Bharat Coking Coal Limited

Tender and Contract document for Supply, Installation, Wiring, Testing and Commissioning of Signalling and Telecommunication P.I. work in connection with Renovation / Strengthening of the existing Railway Siding at Bhojudih Coal Washery, Santhaldih, West Bengal under S.E. Railway, Adra Division.

Part – 1 (TECHNICAL BID)

e-TENDER NOTICE NO: 06/OT/RITES/RPO-KOL/BCCL - BHOJUDIH/S&T/2021 Dated 09.06.2021

CONTENTS

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SECTION 1

NOTICE INVITING TENDER AND INSTRUCTIONS TO TENDERERS

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NOTICE INVITING TENDER AND INSTRUCTIONS TO TENDERERS
NIT NO: 06/OT/RITES/RPO-KOL/BCCL - BHOJUDIH/S&T/2021
Dated 09.06.2021

1.0 GENERAL

1.1 TenderNotice

Tenders are invited through E-Tendering system by RITES Ltd., a Public Sector Enterprise under the Ministryof Railways, acting for and onbehalf of Bharat Coking Coal Limited (Employer) as an Agent/Power of Attorney Holder, from working contractors (including contractors who have executed works within the last seven years reckoned from the scheduled date of opening of tender) of Railways, CPWD, MES, DOT, RITES, State PWD or any other Central/State Government Department, Central/State Government Undertaking or their subsidiaries, Municipal Body, Autonomous Body of Central / State Governments or Public Ltd., Companies listed on Stock Exchange in India or Abroad or subsidiaries of such companies for the "Supply, Installation, Wiring, Testing and Commissioning of Signalling and Telecommunication P.I. work in connection with Renovation / Strengthening of the existing Railway Siding at Bhojudih Coal Washery, Santhaldih, West Bengal under S.E. Railway, Adra Division."

(Note: Throughout these bidding documents, the terms 'bid' and 'tender' and their derivatives are synonymous)

1.2 Estimated Cost of Work

The work is estimated to cost Rs.13,31,82,673.00 (Rupees thirteen crore thirty one lakh eighty two thousand six hundred and seventy three only) is excluding GST but including of inspection fee, insurance charge, freight charge, LWC charges, Contractor's overhead/ Profit etc. The GST will be paid extra on actual basic. The estimate is generally based on adopted market rates for the items, Base price of LAR with due escalation and DAR/DSR 2018 with due escalation. This estimate, however, is given merely as a rough guide.

1.3 Time for Completion

The time allowed for completion will be **09 (Nine) months** from the date of start which is defined in Schedule F under Clause 5.1(a) of Clauses of Contract.

1.4 Brief Scope of Work

i. Supply, Installation and Testing of Earthing.
ii. Training of BCCL/Railway Personals.
iii. Design and Supply of designing, wiring digram, FPD and other scheme etc.
iv. Supply, Fixing, Commissioning of Panel.
v. Termination of Indoor Non Vital Input/output till FTOT/CTR.
vi. Termination of Indoor Non Vital Input/ Output till FTOT/CTR.
vii. Provision of Electrical Point Machines, Track Circuits/MSDAC etc.
viii. Provision of LED light Signals.
ix. Provision of Single Section Digital/Multi Section Digital Axle Counter,
x. Provision of Block Instrument, slotting if any.

xi. Provision of DTMF Way side Control equipment

xii. Provision of L.C. Gate

xiii. Post Commissioning Maintenance.

INDOOR S&T WORKS INVOLVE THE FOLLOWING:

1. Preparation & supply of all drawings/documents.
2. Installation, Wiring, Testing, Making of Pre-commissioning Check list & commissioning of IPS.
3. Installation, Testing, Making of Pre-commissioning Check list & commissioning of Data Logger.
4. Internal wiring in between Panel, Relay Racks, CTR's etc.
5. Post commissioning Maintenance.
6. Alteration & patching work at existing adjacent P.I. cabin.
7. Any other works related to commissioning of the Signaling System.

OUTDOOR S&T WORKS INVOLVE THE FOLLOWING:

1. Trenching, laying and termination of Signal/ Telecom cables.
2. Installation & Commissioning of Signals & Track Circuits.
3. Charging & installation of batteries.
4. Fixing of Steel Apparatus cases & wiring as per approved Circuit diagram.
5. Installation and commissioning of Earth Electrodes.
6. Wiring of Relay Racks in Relay Room /Locations.
7. Installation & commissioning of Electric Motor Points.
8. Installation & commissioning of Axle Counter.
9. Outdoor works required for commissioning of the System.

Any other items not listed above but referred to in the Tender Document.

AND

Design, Fabrication, Supply, Installation, Testing & Commissioning of Signaling Telecommunication and other related work of S&T in connection with the work of "Supply, Installation, Wiring, Testing and Commissioning of Signalling and Telecommunication P.I. work in connection with Renovation / Strengthening of the existing Railway Siding at Bhojudih Coal Washery, Santhaldih, West Bengal under S.E. Railway, Adra Division."

(Inclusive of any other work required for completion of the work under this contract as per direction of Engineer in charge).

1.5 Availability of Site

The site for the work is available.

1.6 Deadline for submission of bids: 11.00 Hrs.on 28.06.2021.

The Employer may extend the deadline for submission of Tenders by issuing an amendment in writing in accordance with Clause 6.3 in which case all rights and obligations of the Employer and the Tenderer previously subject to the original deadline will be subject to new deadline.

CRITICAL DATA SHEET

Published Date	10.06.2021 at 18:00 hrs
Bid Document Download / Sale Start Date	10.06.2021 at 18:30 hrs
Pre-bid Query Receipt Start Time & Date	NA
Pre-bid Query Receipt End Time & Date	NA
Bid submission Start Date & Time	11.06.2021 from 11.00 hrs.
Bid submission End Date & Time	28.06.2021 at 11.00 hrs.
Bid Opening Date & Time	29.06.2021 at 11.30 hrs.

2.0 QUALIFICATION CRITERIA TO BE SATISFIED

2.1 The Qualification Criteria to be satisfied are given at Annexure Ienclosed.

2.2 The Qualification Criteria to be satisfied will depend on the category of works, whether Small, Normal or Large. Small Works are those costing upto and including Rs. 3 Crore, Normal Works are those costing above Rs. 3 Crore and up to and including Rs. 100 Crore each and Large Works are those costing more than Rs. 100 Crore. The work for which the Tender is being invited falls under the category of **Normal works**.

2.3 The Qualification Criteria to be satisfied will also depend on whether the Work fallsin Normal area or difficult area. Difficult area includes North East States, Jammu & Kashmir, Andaman & Nicobar Islands and the 60 districts requiring Integrated Action Plan of Government of India (List available at Annexure X). Normal area covers all areas other than difficult area. The work for which this Tender has been invited falls under **Normal area.**

2.4 In this tender Joint Venture is **not allowed.**

2.5 The documents to be furnished by the Bidder to prove that he is satisfying the qualification Criteria laid down should all be in the Bidder's name, except in cases where through the name has changed, the owners continued to remain the same and in cases of amalgamation ofentities.

3.0 FORMAT AND CHECK LIST FOR SUBMISSION OF INFORMATION ON QUALIFICATION CRITERIA

3.1 The information to be furnished and the documents to been closed shall be as per Clause 28.0 hereinafter. Documents/ information complete in all respects, in support of meeting the Qualification Criteria should be submitted in one go. Submission of additional documents shall not be permitted. Only clarifications and filling of gaps/missing information in the submitted documents, may be permitted.

4.0 CONTENTS OF TENDER DOCUMENT

4.1 Each set of Tender or Bidding Document will comprise the documents listed below and addenda issued in accordance with Clause 6:

PART-1: - Technical Bid Packet

(Read with Correction Slip Nos. 1 to 8)

Section 1	Notice Inviting Tender and Instructions to Tenderers including Annexures
Section 2	Tender and Contract Form [DELETED]
Section 3	Special Conditions
Section 4	Schedules A to F
Section 5	Technical Specifications
Section 6	Drawings

PART-2: - FINANCIAL BID PACKET

Schedule of Quantities (Bill of Quantities)

PART-3: - General Conditions of Contract

(Read with Correction Slip No. 10)

Section 7	Conditions of Contract
Section 8	Clauses of Contract
Section 9	RITES Safety Code
Section 10	RITES Model Rules for Protection of Health and Sanitary Arrangements for Workers
Section 11	RITES Contractor's Labour Regulations

4.2 Part-3: General Conditions of Contract (Compilation of section 7 to 11) as also Correction Slips to GCC are available on RITES website *www.rites.com* under thelink 'Tenders'.

4.3 Part 3 of the tender, i.e., General Conditions of Contract (Compilation of Section 7 to 11) is not uploaded as a part of this tender document because as stated in sub-clause 4.2 above, the same is available separately on RITES' web site and can be seen/ downloaded from there. **The bidder need not submit/upload Part 3 of the tender as a part of his offer. So far as Part-1 is concerned, the bidder is required to submit/upload only the documents mentioned in Clause 28.0 of Section 1 thereof. Rest of the Part-1 need not be uploaded. The bidder must, nevertheless, read the same. It shall be presumed that the bidder has read the contents of Part 1: Technical Bid Packet and Part 3: General Conditions of Contract and upto date Correction Slips thereto and the same will be binding upon him.** The successful bidder will be required to sign the complete tender document i.e., Part 1, Part 2, Part 3 and Correction Slips, if any, thereto.

5.0 INSTRUCTIONS ON ACCESSING/PURCHASING OF BID DOCUMENTS AND SUBMISSION THEREOF

5.1 To participate in the E-Bid submission for RITES, it is mandatory for the bidders to get their firms registered with E-Procurement Portal https://etenders.gov.in/eprocure/app.

5.2 The bidders are required to submit soft copies of their bids electronically on the CPP Portal,

using valid Digital Signature Certificates. The instructions given below are meant to assist the bidders in registering on the CPP Portal, prepare their bids in accordance with the requirements and submitting their bids online on the CPP Portal.

