagram WR Drg No. CSTE/6055 and standard practice, making rail connections through suitable insulated sleeves from Track lead Junction box at TF, jumper & TR end with seven strand PVC jacketed wire /GI wire 8 SWG, rail clips for fixing bond wire on the TLJB as per standard practice, termination of tail cables on bootleg terminals etc. TF/TR wiring shall be fixed on the suitable arrangement on PRC sleepers with the help of hooks. Hooks shall be provided on PRC sleepers with the help of suitable steel bracket. This item also includes fixing & supply of channel pins etc. The item also includes supply of MS angles/ trestles, GI wire 8 SWG / seven strand PVC jacketed wire, hooks, rail clips etc.</p>
67.	<p>Specifications and Requirements for charging of the secondary cells:</p> <p>All the secondary cells shall be charged as per the charging instructions of the OEM of the batteries.</p> <p>The contractor shall supply the Acid/ Solution for the batteries at its own.</p> <p>The batteries shall be charged and discharged minimum three times before the installation.</p>
68.	<p>Providing brick masonry in ratio 1:6 cement and mortar including plastering with 1:4 cement and sand mixture both sides, 20 mm thick each with contractor's owned class II bricks, including excavation, curing, grouting, bolting etc. wherever required. Bricks sand and cement to be supplied by the contractor.</p>
69.	<p>Erection, Fitting and Rail connection of Track Lead Junction Box on two supports (M.S. angle) with contractor's fixing material and PVC jacketed wire for track lead connection including angles of size 40 x 40 x 5 mm 1200 mm length.</p>

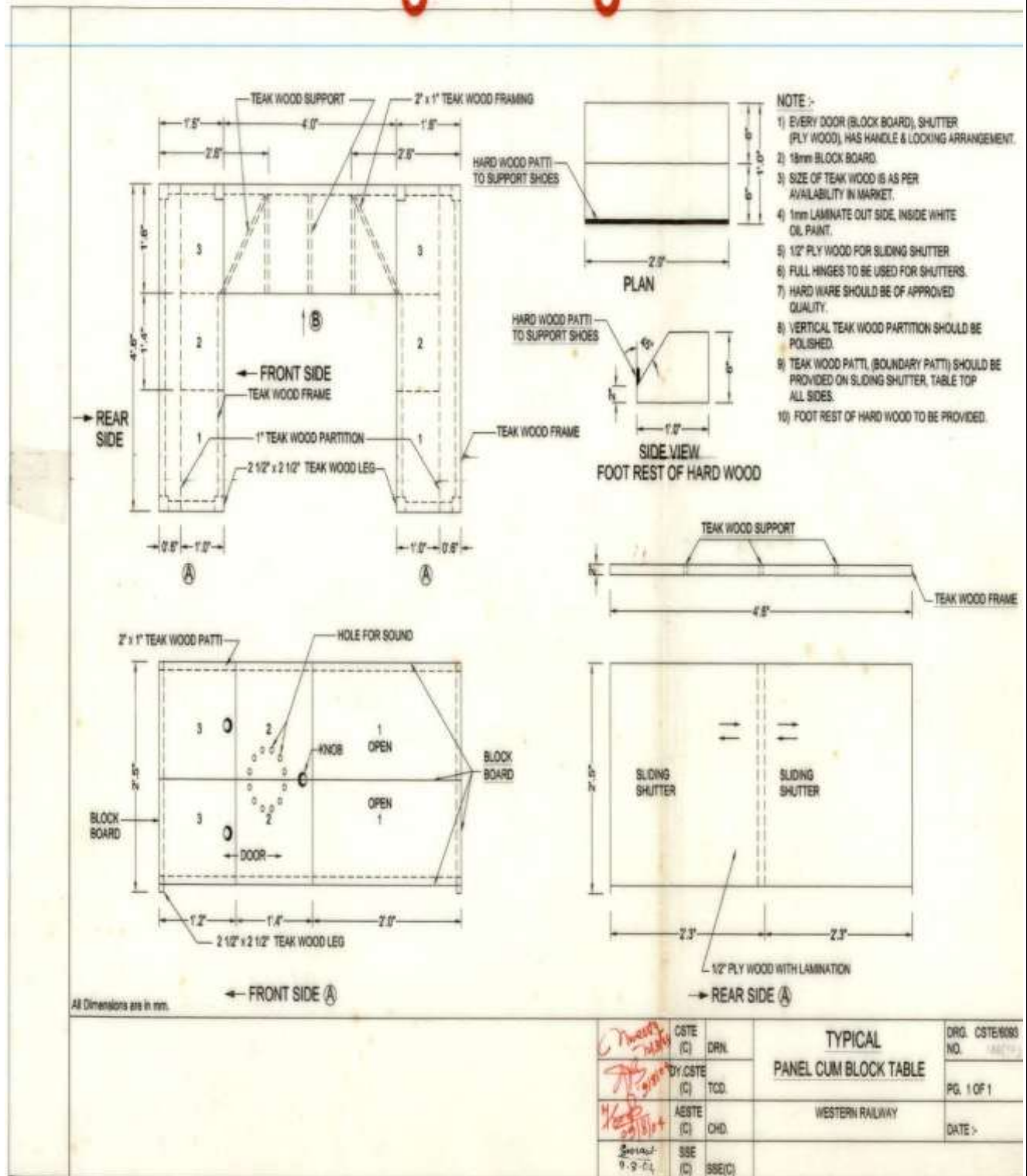
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This will include drilling of holes for track lead/side connections on rail. The work shall be done as per Drg. No. S&T/Const./JHS/T 115 & instructions of Rly engineer at site. This includes provision of double bonding/PVC jacketed wire for each supply i.e two for positive and two for negative supply.

Schedule – B2 Non SOR Supply & Execution item.

2. Supply and installation of Panel cum/VDU Block Instrument table complete as per Drg. No. CSTE/6093. It includes any modification to it if required by Engineer-in-charge.