5.3 REGISTRATION

a) Bidders are required to enroll on the e-Procurement module of the Central Public Procurement Portal (URL:*https://etenders.gov.in/eprocure/app*) by clicking on the link **"Online Bidder Enrolment"** on the CPP Portal which is free of charge.

b) As part of the enrolment process, the bidders will be required to choose a unique username and assign a password for their accounts.

c) Bidders are advised to register their valid email address and mobile numbers as part of the registration process. These would be used for any communication from the CPP Portal.

d) Upon enrolment, the bidders will be required to register their valid Digital Signature Certificate (Class III Certificates with signing key usage) issued by any Certifying Authority recognized by CCA India with theirprofile.

e) Only one valid DSC should be registered by a bidder. Please note that the bidders are responsible to ensure that they do not lend their DSC's to others which may lead tomisuse.

f) Bidder can log in to the site through the secured log-in by entering their user ID/Password and the password of the DSC/e-Token.

5.4 SEARCHING FOR TENDERDOCUMENTS

a) There are various search options built in the CPP Portal, to facilitate bidders to search active tenders by several parameters. These parameters could include Tender ID, Organization Name, Location, Date, Value, etc. There is also an option of advanced search for tenders, wherein the bidders may combine a number of search parameters such as Organization Name, Form of Contract, Location, Date, Other keywords etc. to search for a tender published on the CPP Portal.

b) Once the bidders have selected the tenders they are interested in, they may download the required documents/ tender schedules. These tenders can be moved to the respective 'My Tenders' folder. This would enable the CPP Portal to intimate the bidders through SMS/E-mail in case there is any corrigendum issued to the tender document.

c) The bidder should make a note of the unique Tender ID assigned to each tender, in case they want to obtain any clarification/help from the Help desk.

5.5 PREPARATION OF BIDS

a) Bidder should take into account any corrigendum published on the tender document before submitting theirbids.

b) Bidder is advised to go through the tender advertisement/NIT and the tender document carefully to understand the documents required to be submitted as part of the bid. Bidder may please note the number of covers in which the bid documents have to be submitted, the number of documents – including the names and content of each of the document that need to be submitted. Any deviations from these may lead to rejection of thebid.

c) Bidder, in advance, should get ready the bid document to be submitted as indicated in the tender document/schedule and generally, they can be in PDF/XLS/RAR/JPG

formats. Bid documents may be scanned with 100 dpi with black and white option which helps in reducing size of the scanned document.

d) To avoid the time and effort required in uploading the same set ofstandard documents which are required to be submitted as a part of every bid, a provisionof uploading such standard documents (e.g. PAN Card copy, Annual Reports, Auditor Certificates etc.) has been provided to the bidders. Bidders can use "My Space" or "Other Important Documents" area available to them to upload such documents. These documents may be directly submitted from the "My Space" area while submitting a bid, and need not be uploaded again and again. This will lead to a reduction in the time required for bid submissionprocess.

5.6 SUBMISSION OF BIDS

a. Bid can be submitted only during validity of registration of bidder with CPPP E-Procurement Portal.

b. Bidder should log into the site well in advance for bid submission so that they can upload the bid in time i.e. on or before the bid submission time. Bidder will be responsible for any delay due to otherissues.

c. The Bidder has to digitally sign and upload the required bid documents one by one as indicated in the tender document.

d. Bidder has to select the payment option as "offline" to pay the cost of tender document and EMD as applicable and enter details of the instruments.

e. Bidder should prepare the financial instruments of the Cost of Tender Documents and EMD as per the instructions specified in Clause 7.0(f) hereinafter. The original should be posted/couriered/given in person to the concerned official, so as to reach him within a week from the date of opening. The details of the DD/any other accepted instrument, physically sent, should tally with the details available in the scanned copy and the data entered during bid submission time. If the date of issue of DD/any other accepted instrument, physically sent, is on or before the bid submission end date, the same shall also be accepted even if the details are differentfrom the scanned copy uploaded along with the bid. Otherwise the uploaded bid will be rejected.

f. Bidders are requested to note that they should necessarily submit their financial bids in the format provided and no other format is acceptable. If the price bid has been given as a standard BOQ format with the tender documents, then the same is to be downloaded and to be filled by all the bidders. Bidders are required to download the BOQ file, open it and complete the Sky Blue coloured (unprotected) cells with their respective financial quotes and other details (such as name of the bidder). No other cells should be changed. Once the details have been completed, the bidder should save it and submit it online, without changing the filename. If the BOQ file is found to be modified by the bidder, the bid will berejected.

g. The server time (which is displayed on the bidders' dashboard) will be considered as the standard time for referencing the deadlines for submission of the bids by the bidders, opening of bids etc. The bidders should follow this time during bid submission.

h. All the documents being submitted by the bidders would be encrypted using PKI encryption techniques to ensure the secrecy of the data. The data entered cannot be viewed by unauthorized persons until the time of bid opening. The confidentiality of the

bids is maintained using the secured Socket Layer 128 Bit encryption technology. Data storage encryption of sensitive fields is done. Any bid document that is uploaded to the server is subjected to symmetric encryption using a system generated symmetric key. Further this key is subjected to asymmetric encryption using buyers/bid openers' publickeys.

i. The uploaded tender documents become readable only after the tender opening by the authorized bidopeners.

j. Upon the successful and timely submission of bids (i.e. after clicking "Freeze Bid Submission"in the portal), the portal will give a successful bid submission message & a bid ID to the bid. Abid summary will be displayed with the bid ID and the date & time of submission of the bid with all other relevantdetails.

k. The bid summary has to be printed and kept as an acknowledgement of the submission of the bid. The acknowledgement may be used as an entry pass for any bid openingmeetings.

5.7 ASSISTANCE TOBIDDERS

a) Any queries relating to the process of online bid submission or queries relating to CPP Portal in general may be directed to the 24x7 CPP Portal Help Desk Number 0120-4200462, 0120-4001002, 0120-4001005, 0120-6277787, E-mail id: *support-eproc@nic.in*

b) Bidders information useful for submitting online bids on the CPP Portal may be obtained at: *https://etenders.gov.in/eprocure/app?page=BiddersManualKit& service=page*

c) It is mandatory for all bidders to have Class-IIIDigital Signature Certificate (DSC) in the name of the person along with name of Company who will digitally signthebid from any of licensed Certifying Agency (CA). Bidders can see the list of licensed CAs from the link *https://www.cca.gov.in*

d) Bidder shall ensure use of registered Digital Signature Certificate (DSC) only and safety of thesame.

e) In case the Digital Signature Certificate (DSC) holder who is digitally signing the bid and the person having Authority to Sign as per Clause 11 are different, even then all the terms and conditions of the tender document will be binding upon the bidder.

5.8 CLARIFICATIONS ON TENDERDOCUMENTS

A prospective Tenderer requiring any clarification on the Tender Document may notify through queries, on line only within the specified period (refer clause 1.6-Critical Date Sheet herein before).

Request for clarifications including request for Extension of Time for submission of Bid, if any, must be received not later than 10 (ten) days prior to the deadline for submission of tenders. Details of such queries raised and clarifications furnished will be uploaded in CPP website *https://etenders.gov.in/eprocure/app* without identifying the names of the bidders who had raised the queries. Any modification of the Tender Document arising out of such clarifications will also be uploaded on CPP website.

6.0 AMENDMENT OF TENDER DOCUMENT

6.1 Before the deadline for submission of tenders, the Tender Document may be modified by

RITES Ltd. by issue of addenda/corrigendum.

6.2 Addendum/Corrigendum, if any, will be hosted on website*https://etenders.gov.in/eprocure/app* and shall become a part of the tender document. All tenderers are advised to see the website for addendum/corrigendum to the tender document which may be uploaded up to 7 days prior to the deadline for submission of tender as finallystipulated.

6.3 To give prospective tenderers reasonable time in which to take the addenda/corrigenda into account in preparing their tenders, extension of the deadline for submission of tenders may be given before bid submission end date and time as considerednecessary by RITES. Sometimes due to administrative reasons, the deadline for submission of tenders may be extended latest by the deadline for opening of tender as stipulated including extension given earlier. All tenderers are advised to see the website for extension of deadline for submission oftenders.

6.4 Tenderer who has downloaded the tender from Central Public Procurement Portal (CPPP) website *https://etenders.gov.in/eprocure/app* shall not tamper/modify the tender form including downloaded Price Bid Template in any manner. In case if the same is found to be tampered/modified in any manner, tender will be completely rejected and EMD would be forfeited and tenderer is liable to be banned from doing business with RITESLtd.

7.0 PREPARATION AND SUBMISSION OFBIDS

(a) Part-1 and Part-2 of tender document may be downloaded from CPPP and Part-3 from RITES website *https://www.rites.com*under the link 'Tender' – 'RITESGCCfor Works' well before the deadline for submission of bids. The bids (Part-2 only) alongwith the information and documents specified in Clause 28 hereinafter, shall besubmittedonlinefollowingtheinstructionsappearingonthescreen.**Documents specified in Clause 28 of Section 1, Part-1 are required to be uploaded along with Part-2 (Financial Bid); the rest of Part-1 and the whole of Part-3 of the tender document need not be submitted online but it shall be deemed to have been submitted.** Users are requested to map their system as per the System settings available on the link *https://etenders.gov.in/eprocure/app?page=Bidders_Manual_Kit&service=page* on the CPP portal.

(b) After downloading/getting the tender document/schedules from *https://etenders.gov.in/eprocure/app* the Bidder should go through them carefully and then submit the documents as asked, otherwise bid will be rejected. It is construed that the bidder has read all the terms and conditions before submitting theiroffer. Bidders are advised that prior to bid submission they should read the bid submission manual available on CPP Portal *https://etenders.gov.in/eprocure/app?page=BiddersManualKit&service=page web site*

(c) Bidders may ensure that all the pages of the documents mentioned in Clause 28 must be signed & stamped by authorized signatory and serially numbered. In case, it is found that bidder has not complied with the same, the documents shall be deemed to be signed and stamped as this is a digitally signede-tender.