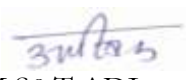


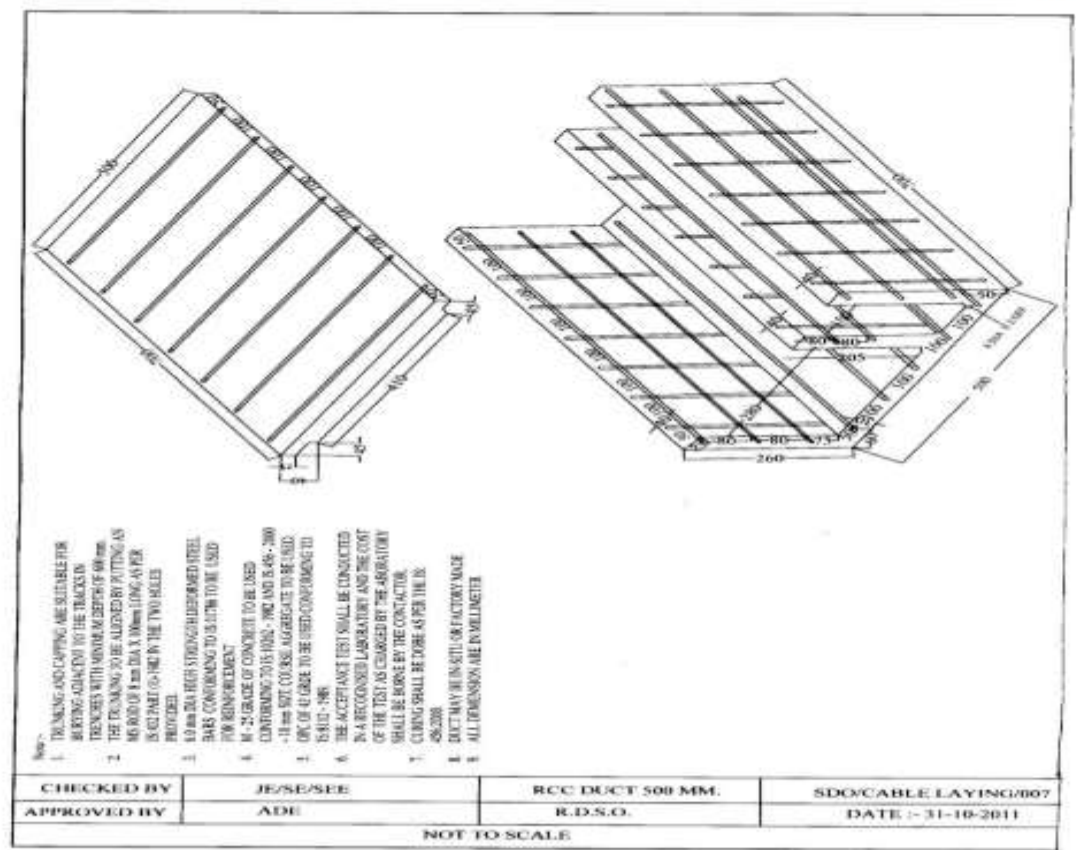
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3.	Fabrication and supply of premium quality foam sheet 5mm thickness with vinyl printing of approximately size 2.5 feet x 4.5 feet with framing. This item also includes lettering/numbering of termination particulars, CTR contact details in relay room, relay hut, goomties etc. For CTR Board
4.	Installation & commissioning of Earth Leakage Detector (24 Nos. Channel) as per RDSO Spec. No. RDSO/SPN/256/2025 Version 2.0 or Latest.
5.	Installation of Thermo-shrinkable joining kits for making (a) straight through joints without transformers for 6 quad Jelly filled cable (b) Derivation joint without transformer for 6 quad jelly filled cable, and (c) Straight Through joint without transformer for 10 Pr/20Pr. PIJF cables and construction of Brick chamber for protection of joints with contractor's all materials as per railway Drg. where VF transformers are not required. All the materials required for the work are to be arranged by the contractor himself at his own cost except Thermo shrinkable jointing kit which is already covered in supply portion of the tender. After jointing the cable through test such as insulation test, Continuity cable losses etc. to be carried out jointly with the Railway Engineer. If any defect or any damage observed during jointing, the contractor should redo the joint free of cost.
6.	Supply & installation of Fencing work around S&T apparatus case or building/office etc. For fencing work structure, gauge and other relevant parameter will be decided by consignee based on actual site requirement.
8.	Supply and fixing of cable truss of 4 inch x 4 inch. For truss structure and other relevant parameter will be decided by consignee based on actual site requirement.
10.	Maintenance Booklet / Cards. Contractor must take prior approval before supply.
11.	Supply, Installation, testing & commissioning of Current referencing device, half effect based isolated series DC current measurement with hardware RS-485 with 5V power supply and 1ft USB-B type cable at distributed EI.
12.	Supply, Installation, testing & commissioning of Remote data Acquisition device with 3 digit 7-segment LCD Display with 5v Power supply and 1ft USB-B type cable at distributed EI.
13.	Supply and placing of trunking and capping (RCC duct) of 300mm width as per DRG No. SDO/Cable laying/007(annexure-10) as detailed in document no. RDSO/SI/G/2010 Ver.1.1 or latest on guidelines on signalling cable laying.

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TECHNICAL GUIDELINES FOR S&T CONTRACTUAL WORKS (MAY-2019)**Schedule – C- Telecom Supply item.**

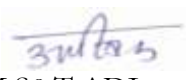
1.	48 Fiber Armoured Optic Fibre Cable as per RDSO /SPN/TC/110/2020 rev.0 or latest. Make APAR, UM or Similar,
2.	2x24/48 fiber optic fiber splice straight joint enclosure (SJC) complete with all accessories as per RDSO/SPN/ TC/68/2014, Rev.3 or latest specs for 24/48 fiber OFC cable with latest amendment with all accessories.
3.	Supply of pre-fabricated RCC OFC jointing pits as per drawing no. RAILTEL/SR/OFC/2008/12 or latest. The jointing pits shall be completely filled with sand up to 30 cm from bottom level of the pit to prevent entry of rodents after blowing and jointing of OFC covering joint enclosure and HDPE conduits completely.
4.	HDPE duct 40/33 mm as per RDSO/SPN/TC/45/2013/Rev.2.0 with latest amendments for each Km of HDPE duct following items are to be supplied. The duct is to be supplied as per HQ Technical guidelines for installation and utilization of OFC cable (efile no. 592147) dtd. 01.01.2025. (Make: - Mukand Poly Product, Narayani Poly Pipe, Dura-Line India Pvt. Ltd or similar.) (a) End Plugs- 2no (b) Cable sealing plugs -2 no. (c) Plastic couplers slip fit/push fit type - 2no (d) End plugs to be provided along with drum -2 nos.
5.	Standard 19" Rack Mountable -48V DC Working Add-Drop STM-4 SDH Equipment conforming to TEC GR No: GR/SDH-010/003. JAN 2011 (with latest amendment) complete with, redundant power supply, 2 Nos STM 4 of Aggregate L.4.2 Optical Interface Modules/Cards one each for East and West side TX/RX and 2 nos of STM-1 S1.1 optical interface modules complete with 5 mts. long