(d) The bids shall be submitted online following the instructions appearing on the screen. Bidders may insert theire -Token/Smart Card in their computer and Log on to CPP portal *https://etenders.gov.in/eprocure/app* using the User-Id and Password chosen during registration.Then they may enter the password of thee-Token/Smart Card to access the DSC.

(e) Prior to bid submission, bidder should get ready with the documents to be uploaded as part of the bid as indicated in the tender document/schedule. Generally, theycan be in Excel/PDF/RAR/JPG formats. No other format is accepted. If there is more than one PDF document, then they can be clubbed together in a Zip file for uploading. There is no limit for uploading file. Bids shall be submitted online only at CPP website *https://etenders.gov.in/eprocure/app*

Tenderer/Contractor are advised to follow the instructions provided in the 'Instructions to the Contractors/Tenderer for the e-submission of the bids online through the Central Public Procurement Portal for e-procurement at *https://etenders.gov.in/eprocure/app.*

Bid documents may be scanned with 100 dpi with black and white option which helps in reducing size of the scanned document.

Intending tenderers are advised to visit CPPP website *https://etenders.gov.in/eprocure/app* till the closing date of submission of tender to check if there is any extension of deadline of submission of tender.

(f) Cost of Tender Document & Earnest Money Deposit (EMD).

During bid submission the bidder has to select the payment option as offline to pay the Cost of Tender Document ~~and EMD~~ and enter details of the instruments. Incase of exemption from payment of cost of tender document ~~and EMD~~ as a matter of Govt. Policy, the scanned copy of document in support of exemption will have to be uploaded by the bidder during bid submission.In case the bidder is registered as a vendor under the category of Micro, Small and Medium Enterprises (MSME), he must state his Udyog Aadhar Memorandum (UAM) number as registered on CPPP. The onus of proving that the bidder is exempted from payment of cost of tender documentand/~~or EMD~~ lieson the bidder.In this connection, it should be noted that mere opening of bid does not mean that the bid has to be considered by RITES asa valid bid. If later, it is discovered from the uploaded documents that bidder is not exempted from payment of cost of tender ~~and/or EMD~~, his bid shall be treated as non-responsive. **It may be noted that the benefits under Public Procurement Policy for Micro and Small Enterprises (MSEs) Order, 2012 are applicable to only Supply and Service Contracts.**

(i) Cost of Tender Document: The Cost of Tender Document is Rs.15,000/- (Rupees Fifteen Thousand only) which is non refundable. It shall be in the form of a Banker's Cheque/Pay Order/Demand draft favouring "RITES Ltd." issued by a scheduled Commercial Bank, payable at Gurgaon/Delhi. No other mode of payment will be acceptable.

(ii) Earnest Money Deposit (Bid Security):

The Bidders/tenderers are not required to deposit the Earnest Money (Bid Security) along with the bid documents. In place of Earnest Money, it is mandatory that the Bidders/ tenderers shall submit Bid Security Declaration (Annexure XI) along with the Bid Documents. Refer GCC July-2019 Correction Slip No.-9.

(Refer CS-9 of RITES GCC- July 2019) EMD not applicable. However, Bidder has to submit the Bid Security Declaration as per Annexure-XI. The bidders are not required to deposit Earnest Money (Bid Security) along with the Bid documents. In place of Earnest Money it is mandatory that the bidders / tenderers shall submit Bid Security Declaration as per Annexure XI to Notice Inviting Tender and Instructions to

Tenderers along with the Bid Documents. Bidders are required to upload scanned copy of acceptable instruments for Bid Security Declaration and Cost of Tender document in different files (Either in PDF or Zip format) during on-line submission of Bid. These documents shall be deposited in "ORIGINAL" in a sealed envelope within a week from the date of opening to:. **The General Manager (Projects),RPO-Ranchi, RITES Limited, 56, C.R. Avenue, 2nd Floor, Kolkata – 700012.**

Any tender not accompanied by Bid Security Declaration shall be rejected out rightly.

Failing which the bid shall be rejected and the bidder shall be debarred from tendering in RITES Ltd. for a period of 02 (two) years unless the lapse is condoned by the Accepting Authority at the request of the bidder for valid reasons. The envelope should bear the tender details (Tender No., Tender Name etc.)

(g) The bid should be submitted online in the prescribed format. No other mode of submission is accepted.

(h) Bid shall be digitally signed by a representative of the bidder and submitted "on-line". No hard copies of the documents (except those specifically asked for in the tender document) are required to be submitted.

(i) The bidders will have to accept unconditionally the online user portal agreement which contains the Terms and Conditions of NIT including General and Special Terms & Conditions and other conditions, if any, along with on-line undertaking in support of the authenticity regarding the facts, figures, information and documents furnished by the bidder on-line in order to become an eligible bidder.

(j) The bidder has to digitally sign and upload the required bid documents one by one as indicated. Bidders to note that the very act of using DSC for downloading the bids and uploading their offers shall be deemed to be a confirmation that they have read all sections and pages of the tender/bid document including terms and conditions without any exception and have understood the entire document and are clear about tender requirements which will be binding upon the bidder.

(k) The bidders are requested to submit the bids through online e-tendering system before the deadline for submission of bids (as per Server System Clock displayed on the portal). RITES will not be held responsible for any sort of delay or the difficulties faced during online submission of bids by the bidders at the eleventh hour.

(l) The bidder may seek clarification online only within the specified period. The identity of bidder will not be disclosed by the system. RITES Ltd. will clarify the relevant queries of bidders as far as possible. The clarifications given will be visible to all the bidders intending to participate in that tender. The clarifications may be asked from the day of "Pre Bid Query Receipt Start Date and Time" till "Pre Bid Query Receipt End Date and Time".

8.0 TENDER VALIDITY

8.1 The Tender shall be valid for a period of **90 days** from the due date for submission of

Tender or any extended date as indicated in sub parabelow.

8.2 In exceptional circumstances, during the process of evaluation of tenders and prior to the expiry of the original time limit for Tender Validity, the Employer may request that the Tenderers may extend the period of validity unconditionally for a specified additional period. The request and the tenderer's response shall be made in writing/ e- mail. A Tenderer may refuse the request without forfeiting his Earnest Money. A Tenderer agreeing to the request will not be permitted to modify his Bid but will be required to extend the validity of the Earnest Money for the period of theextension.

9.0 EARNEST MONEY: Refer GCC July-2019 Correction Slip No. 9.

The Bidders/tenderers are not required to deposit the Earnest Money (Bid Security) along with the bid documents. In place of Earnest Money, it is mandatory that the Bidders/ tenderers shall submit Bid Security Declaration (Annexure XI) along with the Bid Documents. Refer GCC July-2019 Correction Slip No. 9.

10.0 MODIFICATION/ SUBSTITUTION/ WITHDRAWL OFBIDS

10.1 The Tenderers shall submit offers which comply strictly with the requirements of the Tender Document as amended from time to time as indicated in Clause 6.0 above. Alternatives or any modifications by the tenderer shall render the Tenderinvalid.

10.2 Thebiddercanmodify, substitute, re-submitorwithdrawitsE–bidaftersubmissionbut prior to the deadline for submission of bids. No Bid shall be modified, substituted or withdrawn by the bidder on or after the deadline for submission of bids.Withdrawal of bid after the deadline for submission of bids would result in the forfeiture of EMD.

10.3 Any modification in the Bid or additional information supplied subsequently to the deadline for submission of bids, unless the same has been explicitly sought for by RITES, shall bedisregarded.

10.4 For modification of E–bid (Technical Bid), bidder has to detach its old bid from CPP portal and upload / re-submit digitally signed modifiedbid.

10.5 For withdrawal of bid, bidder has to click on withdrawal icon at CPP portal and can withdraw its E–bid.

10.6 After the bid submission on the portal, an acknowledgement number will be generated by the system which should be printed by the bidder and kept as a record of evidence for online submission of bid for the particular tender and will also act as an entry pass to participate in the bid opening.

10.7 The time settings fixed in the server side & displayed at the top of the tender site, will be valid for bid submission, in thee-tender system. The bidders should follow this time during bid submission.

10.8 All the data being entered by the bidders would be encrypted using PKI encryption techniques to ensure the secrecy of the data. The data entered will not be viewable by unauthorized persons during bid submission & will not be viewable by any one until the date & time specified for bid opening.

10.9 The bidder should logout of the tendering system using the normal logout option available in the portal and not by selecting the (X) exit option in thebrowser.

11.0 AUTHORITY TO SIGN

a) If the applicant is an individual, he should sign above his full type written name and currentaddress.

b) If the applicant is a proprietary firm, the Proprietor should sign above his full type written name and the full name of his firm with its currentaddress.

c) If the applicant is a firm in partnership, the Documents should be signed by all the partners of the firm above their full type written names and current addresses. Alternatively, the Documents should be signed by the person holding Power of Attorney for the firm in the Format at AnnexureIII.

d) If the applicant is a limited Company, or a Corporation, the Documents shall be signed by a duly authorized person holding Power of Attorney for signing the Documents in the Format at AnnexureIII.

e) If the applicant is a Joint Venture, the Documents shall be signed by the Lead Member holding Power of Attorney for signing the Document in the Format at AnnexureIV. The signatory on behalf of such Lead Partner shall be the one holding the Power of Attorney in the Format at Annexure III.