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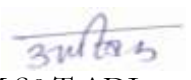
	Optical Patch Cords . 21 EIs with DDFs and Cable assembly for termination to DDF and minimum 8 nos of 10/100 Base-T Ethernet Ports Fast Ethernet on SDH (EoS) 10/100 Base-T Interface Module/ Card supporting with LCAS and GFP , order wire subrack DDF installation Material, manuals and other accessories. Complete Engineering Order Wire(EOW)arrangement. Necessary Software / Firmware for local /remote monitoring / configuration of the equipment through EMS and Software / Firmware Interface to work all Network Elements as Gateway Network Element (GNE).2 Nos of MCBs of appropriate ratings and necessary Connecting cords and cables for power supply modules. Make: TEJAS-1400-7SR or similar or as per site requirement.
6.	2MB programmable primary digital drop insert multiplexer as per RDSO specs. IRS-TC 68/2012 Amd. 1 or latest with conference facility (Make Webfil or as per Engineer in charge as per site requirement) and other stipulations of tender documents fully wired for 30 channels complete with power supply card, NIM card, Tributary card, E&M card, remote control, supervision facility and all other accessories, installation materials, manuals etc. it should have facilities to accommodate data interface card in multi drop mode and should be able to support card needed for video conferencing and ISDN. It shall also support NMS operations from local/remote locations.
7.	<p>Supply of Connectors/Pig Tail/Patch cords/ MC/ LIU/ Patch Panels/Switch etc. with all required necessary accessories as per fiber termination requirement for termination/ splicing of OFC cable/patch cord/pig tail cable make D-link / 3 M/ R&M /Comms Cope.</p> <ul style="list-style-type: none"> Port Fiber Optic Patch Panel high intensified & insulated material, having excellent mechanical Performance. <p>FIBER PATCH PANELS – RACK MOUNT – 12 port LIU Loaded Single mode</p> <p>CharacteristicMin. Required Specification</p> <p>12 port Loaded LIU accommodate LC Single mode adapters.</p> <p>Cold steel base material with powder coating. Aluminum top and front cover for light mounting</p> <p>can manage both splices and terminations</p> <p>should have fiber magic sticker provision inside for 900um tight buffered fiber storing</p> <p>Accessory kit consists of cable ties, mounting ear screw earthing.</p> <p>Front-Mounted Cable Saddles for jumper management</p> <p>Removable Top & Front cover for better access to interior of LIU</p> <p>Rubber grommet allow for pre-terminated fiber trunk installation, protects cable and minimizes dust build-up</p> <p>Adapter panel - Cold steel</p> <p>Adapters should have compact design & high precision.</p> <p>which perform well under various circumstances & maintain good plug Retention strength.</p>
8.	<p>CLI Push button telephones suitable make Panasonic, Siemens, Beetal-DB7400, Orpat or same make higher version as per DOT/TEC specifications no. TEC/GR/CP/Tele-002-/05 Jan 2010 with latest amendment or same make higher version.</p> <ol style="list-style-type: none"> 1. Push button type Instrument 2. Caller ID 3. Tone/Pulse Switch able 4. Speaker 5. Ringer Volume control 6. Last number Redial 7. In coming number display
9.	<p>Single Mode Optical fiber cable</p> <ul style="list-style-type: none"> • 6 -core armored optic fiber cables are to be laid in HDPE in outdoor location/PVC pipe in indoor

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	<p>location/underground.</p> <ul style="list-style-type: none"> ● OFC cable shall be laid from in various locations in HDPE pipe / conduit pipe after putting. The cables shall be properly dressed and clamped at regular intervals of approximately 1 meter. OFC cable shall be laid standard practice as per telecom manual. <p>OFC cable termination at all location in FDMS/LIU. & splicing with Pigtail cable.</p>
10.	<p>25 mm dia HDPE duct with all fitting and laying accessories (make Narayani Poly Pipe, Aaram Plastics Pvt. Ltd or similar) with permanent lubrication/PLB lubrication. TEC spec. No. G/CDS-08/02, Nov'04 or latest</p> <p>25 mm dia. HDPE pipe with accessories on wall or structure / in trench etc. For drawing of CAT-6/OFC cable/ power cable in the same to suit All materials for jointing, fixing, clamping of HDPE pipe, cutting of masonry wall at the entry of room, repairing of masonry wall. Cement plastering at per site requirement are to be supplied by contractor.</p>
11.	<p>Category6 SFTP Solid cable Conductor23 AWG Solid bare Copper InsulationHigh Density Polyethylene Pairs2 Insulated conductors twisted together ShieldAluminum 1 Polyester Foil Tinned copper Braiding SheathFR-PVC / LSZH Complies with ASTM 0 2863 IEC 60332-1 IEC 60754-1 (Applicable for LSZH) Cable Diameter7.6 mm \pm 0.3 mm nominal COLOR CODEPAIR NOCOLOR 1-2 White-Orange Stripe and Orange 3-6 White-Green Stripe and Green 4-5 White-Blue Stripe and Blue 7-8 White-Brown Stripe and Brown > ELECTRICAL PROPERTIES Conductor Resistance:< 9.38 Ω/100m Mutual Capacitance:< 5.6nF/100m Resistance Unbalance:5% Max</p>
12.	<p>FDMS Rack Mounted, Fiber Distribution Frame with 48 nos pigtail and 48 nos. patch cord (LC/SC or SC/SC or SC/APC or as per requirement) Make: R&M, 3M, D link</p> <p>Technical specifications :-</p> <ul style="list-style-type: none"> • SC/APC type optical connector should be used in FDMS for fiber termination • The system accommodates 24 nos of splice tray with 2 nos of fusion splices per tray. • The fiber tray has user friendly features of arranging 48 Fibers per splice tray. • The units are secured with unique Cam lock • Compact system design makes easy installation of the unit anywhere in the building as a wall mountable unit. • Options available for various styles of Adaptors & Connectors. • Mid Span access provision available for cable entry • Suitable for Fiber to the Building application. • Width: 450mm Height: 480mm Depth: 200mm, Splicing Splice trays • Velcro tape or roll (5 meter X 25 mm) shall be provided to secure the pigtails and cassette assembly. • The outdoor cable entry ports shall be on the top/bottom of the both types of boxes or as per site conditions.
13.	<p>Half Round RCC pipes & collars of 150 mm internal dia (2 meter long) along with collars as per IS</p>

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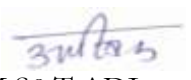
	No. 458/ 2003 of NP type (2m =1m+1Meter).
14.	Supply of 10 pair/12 pair wago based box and termination of 6 Quad cable as per specification.
15.	Patch cord with LC-FC/LC-SC/SC-FC/SC-SC/SC-APC connectors as per RDSO specification RDSO/ SPN TC/69-2007 Rev.1 or latest. (10.0 meter lengths), as per site requirement.
Schedule – D- Telecom Execution item.	
1.	Installation of Pastorate pre-fabricated OFC jointing pits (RCC/PVC).The material shall be supplied as per engineer in charge instructions & installation as per site engineer.
2.	Splicing of laid under above items OFC cable and making the splice joint in dust free environment with contractor's own equipment and labour. Straight joint enclosure (SJC) is covered under schedule 'A' remaining all required materials, tools, plants shall be arranged by the contractor. *Splicing shall be started from one end and each splicing shall be monitored after splicing and after closing the enclosure for all the fibers from one central location by contractor's engineer with his own OTDR and optic Talk set with railway engineer. *Trace for the fibers shall be taken and signed jointly, if any Fiberd splice shows high loss/lossy event, the same shall be redone before completion of splicing work. The splice loss shall be as per the policy/technical circulars issued by the railways from time to time.
3.	Transportation and Laying of HDPE pipe as per approved cable route plan in the excavated trench.
4.	Blowing of OFC through HDPE duct & protective work (elicited in above item) already provided. Where it is not feasible to blow OFC due to curves, road/track crossings, bridges or for any other reason, OFC shall be drawn or laid manually as per standard procedure. All the equipment and machinery required shall be arranged by the contractor at his own cost.
5.	Installation of Connectors/Pig Tail/Patch cords/ MC/ LIU/ Patch Panels/Switch; with necessary accessories for termination/ splicing of OFC cable, as per instruction of site Engineer.
6.	ONT unit with 1 PON port & 4 RJ 45 Giga Ethernet, 802. 4xGE Ethernet Port+ and It shall be of good quality and of reputed make (ZyXEL/ Tejas/ Genexis) 2xFXS (RJ11 Port for VoIP service) Advanced 2x2 dual band 11ac Wi-Fi AP, up to 1200Mbps wireless connectivity Compliant with IEEE 802.3 Clause 40 (10/100/1000BASE-T) Auto-negotiating speed, duplex, MDI/MDIX ONT Broadcast and loop protection GPON port with 1.244Gbps/2.488Gbps link speed Compliant with: - ITU-T G.984.1 to ITU-T G.984.5 Compliant with Single mode fiber (ITU-T G.652 / G.657) Range :-20 Km Adaptor :SC/APC connector Class B+ GPON optical transceiver SIP based Voice-over-IP Supports SIP, RTP protocol CODEC: G.711, G.729(A/B) Support Call ID / Call waiting / Call forwarding / Call Transfer / 3-way Calling and T.38 FAX Support echo cancellation, compliant with G.165, G.168 External antennas WEP, WPA, WPA2 Multiple SSIDs supported VPN pass-through Firewall TR-069, TR-098, TR-104 SNMP DHCP / TFTP

Tenderer's Signature
Date

DRM S&T ADI
For & on behalf of the President of India

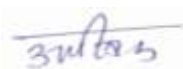
	N GPON HGU should be installed at end locations all accessories including supply and laying of required Optical Drop cable and connectors.
7.	<p>4 PON port OLT with 4 port SFP + (10G), 4 port SFP (Giga Fiber) & 4 Port Giga TX/SFP Combo, ITU-T G.984/G.998, L2 switching functionality, 4096 VLAN, QoS, SNMP, IGMP as per technical specification:</p> <p>19" Rack mountable and It shall be of good quality and of reputed make (ZyXEL/ Tejas/ Genexis, Huawei).</p> <p>Dual Redundant & Hot Swappable Power Supply</p> <p>Fully compliant with ITU GPON standards.</p> <p>Should have 8 downstream GPON ports 2.5 gig, with 4 uplink GE optical (SFPS) and 4 GE electrical combo ports, and also have fixed 2 x 10GE SFP+ ports (10 Gig SFPS)</p> <p>High splitter rate with support up to 128 x ONT</p> <p>4096 port-IDs per GPON MAC (Downstream and Upstream) & 1024 Alloc -IDs per GPON MAC (Upstream)</p> <p>Static & Dynamic Bandwidth Allocation</p> <p>Support uplink & downlink FEC (Forward Error Correction)</p> <p>Port-based QinQ and Selective QinQ (Stack VLAN)</p> <p>Port-based/MAC-based/IP subnet-based VLAN</p> <p>IEEE 802.1D Spanning Tree Protocol (STP)</p> <p>IEEE 802.1w Rapid Spanning Tree Protocol (RSTP) IEEE 802.1s</p> <p>Multiple Spanning Tree Protocol instances (MSTP)</p> <p>Bi-directional bandwidth control</p> <p>Static link aggregation and LACP (Link Aggregation Control Protocol)</p> <p>Port mirroring and traffic mirroring</p> <p>VRRP host backup & Double fault-tolerant backup of host program and configuration files</p> <p>Backplane capacity should be more than 102.5 Gbps</p> <p>Throughput (IPv4/V6) 152.5 Mbps</p> <p>PON port protection B type</p> <p>Uplink Port isolation on same network</p> <p>ONU batch software upgrade, real time upgrade</p> <p>Port real-time, utilization and transmit/receive statistic based on Telnet</p> <p>Dynamic ARP table-based binding</p> <p>Loopback-detection</p> <p>CaTV filtration of ONT through OMCI</p> <p>Remote ONT configuration for Internet/Voice</p> <p>HTTP enable/disable from OLT</p> <p>DHCP-Option 82</p> <p>Advance Encryption Standard (AES) for downstream traffic</p> <p>AC/DC voltages shall have protection against short circuit and overload. (Grounding point available)</p> <p>Fan cooling system</p> <p>Removable fan tray</p> <p>ONT support</p> <p>IPv4:</p> <p>ARP Proxy</p> <p>DHCP Relay</p> <p>DHCP Server</p> <p>Static route</p> <p>IPv6:</p> <p>SA/DA Classification</p>