11.1 Points to be kept in mind while preparing thebid

While filling in Qualification Information documents and the Financial Bid, following should be kept in mind:

i. There shall be no additions or alterations except those to comply with theinstructions issued by the Employer or as necessary to correct errors, if any, made by theTenderers.

ii. Conditional Offer/ Tender will be rejected. Unconditional rebate/discounts in the Financial offer will however beaccepted.

iii. The Employer reserves the right to accept or reject any conditional rebate/discounts. While evaluating the Bid Price, the conditionalrebates/discounts which are in excess of the requirements of the bidding documents or otherwise result in accrual of unsolicited benefits to the Employer, shall not be taken into account.

iv. The bidder has to quote value only in figures in theBOQ.

v. In case of Item Rate Tenders, the bidders have to compulsorily quote rates of all the BOQ items as also all items of Item Rate Schedule/ Sheetina Mixed (Item Rate Schedule and Percentage Schedule) Tender.

vi. In case of Item Rate Tenders, if the same item figures in more than one section/ part of Schedule of Quantities, the Tenderer should quote the same rate for that item in all sections/ parts. If different rates are quoted for the same item, the least of the different rates quoted only shall be considered for evaluation of that item in all sections/ parts of the Schedule of Quantities.

vii. In case of item wise BOQ, the bidder is required to quote his rate for all items. For the items not quoted by the bidder, it will be presumed that the bidder has included the cost of that/ those item(s) in the rates of other items and the rate for such item(s) shall be considered as Zero and the tender will be evaluated by the Employer accordingly and the work executed by the successful bidder accordingly.

viii. In case of Percentage Rate BOQ, the bidder has to select Excess (+) or Less (-) and enter the valid percentage for that BOQ.

ix. Deduction/recovery/credit items, if any, are placed in a separate sub-head and in a separate sheet of BOQ. In case of credit items/recovery items/deduction items for which the bidder has to pay the amount to Employer, the bidder is not allowed to make negative entry and the rate quoted by the bidder shall be taken as negatively default. The amount so calculated shall be considered as negative and deducted from the total of other sub-heads of BOQ to work out the total bidamount.

11.2 INTEGRITY PACT

(i) TheBidder/Contractor is required to enter into an Integrity Pact with the Employer, in the Format at Annexure VI. The Integrity Pact enclosed as Annexure VI will be signed by RITES for and on behalf of Employer as its Agent/Power of Attorney Holder at the time of execution of Agreement with the successful Bidder. While submitting the Bid, the Integrity Pact shall be signed by the duly authorized signatory of the Bidder/Lead Member of JV. In case of failure to submit the Integrity Pact duly signed and witnessed, along with the Bid, the Bid is likely to be rejected.

(ii) In case of any contradiction between the Terms and Conditions of the Bid Document and the Integrity Pact, the former willprevail.

Provided always that provision of this Clause 11.2 – Integrity Pact (IP), shall be applicable only when so provided in Clause 11.2A below which will also stipulate the name and address of the Independent External Monitors as well as the Name, designation and address of the official nominated by the Employer to act as the Liaison Officer between the Independent External Monitor and the Engineer-in- Charge as well as the Contractor/Bidder.

11.2A Whether Clause 11.2 (Integrity Pact) shall be applicable: **YES**

In case Integrity Pact is applicable (When estimated cost put to tender is Rs.10 crores or more), the following Independent External Monitors who have been appointed by the Central Vigilance Commission, shall monitor implementation of IP).

In case Integrity Pact is applicable (When estimated cost put to tender is Rs.10 crores or more), the following Independent External Monitors who have been appointed by the Central Vigilance Commission, shall monitor implementation of IP).

Name and Address of IEM 1
Shri. Aditya Prakash Mishra, IRSE (Retd.),
Flat No. 24, ASTER-1, Vatika City, Sohna Road, Sector – 49,
Gurgaon - 122003.

Name and Address of IEM 2
Shri. Abhay Kumar Khanna, IRAS (Retd.),
S – 410, UGF, GK – II, New Delhi – 110048.

Complaints arising from tendering process shall be, as far as possible, referred to both the IEMs for their joint investigation and recommendation.

Name, Designation and Address of RITES' Liaison Officer:
Shri. Alok Garg, ED (B&A),
RITES Ltd., Gurgaon -122001.

11.2B The Guidelines on Banning of Business Dealings as per Annexure-A of Annexure VI are

applicable to all contracts, are applicable to all contracts irrespective of applicability of Intergrity Pact.

If Buisness dealings with the Bidder/ Contractor has been banned as per Annexure-A of Annexure-VI , then such a bidder Bidder/Contractor individually and also any Joint Venture wherein such Bidder/Contractor is a member , will not be eligible for a period till such ban is in force to participate in tenders of any work(s), which may be invited by RITES. In case, the Bidder/Contarctor is a Joint Venture, the JV as well as all members of the JV individually or as member(s) of any other Joint Venture (JV), will not be so eligible. In case the contractor is a company , then , in addition to the aforesaid provisions , the Associate Companies and Subsidiary Companies(as defined under Comapany's Act -2013.), of the company included in the Negative List , will also not be eligible.

12.0 TENDER OPENING, EVALUATION AND CLARIFICATIONS

12.1.....The Employer will open all the Tenders received, in the presence of the Tenderers or their representatives who choose to attend at **11.30 Hrs. on 29.06.2021** in theoffice of General Manager (P), RITES Ltd., 56, C.R. Avenue, 2nd Floor, Kolkata – 700012 In the event of the specifieddate of the opening being declaration a holiday by the Employer, the Tenders will be opened at the appointed time and location on the next working day.

12.2 Opening of bids will be done through online process. RITES reserves the right to postpone or cancel a scheduled bid opening at any time prior to its opening. Information of the same will be displayed at *https://etenders.gov.in/eprocure/app* CPP portal.

12.3 Bid opening committee will open the bids online in the presence of bidders or their authorized representatives who choose to attend on opening date and time. Also, the bidders can participate online during the bid opening process from their remote end through their dashboard. The bidder's representatives, who are present, shall sign inan attendance register. At the time of technical bid opening, each bidder will be able to view on-line through CPPP, the technical bids of the bidders who have participated in the tender and whose bids have beenopened.

12.4 Bids will be opened as per date/time as mentioned in the Tender Critical Date Sheet unless the same is extended. On completion of Technical Bid Opening, each bidder will be able to view the technical bid documents of the bidders whose bids have been opened. Similarly, on the completion of Financial Bid Opening each bidder will be able to view the Financial as well as technical bid documents of the bidders whose bids have been opened.

12.5 RITES shall subsequently examine and evaluate the bids in accordance with the provision set out in the tenderdocument.

12.6 The results of technical and financial qualification of bidders will be available on the CPP Portal at *https://etenders.gov.in/eprocure/app* and intimated to the bidder through system generated email or SMS.

12.7 It will be the bidder's responsibility to check the status of their Bid on-line regularly after the opening of bid till award of work.

12.8 The bids will be evaluated for qualifying criteria as mentioned in Clause 2 herein before. RITES shall not be responsible for any postal delay in receipt of all original documents including the cost of tender document and EMD. In case of non-receipt of these documents in original within the specified period, the bid will be treated as non- responsive.

12.9 Request for clarification/deficient documents from the bidder can be asked for either through the system or through E-mail. A system generated SMS alert will be sent to the bidder when clarifications/ deficient documents are called through the system. In such a case, no separate communication will be sent in this regard. Non-receipt of email and/or SMS will not be accepted as a reason of non-submission of deficient documents or confirmatory documents within prescribed time. The date and time of submission of deficient documents cannot be extended.

12.10 After evaluation of Technical-Bid, the bidder will be able to view uploaded Tender Committee evaluation results as also the date and time of Financial BidOpening.

12.11 The bidder will be able to view (through his Login Id) BOQ Sheets of other bidders, Comparative Chart and Financial Evaluation Summary uploaded by Tender Evaluation Committee. Without login, bidder will be able to view only Comparative Chart.

12.12 SINGLE PACKETSYSTEM – Not Applicable

Envelope 1 containing scanned copy of Earnest Money along with Mandate Form as per Annexure VII, Cost of tender document of all the Tenderers and Authority to Sign as per Clause 11.0 will be opened first and checked. If Earnest Money and Cost of Tender Document are not furnished as per tender stipulations, the Envelope-2 of Technical bid and Envelope-3 containing Financial bid will not be opened and the bid will be rejected as non-responsive unless the bidder has established that it is exempted from payment of Cost of Tender Document and Earnest Money Deposit. The Envelope-2 containing Technical Bid and Envelope-3 containing Financial Bid of other Tenderers who have furnished scanned copies of Earnest Money and cost of Tender document as per tender stipulations will then be opened.

12.13 TWO PACKETSYSTEM - Applicable

Envelope 1 of Packet I containing scanned copy of Earnest Money along with Mandate Form as per Annexure VII, Cost of Tender Document of all the Tenderers and Authority to Sign as per Clause11.0 will be opened first and checked. If Earnest Money and cost of Tender Document are not furnished as per tender stipulations, the Envelope-2 of PACKET-I (Technical Bid) and PACKET-II (Financial Bid) will not be opened and the bid will be considered as non-responsive and rejected unless the bidder has established that it is exempted from payment of Cost of Tender Document and Earnest Money Deposit. The Envelope-2 of PACKET-I (Technical Bid) of other Tenderers who have furnished scanned copies of Earnest Money and cost of Tender document as per tender stipulations will then be opened.

The Employer will scrutinize the Technical Bids accepted for evaluation to determine whether eachTenderer

i. has submitted 'Authority to sign' as per Clause11.0 above and Integrity Pact (where applicable) duly signed and witnessed as per Clause 11.2 above;

ii. meets the Qualification Criteria stipulated in Clause2.0

If required, the Employer may ask any such Tenderer for clarifications on his Technical Bid through CPPP or through E-mail. The tenderer shall furnish the same online only in case

clarifications are sought through CPPP and through E-mail if clarifications are sought through E-mail. If a Tenderer does not submit the clarification/document requested, by the specified time, the bid of such Tenderer is likely to be rejected. PACKET-II (Financial Bid) of Tenderers whose Technical Bids are not found acceptable will not be opened. Such tenderers will be informed about non-acceptance of their Technical Bid through system generated SMS/E- mail. The tenderers whose Technical Bids are found acceptable will be advised accordingly and will also be intimated through e-mail the time and date and place where and when PACKET-II (Financial Bid) will beopened.