Tenderer's Signature
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	MLD Snooping Network Management: Must support for remote monitoring Telnet-based statistics,LLDP,802.3ah, SNMP
8.	2.5 Gig PON Port SFP Module for OLT 2.5 Gig PON Port SFP Module for OLT as per technical specification. These SFP should be compatible and configurable with above OLT and It shall be of good quality and of reputed make (Tejas/ Genexis / Zyxle/Nokia) Simple Fiber Termination Bi-directional with 2488Mb/s downstream Single fiber Bi-directional with 1244Mb/s upstream 1310nm DFB Burst Mode Laser 1490nm CW Mode Receiver Downstream AES decryption Highly flexible 802.1Q VLAN support Single 3.3V DC supply Single Fiber, Full Duplex Operation 2X10 Electrical SFP Connector Compliant with ITU-T G.984 (G.984.5 support) SC/APC in GPON SFP stick 1 x SC/APC complies 984.5 and Class B+
9.	Wall mount Outdoor 1:4 Optical splitter for PON with fusion Splicing termination as per technical specification: Applications for the ABS /PLC splitters include all FTTH network architectures (GPON, BPON, EPON), CATV and data communications. Features: Low insertion loss High uniformity Port CountMin Loss(dB)Average Loss(dB)Max Loss(dB) 2 3.40 3.63 3.90 4 6.70 7.22 7.70 8 10.00 10.72 11.40 16 13.00 13.95 14.50 32 16.50 17.30 18.30 64 19.67 20.78 21.84 128 22.92 24.19 25.40
10.	Laying of OFC/Power cable through HDPE pipe/casing capping/fall ceiling with laying/fixing of HDPE pipe/casing capping for interfacing various components and system integration. All materials for jointing and termination of power cable as per site requirement are to be supplied by contractor.
11.	Installation of fiber distribution management system with all installation materials, restoration wall etc. to original condition , splicing and termination of 2 X 24 fiber cable (With all contractor's materials), routing/dressing fibers as per directions of Engineer in-charge.
12.	Laying of half round RCC pipe after laying the cables in the trenches as per instruction of site engineer.
13.	Installation of 10 pair/12 pair wago based box and termination of 6 Quad cable as per specification.
IN CASE OF ANY CONFUSION BETWEEN THE DRAWING AND INSTRUCTIONS OR BETWEEN ANY TWO CLAUSES OF THE TENDER DOCUMENT THE DECISION OF ENGINEER IN CHARGE SHALL BE FINAL.	

Tenderer's Signature
Date


 DRM S&T ADI
 For & on behalf of the President of India

2613

5852210/2024/O/o Sr DSTE/W/S&T/MMCT/WR



भारत सरकार Government of India
रेल मंत्रालय Ministry of Railways
(रेलवे बोर्ड Railway Board)



No. 2024/CE-I/CAO(C)Workshop/part-2

New Delhi, dated: 03.06.2024

The Principal Chief Engineers
All Indian Railways.

Sub: Instructions for incorporating the JPO, Circular etc. Provisions in the Tender Document for all works requiring digging work close to Railway signaling, telecommunication, electrical etc. Cables. .

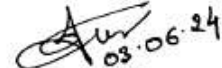
Ref: (i) Board's letter No. 2021/Tele/5(2)/3-Part(1)(3425647) dated 12.06.2023

Board vide letter under reference (i) "Telecom Circular No. 09/2023" has issue a Joint Procedure Order (JPO) on the subject 'procedure for undertaking digging work in the vicinity of Signaling, Electrical and Telecommunication cables'. (Copy enclosed)

In regard to lodging FIR with RPF in cases of work being executed by authorised contractors who have been duly permitted to execute the works, Zonal Railways are requested to ensure strict compliance of para 9 containing in Board's letter under reference (i) "Telecom Circular No. 09/2023" which is reiterated as under:-

'Para-9:- Railway will not lodge FIR with RPF in cases of works being executed by authorized contractors of Railways who has been duly permitted to execute the works'.

DA:- As above.

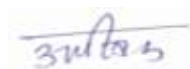

03.06.24
(गौरव)

निदेशक सिविल इंजीनियरिंग(जी)
रेलवे बोर्ड

[Phone: 030-47598(Rly) : 011-23307598(MTNL)]
Email address: dceg@rb.railnet.gov.in;

Signature Not
Verified
Digitally signed by
YOGESH GUPTA
Date: 2024.07.25
16:43:48+05'30
Reason: IR&PS-CRIS
Location: New Delhi

Tenderer's Signature
Date


DRM S&T ADI
For & on behalf of the President of India

5852210/2024/O/o Sr DSTE/W/S&T/MMCT/WR



75
आज़ादी का
अमृत महोत्सव

भारत सरकार Government of India
रेल मंत्रालय Ministry of Railways
रेलवे बोर्ड (Railway Board)



Telecom Circular No.09/2023

सं.2021/Tele/5(2)/3-Part(1)(3425647)

नई दिल्ली, दिनांक: 12.06.2023

The GM/CMD/MD/PCAO/CAO,
All Indian Railways, KRCL, PUs, CORE, COFMOW
(As per standard list)

The DGs/Directors
RDSO, NAIR, All CTIs

Sub.: Procedure for undertaking digging work in the vicinity of Signalling, Electrical and Telecommunication cables

Ref.: JPO issued vide Board's letter No.2003/Tele/RCIL/1Pt.IX dated 24.06.2013 (Telecom Circular No.17/2013)

A Joint Procedure Order (JPO) for undertaking digging work in the vicinity of underground Signalling, Electrical and Telecommunication cables was issued last vide Board's letter No.2003/Tele/RCIL/1Pt.IX dated 24.06.2013 (Telecom Circular No.17/2013). Notwithstanding the provisions contained in the JPO for protection of cables, a significant number of cable-cut incidents and practical difficulties in implementation of certain provisions of the said JPO were reported.

Board, therefore, constituted a committee of SAG officers to revisit the JPO. Based on the recommendations of the committee, Board (MI) has approved broad guidelines for procedure to be adopted by Zonal Railways for protection of cables while undertaking digging work in their vicinity (Annexure). These guidelines are in supersession of JPO issued vide reference above.

Zonal Railways are requested to issue local instructions/guidelines/JPO implementing these broad guidelines within a month of issue of this letter. Zonal Railways may also ensure that these local instructions/guidelines/JPO are also made part of all tenders for works in the vicinity of cables in accordance with the instructions issued by Civil Engineering Dte of Railway Board vide letter No.2023/CE-I/EDCE(G)/Misc. Dated 18.04.2023.