At the appointed place, time and date, in the presence of the Tenderers or their representatives who choose to be present, the Employer will open the online PACKET-II (Financial Bid).

12.14 Mere Opening of Bid to be No Guarantee of its Validity

It may be noted that mere opening of a bid does not mean that the bid has to be considered by RITES as a valid bid. All bids will be evaluated to decide whether the bids are responsive or non- responsive.

12.15 In order to give effect to the policy of Government of India to encourage 'Make in India', price preference shall be accorded to Local Suppliers/Bidder in accordance with Order No. P-45021/2/2017-BE-II dated 15.06.2017 on Public Procurement (Preference to Make in India) Order 2017 as amended upto date of the Department of Industrial Policy and Promotion, Ministry of Commerce and Industry as under -

1. **Definitions:**

'Local content' means the amount of value added in India which shall be the total value of the item procured (excluding net domestic indirect taxes) minus the value of imported content in the item (including all custom duties) as a proportion of the total value, in percent.

"Class-I local supplier' means a supplier or service provider, whose goods, services or works offered for procurement, has local content equal to or more than 50%, as defined under this clause.

"Class-II local supplier' means a supplier or service provider, whose goods, services or works offered for procurement, has local content more than 20% but less than 50%, as defined under this clause.

"Non-Local supplier' means a supplier or service provider, whose goods, services or works offered for procurement, has local content less than or equal to 20% as defined under this clause.

'L1' means the lowest tender or lowest bid or the lowest quotation received in a tender, bidding process or other procurement solicitation as adjudged in the evaluation process as per the tender or other procurement solicitation.

'Margin of purchase preference' means the maximum extent to which the price quoted by a "Class-1 local supplier" may be above the L1 for the purpose of purchase preference.

'Procuring entity' means RITES Ltd.

'Works' means all works covered in the scope of work in this tender.

2. **Eligible bidder in this tender: *'Class-I local supplier' ~~/ 'Class-II local supplier' / Non-local suppliers~~**

*** (**strike out whichever is not applicable)

3 Purchase Preference

(a) In the procurements of goods or works which are divisible in nature, the "Class-I local supplier' shall get purchase preference over 'Class-II local supplier' as well as 'Non-local supplier', as per following procedure:

i. Among all qualified bids, the lowest bid will be termed as L1. If L1 is 'Class-I local supplier', the contract for full quantity will be awarded to L1.

ii. If L1bid is not a "Class-I local supplier', 50% of the order quantity shall be awarded to L1. Thereafter, the lowest bidder among the 'Class-I local supplier' will be invited to match the L1 price for the remaining 50% quantity subject to the class-I local supplier's quoted price falling within the margin of purchase preference and contract for that quantity shall be awarded to such Class-I local supplier' subject to matching the L1 price. In case such lowest eligible 'Class-I local supplier' fails to match the L1 price or accepts less than the offered quantity, the next higher 'Class-I local supplier' within the margin of purchase preference shall be invited to match the L1 price for the remaining quantity and so on, and contract shall be awarded accordingly. In case some quantity is still left uncovered on Class-I local suppliers, then such balance quantity may also be ordered on the L1 bidder.

(b) In the procurements of goods or works which are not divisible in nature, and in procurement of services where the bid is evaluated on price alone, the 'Class-I local supplier' shall get purchase preference over 'Class-II local supplier' as well as 'Nonm-local supplier', as per following procedure:

i. Among all qualified bids, the lowest bid will be termed as L1. If L1 is 'Class-I local supplier', the contract for full quantity will be awarded to L1.

ii. If L1 is not 'Class-I local supplier', the lowest bidder among the 'Class-I local supplier', will be invited to match the L1 price subject to Class-I local supplier's quoted price falling within the margin of purchase preference, and the contract shall be awarded to such 'Class-I local supplier' subject to matching the local price.

iii. In case such lowest eligible 'Class-I local supplier' fails to match the L1 price, the 'Class-I local supplier' with the next higher bid within the margin of purchase preference shall be invited to match the L1 price and so on and contract shall be awarded accordingly. In case none of the 'Class-I local supplier' within the margin of purchase preference matches the L1 price, the contract may be awarded to the L1 bidder.

(c) "Class-II local supplier" will not get purchase preference in any procurement undertaken by procuring entity.

4. Applicability of Purchase preference in this tender as per Para *~~3(a)~~/3(b)

*** (**strike out whichever is not applicable)

5. Type of this Tender/Work: *~~Goods/services~~/works.

*** (**strike out whichever is not applicable)

6. Margin of Purchase Preference: The margin of purchase preference shall be ~~20%~~.

7. The minimum local content for this tender shall be* 50%

*****(Fill the value of minimum local content).

8. Verification of local content:

a. The 'Class-I local supplier' / 'Class-II local supplier' at the time of tender, bidding or solicitation shall be required to indicate perecentage of local sontent and provide self-certification that the item offered meets the local content requirement for 'Class-I local supplier / 'Class-II local supplier' as the case may be. They shall also give details of the location(s) at which the local value addition is made.

b. In case of procurement for a **value in excess of Rs 10 crores,** the 'Class-I local supplier / 'Class-II local supplier**'** shall be required to provide a certificate from the statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of local content.

c. In case of false declaration by Class-I local supplier / Class-II local supplier or submission of false certificate. Banning of Business Dealings shall be done with defaulter as per the Guidelines given in Sub-clause 11.2B.

13.0 INSPECTION OF SITE BY THE TENDERERS

Tenderers are advised to inspect and examine the site and its surroundings and satisfy themselves before submitting their Tenders, as to the nature of the ground and sub-soil (asfarasis practicable),theformandnatureofthe site,themeansofaccesstothesite, the accommodation they may require and in general shall themselves obtain all necessary information as to risks, contingencies and other circumstances which may influenceor affecttheirTender.ATenderershallbedeemedtohavefullknowledgeof the site whether he inspects it or not and no extra charges consequent on any misunderstanding or otherwise shall be allowed.The Tenderer shall be responsible for arranging and maintaining at his own cost all materials, tools & plants, water, electricity, access, facilities for workers and all other services required for executing the work unless otherwise specifically provided for in the contract documents. Submission of a tender by a Tenderer implies that he has read this notice and all other contract documents and has made himself aware of the scope and specifications of the work to be done and of conditions and rates at which stores, tools and plant etc. will be issued to him by the Employer and local conditions and other factors having abearing on the execution of the work. The bidders may contact **Sri Mukesh Kumar Sharma, Sr. DGM/C at Dhanbad site Office. Phone No.: 9163341030, email: pokolkata@rites.com or mukeshrites08@gmail.com or ritesofficeranchi@gmail.com** regarding inspection of site.

14.0 EMPLOYER'S RIGHT ON ACCEPTANCE OF ANY TENDER

(i) If required, the Employer may ask any Tenderer the breakdown of unit rates. If the Tenderer does not submit the clarification by the date and time set in the Employers request for clarification, such Tender is likely to be rejected.

(ii) The competent authority on behalf of the Employer does not bind himself to accept the lowest or any other Tender and reserves to himself the authority to reject any or all the Tenders received without the assignment of any reason. All Tenders in which any of the prescribed conditions is not fulfilled or any condition is put forth by the Tenderer shall be summarily rejected.

15.0 CANVASSING PROHIBITED

Canvassing whether directly or indirectly, in connection with tenders is strictly prohibited and the tenders submitted by the Contractors who resort to canvassing will be liable to

rejection.

16.0 EMPLOYER'S RIGHT TO ACCEPT WHOLE OR PART OF THETENDER

Canvassing whether directly or indirectly, in connection with tenders is strictly prohibited and the tenders submitted by the Contractors who resort to canvassing will be liable to rejection.

17.0 MISCELLANEOUS RULES AND DIRECTIONS

17.1 The Tenderer shall not be permitted to tender for works if his near relative is posted as Associated Finance Officer between the grades of AGM (F) and J.M (F) in the concerned SBU Unit of RITES or as an officer in any capacity between the grades of GGM/GM and Engineer (both inclusive) of the concerned SBU of the Employer. He shall also intimate the names of persons who are working with him in any capacity or are subsequently employed by him and who are near relatives to any OfficerofEngineer rank and above in the organization of the Employer. Any breach of this condition by the Tenderer would render his Tender to berejected.

No Officer of Engineer rank and above employed in Engineering or Administrative duties in an Engineering Department of the Organisation of the Employer is allowed to work as a contractor for a period of one year after his retirement from the Employer's service without the previous permission of the Employer in writing. The contract is liable to becancelled if either the Contractor or any of his employees is found any time to be such a person who had not obtained the permission of the Employer as aforesaid before submission of the tender or engagement in the Contractor's service.

17.2 If required by the Employer, the Tenderers shall sign a declaration under the officials Secret Act 1923, for maintaining secrecy of the tender documents drawings or other records connected with the work given to them. The unsuccessful Tenderers shall return all the drawings given tothem.

17.3 In the case of any Item rate tender where unit rate of any item/items appears unrealistic, such tender will be considered as unbalanced and in case the Tenderer is unable to provide satisfactory explanation, such a tender is liable to be disqualified andrejected.

17.4 Price/rates quoted by the contractor in respect of the contract shall be after considering all input credits and inclusive of all taxes and cess etc. other than GST on Contract Price.The GST leviable on Contract Price shall be paid in addition to the Contract Price as mentioned below.

In the bill for the works done, the contractor shall charge GST separately. It is the responsibility of the contractor to pay GST to the Government concerned and file statutory return within due date prescribed under the respective Act. For RITES to get input credit, it is necessary that the amount get reflected in the return. In case the next Running Account Bills (RA Bills) are submitted before due date of filing of return, documentary evidence is to be submitted by the contractor/agency in the subsequent running account bill. The procedure for payment of bills shall be as under:

i. The contractor may be asked to charge GST separately in hisbills.

ii. The GST amount so claimed shall be paid along with payment of running account bill.

iii. ThecontractorhastofurnishthedocumentaryevidenceofthedepositoftheGSTor a copy of the return in case of adjustment of available input credit, whichever is earlier, before processing of subsequent RA bills, Else, the Engineer-in-Charge shall withhold the GST amount so paid in the previous bill(s), in the subsequent/next RA bill(s).

iv. Amount to be withheld shall relate only to the extent of GST not deposited or adjusted within due date of filling ofreturn.

In case of final bill, GST amount so deposited shall be reimbursed by the Engineer- in-Charge only after the contractor furnishes the documentary evidence of actual deposit of GST to the credit of Government and is reflected against the GSTIN of the employer.

Regarding payment of GST to the contractor, the decision of Engineer-in-Charge shall be binding on the contractor.

17.5 Each Bidder shall submit only one Bid either as an individual or as a Proprietor in a Proprietary firm or as a Partner in a Partnership firm or as a Director of a Limited Company/Corporation or as a Partner in a Joint Venture. Any Bidder who has submitted a Bid for a work, shall not be a witness for any other Bidder for the same work. Failure to observe the above stipulations would render all such Tenders submitted as a Bidder and/or as a witness, liable to summary rejection.

17.6 The Contractor shall be fully responsible for all matters arising out of the Performance of the Contract and shall, at his own expense, comply with all laws/acts/enactments/ orders/regulations/obligations whatsoever of the Government of India, State Government, Local Body and any Statutory Authority.

17.7 In case the bidder does not quote his rate for any item(s) in Item Rate Tender or Mixed Tender containing one or more Item Wise Schedules, it will be presumed that the bidder has included the cost of that/those item(s) in the rates of other items and the rate for such item(s) shall be considered as Zero and the tender will be evaluated by the Employer accordingly and the work executed by the successful bidder accordingly.

17.8 In case of credit items/recovery items/deduction items for which the bidder has to pay the amount to RITES/Employer, the rate quoted by the bidder shall be taken as negative (bidder is allowed to make positive entry only) and the negative amount so calculated shall be considered to work out the total bid amount.

18.0 SIGNING OF CONTRACT AGREEMENT

18.1 The Tenderer whose tender has been accepted will be notified of the award by the Employer by issue of a 'Letter of Acceptance' prior to expiration of the Bid Validity period.

The Letter of Acceptance will be sent to the Contractor in two copies one of which he should return promptly, duly signed and stamped. The Letter of Acceptance will be a binding Contract between the Employer and the Contractor till the formal Contract Agreement is executed.

18.2 Within the period as specified in Clause 1 of 'Clauses of Contract', from the date of issue of Letter of Acceptance, the successful Tenderer shall deliver to the Employer, Performance Guarantee and Additional Performance Guarantee (where applicable) in the formatprescribed.

18.3 The Tenderer whose Tender is accepted shall be required to submit at his cost stamp papers of appropriate value as per the provisions of Indian Stamp Act within 15 days of the date of

issue of Letter ofAcceptance.

18.4 At the same time the Employer notifies the successful Tenderer that his Tender has been accepted, the Employer will direct him to attend the Employer's office within 28 days of issue of Letter of Acceptance for signing the Agreement in the proforma at Annexure V. The Agreement will however be signed only after the Contractor furnishes Performance Guarantee and Additional Performance Guarantee (where applicable) and hence, where justified, the period of 28 days stipulated above will be extended suitably.

18A **Amendment toContract**

The conditions and clauses of this contract cannot be varied except through a written Supplementary Agreement with mutual consent of both the parties to the contract.

19.0 PRE-QUALIFICATION PERFORMA

The bidder shall fill the pre-qualification Performa at Annexure IX. The bid will be evaluated only considering those details and corresponding documents as mentioned in Annexure-IX and no other details/certificate/document will be taken into consideration while evaluating the bid to decide whether the bidder is qualified or not. For similar work experience the details of only those works mentioned in Annexure IX may be given in Performa no. 1 attached to Annexure-I.

20.0 BRIEF NOTICE INVITING E-TENDERS

General Manager (P), RITES Ltd. invites on behalf of BCCL Online percentage ratebids on Two Packet System for the following work. No other mode of submission shall be accepted.

S. No.	NIT No.	Name work of & Location	Cost of Tender Document	Estimated Project Cost put to Bid	Earnest Money	Period of Completion	Last Date & time of submission of bid, EMD, cost of tender document and other Documents as specified in the press notice	Time & Date Of opening Of bid
1	2	3	4	5	6	7	8	9
(1)	06/OT/RITES/RPO-KOL/BCCL-BHOJUDIH/S&T/2021 Dated 09.06.2021	Supply, Installation, Wiring, Testing and Commissioning of Signalling and Telecommunication P.I. work in connection with Renovation / Strengthening of the existing Railway Siding at Bhojudih Coal Washery, Santhaldih, West Bengal under S.E. Railway, Adra Division.	Rs.15,000/-	Rs. 13,31,82,673/-	N. A. ((Refer Correction slip-9, GCC for works July2019) Bid security Declaratio n as per Annexure XI)	09 months	11.00 hrs. on 28.06.2021	11.30 hrs. on 29.06.2021

21.0 The bid document consisting of tender drawings, specifications, the schedule of quantities of various types of items to be executed and the set of terms and conditions of the contract to be complied with and other necessary documents can be seenon CPP Portal *https://etenders.gov.in* free of cost.

22.0 After submission of the bid the bidder can re-submit revised bid any number of times but before last time and date of submission of bid as notified.

23.0 While submitting the revised/modified Financial bid, the bidder can revise/modify the rate of one or more item(s) any number of times (he need not re-enter rate of all the items) but before last time and date of submission of bid as notified.

The bid submitted shall become invalidif:

(i) The bidder is foundineligible.

(ii) The bidder does not upload all the documents as stipulated in the bid document including the undertaking about deposition of physical EMD and Cost of Tender Document of the scanned copy of EMD and Cost of Tender Document uploaded.

(iii) If any discrepancy is noticed between the documents as uploaded at the time of submission of bid and hard copies as submitted physically by the lowest bidder in the office of bid opening authority.

(iv) The bidder does not deposit physical instruments of EMD and Cost of Tender Document within a week of opening of technicalbid.

25.0 Those contractors not registered on the website mentioned above, are required to get registered beforehand. If neededthey can go to CPP Portal *https://eprocure.gov.in/eprocure/app?page=BiddersManualKit&service=page* bidders manual kit.

26.0 The intending bidder must have valid Class-III digital signature to submit thebid.

27.0 On opening date, the bidder can login and see the bid opening process. After opening of bids he will be able to view the competitors' bid documents.

28.0 List of Documents to be scanned and uploaded within the period of bid submission:

1. Banker's Cheque/Pay Order/Demand Draft towards cost of Tender Document in accordance with Clause 7.0 (f) hereinbefore.

OR

Document in support of exemption from payment of cost of Tender Document and Udyog Aadhar Memorandum (UAM) number.

2. **Bid Security Declaration (Annexure XI) along with bid document as per correction slip no.9 of GCC 2019.**

OR

~~Document in support of exemption from payment of EMD and Udyog Aadhar Memorandum (UAM) number~~

3. Authority to Sign (if required as per Clause 11.0 hereinbefore) in the format given at Annexure III/Annexure IV asapplicable.

4. RTGS/NEFT details as per Annexure-VII.

5. Self-attested copy of Documents in support of meeting the criterion of Annual Financial Turnover in accordance with Para 1 of AnnexureI.

6. Self-attested copy of Certificates in support of meeting the criterion of Similar Work Experience in accordance with Para 2(a) of AnnexureI.
7. Details of Similar Works completed in the format given at Performa 1 in Annexure I.
8. Self-attested copy of Certificates in support of meeting the criterion of Construction Experience in key activities in accordance with Para 2(b) of Annexure I.
9. Self-attested copy of Documents (Audited Balance Sheets, Profit & Loss Statements and Auditor's Reports) in support of meeting the Profitability criterion in accordance with Para 4 of Annexure I.
10. Self-attested copy of Documents in support of meeting the criterion of Net Worth in accordance with Para 5 of Annexure I.
11. Declaration by the Bidder in the format given in Performa 3 of Annexure I.
12. Integrity Pact as per AnnexureVI
13. Self-attested copy of Guidelines on Banning of Business Dealings as per Annexure-A.
14. Annexure IX duly filled in.
15. Self-attested copy of a certificate, confirming that the applicant is working contractor or has executed any work within the last seven years reckoned from the date of opening of tender, issued by Railways, CPWD, MES, DOT, RITES, State PWD or any other Central/State Government Undertaking, Municipal Body of Central/State Government or Public Limited Company listed in Stock Exchange in India & Abroad.
16. Self-Attested Copy of Partnership Deed/ Memorandum and Articles of Association of the firm.
17. Self-Attested copy of Corrigendum(s), if any.
18. Self-attested copy of any other document if specified in the correction slips to the Tender Document.
19. Self-certified copy of the Joint Venture Agreement/Memorandum of Understanding as per Annexure II & Annexure IV (where Joint Venture is allowed). - Not Applicable
20. Power of Attorney in favour of Lead Member as the Lead Member of JV executed by the authorized representatives of all the members of JV (where Joint Ventureis allowed). - Not Applicable.
21. Self-attested copy of a certificate, confirming that the Partners including Lead Partner duly signed by the Authorized representative of each Partner/Member of Joint Venture is a working contractor or has executed any work within the last **seven** years reckoned from the date of opening of Tender, issued by Railways, CPWD, MES, DOT, RITES, State PWD or any other Central/State Government Undertaking, Municipal Body, Autonomous Body of Central or State Government or Public Limited Company listed on NSE/BSE (where Joint Venture isallowed). - Not Applicable.
22. Self-attested copy of GST Registration Certificate (As applicable).