DA: As above

07/6
24/6/23
(राकेश रंजन)

कार्यकारी निदेशक (दूरसंचार विकास)
दूरभाष: 011-47843012, 030-43012
ई.मेल: edtd@rb.railnet.gov.in

Copy to:

1. PSO to M(I) for kind information of Member/Infra
2. ED/SD, EDEF/M, EDCE/G, ED/GS/C-II for information & ensuring implementation of guidelines in letter & spirit
3. PCSTE, PCE & PCEE, All Indian Railways

कमरा सं.103-ए, रेल भवन, रायसीना रोड, नई दिल्ली - 110001

Tenderer's Signature
Date

DRM S&T ADI
For & on behalf of the President of India

5852210/2024/O/o Sr DSTE/W/S&T/MMCT/WB

(Annexure to letter No. 2021/Tele/5(2)/3-Part(1)(3425647) dated 12.06.2023)

Annexure**Guidelines for protection of cables while doing work its vicinity**

1. Cable route marking for all types of cable must be made available block section wise on Railnet.
2. Before allowing the contractor to work near the tracks, the work executing agency (like SrDSTE/SrDEN/SrDEE or DyCSTE/DyCEE/DyCE etc.) shall ensure that the permission has been granted by the division to the contractor in accordance with the local instructions / JPO to work in the vicinity of the cables. Zonal railways shall devise suitable mechanism and timelines for the obtaining/granting such permission.
3. In case of works being taken up by the State Government, National Highway Authority etc., zonal railways shall devise mechanism for shifting the cables or for proper protection of cables before granting permission to work.
4. The engineering control shall keep all the information regarding any works being done near the track. S&T and electrical control shall obtain this information from engineering control. These controls shall coordinate among themselves to ensure that no work is done in the vicinity of the track without proper permission.
5. The concerned SE/P.Way/SE/Works/SE/Sig/SE/Tele SE/Electrical (TRD or G) or RailTel supervisors supervising the work of the contractor shall ensure that the existing emergency sockets are not damaged due to their importance in providing communication during accident/emergency.
6. For all new works, cable shifting should be a mandatory part of DPR and estimate. For ongoing works, Zonal Railways may sanction works for cable shifting if necessary through contingency/supplementary/revised estimate where provision does not exist. However, in case zonal railways decide not to shift cables (due to any reason) then protection of cable shall be ensured by the zonal railways during execution of the work.
7. Penalty to be imposed for damages to cable shall be as under:

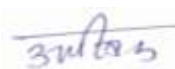
Cable damaged	Penalty per location
Only Quad cable or Signaling cable	₹ 1.0 Lakh
Only OFC	₹ 1.25 Lakh
Both OFC & Quad	₹ 1.5 Lakh
Electrical Cable	₹ 1.0 Lakh







Tenderer's Signature
Date


 DRM S&T ADI
 For & on behalf of the President of India

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852210/2024/O/o Sr DSTE/W/S&T/MMCT/WR

8. Penalty should be levied on the contractor when they work without permission or resort to careless working without making arrangements for protecting cables and other utilities. Based upon the local conditions and practices, zonal railway shall devise its own conditions for examining and levying penalty. For each cable cut, a joint report at the level of supervisors should be prepared on the same day and it should become the basis for levying penalty and fixing responsibility. Joint note should be forwarded by SrDSTE/SrDEE to the executive in-charge of the work. The executive in-charge of the work should act and decide on the cable cut case within 15 days under information to SrDSTE/SrDEE as the case may be. There should be provision of appeal by contractors within one month of notice for levying penalty at ADRM level. Decision of ADRM shall be final and binding upon both parties.
- ✓ 9. Railways will not lodge FIR with RPF in cases of works being executed by authorized contractors of Railways who have been duly permitted to execute the works.
10. Zonal Railways shall issue local instructions/JPO for protection of cables while undertaking works in the vicinity of railway tracks in line with this guideline. Zonal Railways shall also ensure that such instructions become part of their tender document within one month of the issue of the local instructions. Suitable action against erring officials shall also be incorporated in these instructions if the same is not adhered to.

Tenderer's Signature
Date

DRM S&T ADI
For & on behalf of the President of India

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3952279/2024/O/o Sr.DSTE/Sig&T/MMCT/WR

पश्चिमरेलवे
प्रमुख मुख्य संकेत एवं दूरसंचार
इंजीनियर का कार्यालय,
5वींमंजिल, स्टेशनभवन, चर्चगेट,
मुंबई-400 020



Western Railway
Office of the
Principal Chief Signal & Telecom
Engineer,
5th Floor, Station Building Churchgate,
Mumbai-400 020.

No. SG 217/9(Computer No- 433074)

Dt: 08.01.2024.

CSTE/C-I, CSTE/C-II

Sr.DSTE/Co-MMCT, BRC, RTM

Sr.DSTE/S/MMCT, Sr.DSTE/N/MMCT, Sr.DSTE/N/BRC, Sr.DSTE/ADI

Sr.DSTE/Sig/ADI, Sr.DSTE/W/RTM, Sr.DSTE-RJT, Sr.DSTE-BVP

(POLICY NO-01/2024)

Sub: - Shifting and Laying of Signal & Telecom Cable in new doubling
works

In recent past there have been many cases in various Divisions where doubling works or other activity is going on. There is massive cut of Signaling and Telecom cables during the course of earth work or preparatory works. In the current year total 417 cable cut cases have taken place.

Such cuts lead to heavy detention to train traffic and movement of trains by piloting of PLC for hours together.

Therefore, following policy is to be adopted for construction works to avoid cable cuts:

- (i) No work of cable trenching should be carried out without site survey and prior intimation to avoid signal and telecom cable cutting and resulting detention to train traffic.
- (ii) For sections which are targeted for commissioning in the present financial year. Adequate planning for identification (Cable route tracing) and rectification should be done in ongoing contracts along with provision of restoration by trenching, cable laying, jointing etc. to be executed through ongoing works or if required by operating NS items in existing contracts. This may be planned by separate works if decided by construction units.
- (iii) Objective is to obviate and minimize cable cuts of signal and telecom cable and if despite of efforts cable gets cut to achieve the restoration in shortest possible time.
- (iv) For doubling works which are not targeted in the current year S&T Construction Unit should immediately plan works of relocating all the cables in infringement and which are falling under the plan earth work site. In case of

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Date

DRM S&T ADI
For & on behalf of the President of India

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152979/2024/O/o S. Bandopadhyay CSE (HAG)/WR/CCG

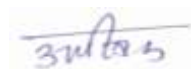
multi tracking, where such relocation is inescapable, the new cable should laid out of all the toe line.

- (v) Sufficient provision in existing contract or new contract in schedule items should be made for restoration of damaged cables. Cable trenching, laying and suitable protection (as per policy of Board) etc. to avoid cable cuts and early restoration in case inadvertent happens.

This has the approval of PCSTE/WR.


(S. Bandopadhyay)
CSE (HAG)/WR/CCG

Tenderer's Signature
Date


DRM S&T ADI
For & on behalf of the President of India

पश्चिम रेलवे
प्रमुख मुख्य संकेत एवं दूरसंचार इंजीनियर
का कार्यालय,
5 वीं मंजिल, स्टेशन भवन, चर्चगेट,
मुंबई-400020



Western Railway
Office of the
Principal Chief Signal &
Telecom Engineer,
5th Floor, Station Building
Churchgate, Mumbai-400 020.

No. 215/1 (Follow Up) CN- 481595

Date:18.02.2025

CSTE(C-I)/CCG @ADI, CSTE(C-II)/CCG
Sr.DSTE(Co)/MMCT, Sr.DSTE(N)/MMCT, Sr.DSTE(S)/MMCT
Sr.DSTE(Co)/BRC, Sr.DSTE(N)/BRC
Sr.DSTE(Co)/RTM, Sr.DSTE(S)/RTM
Sr.DSTE(Co)/ADI, Sr.DSTE(Sig)/ADI
Sr.DSTE/RJT, Sr.DSTE/BVP
Dy.CSTE(W)/MMCT, Dy.CSTE(W)/BRC, Dy.CSTE(W)/RTM
Dy.CSTE(W)/RJT

Sub:- Revised checklist for lightning protection, surge, earthing and bonding.

Ref:- This office letter of even No. dt:04/02/2025.

In continuation to the above referred letter, **revised checklist** for lightning protection, surge, earthing and bonding is enclosed herewith.

The earlier checklist issued vide letter referred above shall be treated as **'CANCELLED'**.

It should also be ensured that this checklist shall be a part of all TSAA and PCSTE approvals.

EncL: Revised Checklist

BHAVNA KAUSHIK
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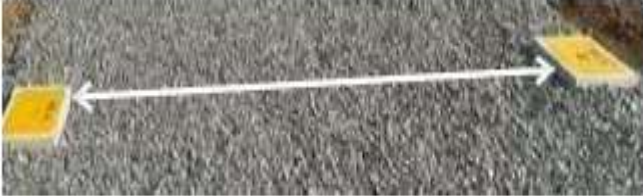
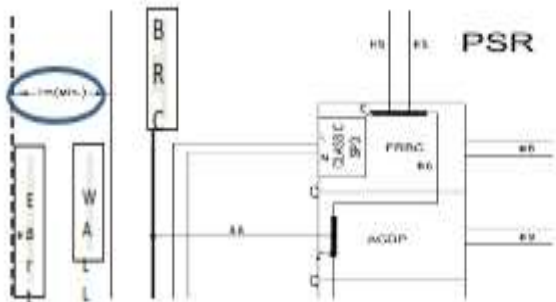
(Bhavna Kaushik)
Dy.CSTE/Sig

C/- CSE-I, CSE-II – for kind information please.

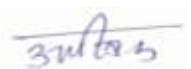
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Date

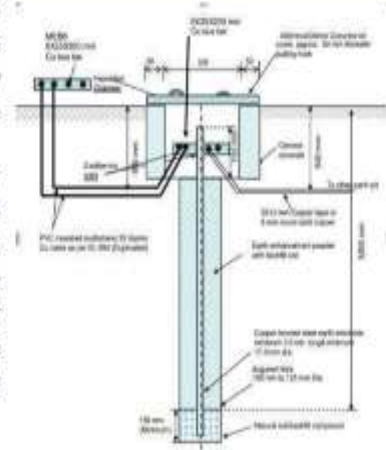

DRM S&T ADI
For & on behalf of the President of India

Checklist For Lightning Protection, Surge, Earthing and Bonding (Checked on Date.....)

SN	Description	Status (<input checked="" type="checkbox"/> / <input type="checkbox"/>)	Action Plan with Tentative TDC(for Non- Complied Items)/Remarks
	EARTH INSTALLATION		
1.	Earthing and bonding should be done as per the Technical Advisory Notes (TAN) issued by RDSO from time to time.	<input type="checkbox"/>	
2.	Earth electrode should not be installed on high bank or made-up soil.	<input type="checkbox"/>	
3.	As per SEM 19.11.5 (g) The minimum clearance of equipment earths from electrical earths provided by the Electrical Department either of the Railways or of the other Administrations shall be 20 meters.	<input type="checkbox"/>	
4.	Distance between two successive earth electrodes shall be 3mts to 6mts. 	<input type="checkbox"/>	
5.	Earthing Arrangement should not be done under the building and the main earth pit shall be located not less than 1mtr from wall to the MEEB in the equipment room. 	<input type="checkbox"/>	

Tenderer's Signature
Date


DRM S&T ADI
For & on behalf of the President of India

SN	Description	Status (<input checked="" type="checkbox"/> / <input type="checkbox"/>)	Action Plan with Tentative TDC (for Non- Complied Items)/Remarks
6.	<p>a) The top edge of the Copper electrode should be below 150mm from the surface level.</p> <p>b) The Inspection chamber should be completely beneath the surface level. The concrete lids cover should be on same level as of surface level.</p> 	<input type="checkbox"/>	
7.	No hammering should be done on earth electrode during installation.	<input type="checkbox"/>	
8.	There should be no loose connection between any earth conductors connected for earthing and bonding system.	<input type="checkbox"/>	
9.	Material used for the installation of earth should be anti-corrosive.	<input type="checkbox"/>	
10.	As per Para 8.4.1 (g) of RDSO/SPN/197 Ver. 1.0 Only NABL/ILAC-tested exothermic materials are used for exothermic welding in Earthing and Bonding system.	<input type="checkbox"/>	
11.	<p>Are the earth pits interlinked using 25 X 2 mm copper tape or 8mm round solid copper conductor with exothermic welding properly.</p> 	<input type="checkbox"/>	
12.	As per Para 8.4.2 (d) of RDSO/SPN/197 V1.0 The interconnecting conductor shall be buried at depth not less than 500mm below the ground level. This interconnecting conductor shall also be covered with approximately 30 Kg of earth enhancing compound for each 3 meters length.	<input type="checkbox"/>	
EQUI-POTENTIAL BUS BAR (EEB) & MEEB/SEEB CONNECTIONS			
13.	Equi-potential bus bar and its connections to equipment & surge protection devices in the equipment room shall be as per the typical bonding connection drawing no SDO/RDSO/E&B/002 which is as below.		