Note: - Any clarification / deficient document(s) sought by RITES Ltd. as per Clause shall be submitted by the bidder online only.

29.0 List of Documents to be submitted physically by Lowest (L1) Bidder within a week of the opening of Financial Bid:-

1. Self-attested copy of PAN/TAN issued by income TaxDepartment.
2. Self-attested copy of registration under Labour Laws like PF, ESIetc.
3. Self-attested copy of ISO 9000 Certificate. (ifany)
4. Self-attested copies of all the documents specified in Clause 28.0above.

30.0 RITES Ltd. may approach any Bank, Individual, Employer, Firm or Corporation, whether mentioned in the documents submitted by bidders or not, to verify the credentials and general reputation of the bidder and where JV is allowed the credentials and general reputation of lead member & each Member of JointVenture.

31.0 With reference to Clause 3, subclause 3(a) , 3(a-i), 3(b) and Clause 52.7 of Clauses of Contract of RITES GCC for works (Section-8) , the name of the Contarctor declared as " Poor Performer" as per 52.7 and the contractor , whose Contract is determined as per Clause 3 and deemed to be declared as " Poor Performer" as per subclause 3(a)(i), will be placed in RITES's Negative List of Contractors 'and the such a contractor individually and also any Joint Venture wherein such contractor is a member , will not be eligible for a period of upto two years to participate in Tenders of other works and in the tendering process for balance work as per sub-clause 3(b) which may be invited by RITES . In case, the contarctor is a Joint Venture , the JV as well as all members of the JV individullay or as member(s) of any other Joint Venture (JV) , will not be so eligible . In case the contractor is a company , then , in addition to the aforesaid provisions , the Associate Companies and Subsidiary Companies(as defined under Comapany's Act -2013.), of the company included in the Negative List , will also not be eligible

ANNEXURE – I

QUALIFYING CRITERIA FOR WORKS CONTRACTS

1. ANNUAL FINANCIAL TURNOVER

The bidder should have achieved a minimum annual financial turnover of **Rs.13,31,82,673/-**in any one of the last 3 Financial Years.

Notes:

a) The financial turnover will be taken as given under the head "Income" in audited Profit and Loss Account and excluding non-recurring income, income from other sources and stock. It is clarified that the Financial Turnover means relevant revenue as recorded in the Income side of Profit and Loss Account. It does not mean Profit.

b) Closing stocks in whatsoever manner should not form part of turnover.

c) Weightage of 7% (compounded annually) shall be given for equating the financial turnover of the previous years to the current year.

d) For considering the Financial Years, for example for a work for which the last stipulated date for submission of the bids is in Financial Year 2014-15, the last three Financial Years will be 2013-14, 2012-13 and 2011-12. For a work for which the last stipulated date for submission of the bids is on (say) 05.09.14 (F.Y. 2014-15), with weightage of 7% compounded annually, the weightages to be applied on the Turnover of the previous three Financial Years will be: F.Y. 2013-14 = 1.070; F.Y. 2012-13 — 1.145; F.Y. 2011 -12 = 1.225

e) The Bidder should furnish Annual Financial Turnover for each of the last 3 Financial Years in tabular form and give reference of the document (with page no.) relied upon in support of meeting the Qualification Criterion.

f) The Bidder should submit self-attested copy of Auditor's Report along with Balance Sheet and Profit and Loss Statement along with Schedules for the relevant Financial Year in which the minimum criterion is met. Provisional Audit Reports or certified statements will not be accepted.

g) lf the Audited Balance Sheet for the immediately preceding year is not available in case of a work for which the last stipulated date for submission of the bids is before 30th September audited Balance Sheets, Profit and Loss Statements and other financial statements of the three Financial Years immediately preceding the previous Financial Year may be adopted for evaluating the credentials of the Bidder.

h) ln case JV is permitted the following provisions will apply:

i) Large Works

For each Partner, the highest Annual Turnover in any of the last three Financial Years will be considered and the weighted figure for the current Financial Year will be worked out as described in Para I (Note c). This should not be less than the figure arrived at by multiplying the minimum Annual Turnover stipulated for the Bidder in Qualification Criterion multiplied by the percentage of Financial participation by that partner in the JV. Each partner should satisfy this requirement and thus automatically JV will satisfy the criterion of minimum Annual Turnover.

ii) Normal Works

The Partner-in-charge/Lead Member shall singly meet this criterion.

2. WORK EXPERIENCE

aa) Similar Work Experience

(i) For works in Normal Areas (other than Difficult Areas)

The Bidder should have satisfactorily completed in his own name or proportionate share as amemberofaJointVenture,atleastonesimilarwork of minimum valueof **Rs.8,65,68,737/-** OR at least two similarworkseach of minimum valueof **Rs.5,32,73,069/-**during the last **7 (seven)** years prior to the last stipulated date for submission of the Bid. Works completed prior to the cut-off date shall not be considered.
Or

(ii) For Works in Difficult Areas (Refer Clause 2.3) – Not Applicable

Similar Works

Similar Works shall mean the work of **"Supply, Installation, Testing and Commissioning of Signaling & Telecommunication Equipment/ System with the provision of Panel Interlocking (PI)/ Auto Signaling/ RRI/ Electronic Interlocking (SSI/EI) with Multi Aspect Colour Light Signaling (MACLS)**" carried out in India under a single contract (including additional work carried out under the contract).

~~In case the Bidder (Indian Company) wishestorelyonaworkcompletedabroad, the value of such completed work in foreign convertible currency shall be converted into Indian Rupees. The conversion rate shall be decided by RITES based on the rates of currency on the date of completion of work (the bidder to also submit the currency conversion rate as on completion date of the Credential Certificaterelieduponbythebidderforthepurposeofworkexperience).Further, such a bidder (Indian Company) should have also completed at least one construction work of value minimum 25% of estimated cost of work, in India in the last fiveyears prior to the last stipulated date for submission of the Bids~~.

Notes:

I. A weightage of 7% (compounded annually from the date of completion ofthe work to the last stipulated date for submission of the Bids) shall be given for equating the value of works to the last stipulated date for submission of the Bids. For example, for a similar work of Rs.1,00,000/- completed on 31.12.2017 and last stipulated date for submission of the bids was 31.08.2020, the value of work that shall be considered after giving weightage is [Rs.1,00,000*1.07*1.07] {1+[(7/100)*(244/366)]} = Rs.119832.87, rounded off to Rs.119833/-.

II. Only such work shall be considered where physical completion of entire work is over or commissioning of work has been done, whichever is earlier.

III. The Bidder should submit the details of such similar completed works as per the format at Proforma-1enclosed.

IV. Works carried out by another Contractor on behalf of the Bidder on a back to

back basis will not be considered for satisfaction of the Qualification Criterion by the Bidder.

V. Credential certificates issued by Government Organizations/ Semi Government Organizations of Central or State Government; or by Public Sector Undertakings/ Autonomous Bodies of Central/State Government or their subsidiaries/by Public Ltd. Companies listed in Stock exchange in India or Abroad or subsidiaries of such companies shall only be accepted for assessing the eligibility of a Tenderer. Certificates issued by one of the aforesaid organizations as a lead member (having equity stake of 51% or more) of a Joint Venture (JV) for a work executed for the JV, will also be acceptable. In case of PPP projects, if the bidder has executed a work for a concessionaire who is one of the aforesaid organizations, then the certificate issued by such concessionaire or by the public authority concerned, will also be acceptable.

VI. The cutoff date shall be calculated backwards from the last stipulated date for submission/ opening of Tender i.e. for a Tender which is being opened on 27.04.2021, the cutoff date shall be 26.04.2016.

VII. In case of JV is permitted the following provisions will apply: - Not applicable

b) Construction Experience in Key Activities - Not applicable

To qualify for award of the contract, each bidder in his own name or as a member of a Joint Venture should have, in the last seven years prior to the last stipulated date for submission of the bid, executed the following key activities in any one work individually* /~~maximum three works cumulatively~~*carried out in India.

Notes:

I.Credential certificates issued by Government Organizations/ Semi Government Organizations of Central or State Government; or by Public Sector Undertakings/ Autonomous Bodies of Central/State Government ortheir subsidiaries /by Public Ltd. Companies listed in Stock exchange in Indiaor Abroad or subsidiaries of such companies shall only be accepted forassessing the eligibility of a Tenderer. Certificates by one of the aforesaidorganizations as a lead member of (having equity stake of 51% or more) of aJoint Venture (JV) for a work executed for the JV, will also be acceptable. Incase of PPP projects, if the bidder has executed a work for a concessionairewho is one of the aforesaid organizations, then the certificate issued by suchconcessionaire or by the public authority concerned, will also be acceptable.

II. When key activities are expressed/ specified inmonetary terms, a weightage of 7% (compounded annually from the date ofcompletion of the Key activity to the last stipulated date for submission of the Bids to the submission of Bid) shall be given for equatingthe value of Key activity to the last stipulated date for submission of the Bids.For example, for a similar work of Rs.1,00,000/- completed on 31.12.2017 and last stipulated date for submission of the bids was 31.08.2020, the value of work that shall be considered after giving weightage is [Rs.1,00,000*1.07*1.07] {1+[(7/100)*(244/366)]} = Rs.119832.87, rounded off to Rs.119833/-.

III. The work satisfying the criterion for a particular key activity may be differentfrom a work satisfying the criterion for another key activity.

IV. The Bidder should furnish with his Bid a tabular statement giving contract wise quantities/amount of key activities (mentioning date of start and date of completion of key activities) executed in the last 5years prior to the last stipulated date for submission of the bids which meet the Qualification Criterion along with documentary proof insupport thereof (indicating page nos.).