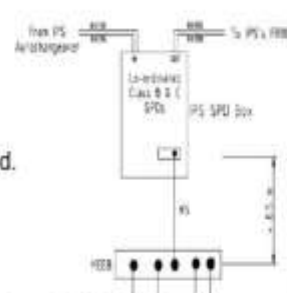
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Date

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For & on behalf of the President of India

SN	Description	Status (✓/□)	Action Plan with Tentative TDC(for Non- Complied Items)/Remarks
		<input type="checkbox"/>	
14.	Main equipotential earth bus bar (MEEB) Copper strip size of 300X25X6 mm (min.) to be used.	<input type="checkbox"/>	
15.	MEEB should be installed at a height of 0.6mts from the room floor surface.	<input type="checkbox"/>	
16.	MEEB insulator spacers of height 60mm to be used to install the EEB.	<input type="checkbox"/>	
17.	As per STS/E/TAN/3006 PVC insulated multi-strand single core 4 X 35 sq.mm copper cable or 3X25 sq.mm copper tape to be used for connecting MEEB to nearest earth electrode.	<input type="checkbox"/>	
18.	Knot & coils to be avoided in the earth cable between MEEB and Earth Electrode.	<input type="checkbox"/>	
19.	Sub equipotential earth bus bar (SEEB) Copper strip size of 150X25X6 mm (min.) to be used.	<input type="checkbox"/>	
20.	PVC insulated multi-strand single core 10 sq.mm copper cable as per IS:694 to be used for individual equipment earthing to SEEB using tinned copper lugs with stainless steel nut and bolts.	<input type="checkbox"/>	
21.	PVC insulated multi-strand single core 16 sq.mm copper cable as per IS:694 to be used for connecting MEEB to SEEB using tinned copper lugs with stainless steel nut and bolts.	<input type="checkbox"/>	
22.	PVC insulated multi-strand single core 16 sq.mm copper cable as per IS:694 to be used for connecting Surge protection devices (SPD) to MEEB using tinned copper lugs with stainless steel nut and bolts.	<input type="checkbox"/>	



Tenderer's Signature
Date

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For & on behalf of the President of India

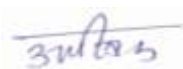
SN	Description	Status (✓/□)	Action Plan with Tentative TDC(for Non-Complied Items)/Remarks
23.	All connections i.e., routing of bonding conductors from equipment to SEEB & from SEEBs to MEEB shall be as short and as direct as possible with min. bends and separated from other wiring.	<input type="checkbox"/>	
24.	All equipment's earthing to be connected to the common Bonding Ring Conductor (BRC) of MEEB except where the earth is used as return conductor (e.g., SGE Block Instrument).	<input type="checkbox"/>	
25.	All the copper strips connected between MEEB, SEEB are to be connected through exothermic welding. In no case, the nuts and bolts shall be used for connecting the copper strips to MEEB or SEEB.	<input type="checkbox"/>	
SEPARATION OF DIRTY WIRE AND CLEAN WIRE			
26.	Dirty wires and clean wires shall be segregated.	<input type="checkbox"/>	
27.	All equipment earthing to be done by carrying the earth wire to equipment/rack through floor level not through ladder.	<input type="checkbox"/>	
SINGLE POINT ENTRY			
28.	As per RDSO/SPN/197 V1.0 entry of earth cable from Main earth pit to MEEB should a one-point entry.	<input type="checkbox"/>	
SPDS/LPDS			
29.	Connection from SPD to MEEB shall be not more than 0.5 mtr and preferably without any bend.	<input type="checkbox"/>	
			
30.	The SPD/LPD Box are to be installed close to IPS (preferably near FRBC panel of IPS).	<input type="checkbox"/>	
31.	Indicative type SPDs are provided or not, if provided the healthy status of the SPD is to be checked and to be replaced if found faulty.	<input type="checkbox"/>	
32.	SPD shall have potential free contact for connection to data logger for remote diagnostics of SPD at a centralized location.	<input type="checkbox"/>	
33.	The SPD and equipment are connected in the shortest path. Additional SPD (Type II) is provided in the equipment rack if the distance between SPD and Equipment is more than 10 meters.	<input type="checkbox"/>	
34.	Length of down conductor of size 50 sq.mm from air terminal of Franklin rod to the earth should be as short as possible.	<input type="checkbox"/>	

Tenderer's Signature
Date

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For & on behalf of the President of India

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35.	<p>Class A Earth, Quad cable earth, Telecom Ring earth and Signal Ring Earth should not be connected from two points with maintenance-free earth.</p>  <p>CLASS A SIGNAL RING EARTH TELECOM RING EARTH</p>	<input type="checkbox"/>	
MEASUREMENT OF EARTH RESISTANCE			
36.	Wenner's method of earth testing is to be used for the measurement of individual disconnected earth electrodes.	<input type="checkbox"/>	
37.	Measuring the earth resistance at the live equipment end, such as the MEEB, use of clamp-type meter is advised.	<input type="checkbox"/>	
38.	<p>Is the resistance for single earth electrode less than 1ohm, if not then no of earth to be made parallel to achieve the value of <1 ohm.</p> 	<input type="checkbox"/>	
39.	Is the earth resistance measured at the Main Equi-potential Earth Bus bar (MEEB) with all the earth pits interconnected.	<input type="checkbox"/>	
40.	The Earth Resistance at MEEB busbar shall not be more than 1 ohm.	<input type="checkbox"/>	
GENERAL			
41.	The Earthing and Bonding Plan of station are made available at Station.	<input type="checkbox"/>	
42.	The installed earth configuration should be painted on the wall for better identification of the earthing pit.	<input type="checkbox"/>	
43.	The date of testing and earth resistance value shall be written on the cover with black base with yellow paint.	<input type="checkbox"/>	
44.	All earths installed as a ring earth or perimeter earth should be protected through tie-bar fencing or boundaries with ballast over the area. If it is not feasible to make boundaries, the area should be properly concreted to avoid any damage to the earth installed.	<input type="checkbox"/>	
45.	The installation of Earthing and Bonding system is carried out by the OEM or an OEM authorized representative. The OEM installation and warranty certificate (valid for 60 months) for Earthing and Bonding is obtained from the OEM.	<input type="checkbox"/>	

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46.	No deviation from the pre-commissioning checklist issued by RDSO.	<input type="checkbox"/>	
47.	The Pre-commissioning checklist is jointly signed with OEM.	<input type="checkbox"/>	

END OF TENDER DOCUMENT

Tenderer's Signature
Date


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