V. Even if a work has not been completed but if the specified quantity/ specified value in monetary terms of the key activity has been completed in last 5 years prior to the last stipulated date for submission of the bids, the same shall be taken into consideration for thepurpose of this criterion.

VI. Any work executed by the Bidder as a member of a Joint Venture will beacceptedprovided there is documentary proof in support of the same either in theMOU/ Agreement of the JV or in a declaration by the other Members of thatJV or the Client confirming that the Key activity executed by the Bidder.

In case of JV is permitted the following provisions will apply: **Not Applicable**

3. SERVICING OF LOAN / CREDITLIMIT

(i) Thebiddershouldfurnishadeclarationthehasnotfailedtoservicetheprincipal amountorinterestorbothofaloanamount/creditlimitfromanyBankorFinancial Institution during a period of one year prior to the deadline for submission ofbids i.e. the last stipulated date for submission of bids.

Notes:

a) In case a bidder has defaulted in servicing his loan/credit limit during a period of one year prior to the last stipulated date for submission of bids, he shall bedisqualified.

b) The declaration may be included in the Declaration to be submitted in Performa 3 to thisAnnexure.

c) In case of JV is permitted the following provisions will apply: **Not Applicable**

4. PROFITABILITY

TheBiddershouldbeaprofit(net)makingfirmandshouldhavemadeprofitduring any two of the past 3 Financial Years immediately preceding the last stipulated date for submission of bids.If the audited Balance Sheet for the immediately precedingyear is not available in case of tenders opened before 30th September, Audited Balance Sheets of the three financial Years immediately preceding the previous Financial Year shall beconsidered.

The Bidder should furnish figures of net profit of last 3 years in a tabular form and submit attested copies of Auditor's Reports along with audited Balance Sheets and ProfitandLossStatementsforthelastthreeFinancialYears.Specificreferencewith page no. of document which proves satisfaction of this Qualifying Criterion should be indicated in the tabularstatement.

Notes: In case of JV is permitted the following provisions will apply: **Not Applicable**

5. NET WORTH

The Bidder should have positive Net Worth of at least **15% of the estimated cost (i.e. Rs.1,99,77,401/-).**

Notes:

a) Net Worth shall be computed from the bidder's audited balance sheet of the last financial year ending on a date not prior to 18 months from the last stipulated date for submission of bids.

b) In case of JV is permitted the following provisions will apply: **Not Applicable**

6. POINTS TO NOTE ON SATISFAC-TION OF QUALIFYING CRITERIA IN CASE OF BOTH LARGE AND NORMALWORKS

a) Sub-Contractor's Experiences andResources

Sub-Contractors' Experiences and Resources will not be taken into account in determining the Bidder's compliance with the qualifying criteria.

b) Experiences and Resources of the Parent Company and other subsidiary companies

If the Bidder is a wholly owned subsidiary of a company, the experience and esources of the owner/parent company or its other subsidiaries will not be taken into account. However, if the Bidder is a Company, only the Experience (and not the Financial Resources) of its subsidiaries will be taken into consideration.

7. DISQUALIFICATION ON CERTAIN GROUNDS

Even though the Bidders may meet the above qualifying criteria, they are subject to be disqualified if they have

a) Concealed any information/document which may result in the Bidder's disqualification or if any statement/information/document furnished by the Bidder or issued by a Bank/Agency/Third party and submitted by the Bidder, is subsequently found to be false or fraudulent or repudiated by the said Bank/Agency/Third Party. In such a case, besides Bidder's liability to action under para 9.4 of Instructions to Tenderers, the Bidder is liable to face the penalty of banning of business dealings with him by RITES.

b) Records of any contract awarded to them, having been determined during the past three years prior to the dead line for submission ofbids.

c) Been declaration as Poor Performer by RITES and their name is currently in the 'Negative List' of RITES.

d) Their business banned or suspended by any Central/State Government Department/ Public Undertaking or Enterprise of Central/State Government and such ban is inforce.

e) Not submitted all the supporting documents or not furnished the relevant details as per the prescribedformat.

A declaration to the above effect in the form of affidavit on stamp paper of

Rs.10/- duly attested by Notary/Magistrate should be submitted as per format given in Proforma 3 enclosed.

Proforma-1

LIST OF SIMILAR WORKS SATISFYING QUALIFICATION CRITERION COMPLETED DURING THE LAST 7 YEARS

S. No.	Client's Name and Address	Name of the Work & Location	Scope of Work carried out by the Bidder	Agreement/ Letter of Award No. and date	Contract Value		Date of Start	Date of Completion		Reasons for delay in Completion if any	Ref. of document (withpage no.) in support of meeting Qualification Criterion
					Awarded	Actual on Completion		As per LOA/ Agreement	Actual		

SEAL AND SIGNATURE OF THE BIDDER

Note:

1. In support of having completed above works, attach self-attested copies of the completion certificate from the owner/client or Executing Agency/Consultant appointed by Owner/Client indicating the name of work, the description of work done by the Bidder, date of start, date of completion (contractual & actual) and contract value as awarded and as executed by the Bidder. "Contract Value" shall meangrossvalueofthecompletedworkincludingcostofmaterialssuppliedbythe Owner/Client but excluding those supplied free ofcost.
2. Credential certificates issued by Government Organizations/Semi Government Organizations of Central or State Government; or by Public Sector Undertakings/Autonomous Bodies of Central/State Government or their subsidiaries/by Public Ltd. Companies listed in Stock exchange in India or Abroad or subsidiaries of such companies shall only be accepted for assessing the eligibility of a Tenderer. Certificates issued by one of the aforesaid organizations as a lead member (having equity stake of 51% or more) of a Joint Venture (JV) for a work executed for the JV, will also be acceptable. In case of PPP projects, if the bidder has executed a work for a concessionaire who is one of the aforesaid organizations, then the certificate issued by such concessionaire or by the public authority concerned, will also be acceptable.
3. In case of a Certificate froma Public Limited Company or itssubsidiary, the Bidder should also submit documentary proof that the Public Ltd. Company was listed in Stock Exchange in India or Abroad when the work was executed for it.

4. Information must be furnished for works carried out by the Bidder in his own name or proportionate share as member of a Joint Venture. In the latter case details of contract value including extent of financial participation by partners in that work should be furnished.

5. If a Bidder has got a work executed through a Sub contractor on a back to back basis, the Bidder cannot include such a work for his satisfying the Qualification Criterion even if the Client has issued a Completion Certificate in favour of that Bidder.

6. Use a separate sheet for each partner in case of a JointVenture.

7. Only similar works completed during the last 7 years prior to the last stipulated date for submission of Bid, which meet the Qualification Criterion need be included in thislist.

8. Only those works mentioned in Annexure IX shall be given in this Performa.

Proforma 2

Solvency Certificate from a Nationalized or A Scheduled Bank

-Deleted-

Proforma 3

DECLARATION BY THE BIDDER

(Affidavit on Non-Judicial Stamp Paper of Rs.10/- duly attested by Notary/Magistrate)

This is to certify that We, M/s……, in submission of this offer confirm that: -

i) We have visited the site of work and seen the working conditions, approachroad/path, availability of water, electricity, construction labour, construction materials andother relevant requirements connected with the work.

ii) We have neither concealed any information/document which may result in our disqualification nor made any misleading or false representation in the forms, statements and attachments in proof of the qualification requirements;

iii) During the past three years prior to the deadline for submission of bids, no contract awarded to us has been determined.

iv) No Central/State Government Department/Public Sector Undertaking or Enterprise of Central/State Government has banned/suspended business dealings with us as on date.

v) We have submitted all the supporting documents and furnished the relevant details as per prescribed format and we agree to submit, without delay additional information/documents which may be demanded by RITES Ltd.

vi) List of Similar Works satisfying Qualification Criterion indicated in Proforma 1 does not include any work which has been carried out by us through a Subcontractor on a back-to-back basis.

vii) The information and documents submitted with the Tender and those to be submitted subsequently by way of clarifications are correct and we are fully responsible for the correctness of the information and documents submitted by us.

viii) We have not failed to service the principal amount or interest or both of a loan account/credit limit from any Bank or Financial Institution during a period of one year prior to the deadline for submission of bids.

ix) *The original instruments of EMD and Cost of Tender Document, in physical form shall be deposited by us with RITES Ltd. within a week from the date of opening of Technical Bid failing which RITES Ltd. may reject the bid and also take action to debarus from participating in Tenders invited by RITES Ltd. for a period of two years.

OR

*We are exempted from payment of cost of Tender Document and EMD and the certified copies of original documents in support of such exemption shall be deposited by us with RITES Ltd. within a week from the date of opening of Technical Bids and original documents produced on demand, failing which RITES Ltd. may reject the bid and also take action to debar us from participating in Tenders invited by RITES Ltd. for a period of two years.

(Delete whichever is not applicable)*

x) We understand that in case any information/document which may result in our disqualification is concealed by us or any statement/information/document furnished by us or to be furnished by us in connection with this offer, or issued by Bank/Agency/Third Party is subsequently found to be false or fraudulent or repudiated by the said Bank/Agency/Third Party, business dealings with us may be banned.

.

SEAL, SIGNATURE & NAME OF THEBIDDER

Signing thisdocument

ANNEXURE II

DRAFT MEMORANDUM OF UNDERSTANDING EXECUTED BY MEMBERS OF THE JOINT VENTURE

(On each firm's Letter Head)

- -DELETED-

ANNEXURE III

FORMAT FOR POWER OF ATTORNEY TO AUTHORISED SIGNATORY
POWER OF ATTORNEY

(To be executed on non-judicial stamp paper of the appropriate value in accordance with relevant Stamp Act. The stamp paper to be in the name of the firm/company who is issuing the Power of Attorney)

We, M/s……. (name of the firm/company with address of the registered office) hereby constitute, appoint and authorize Mr./Ms.……. (Name and residential address) who is presently employed with us and holding the position of and whose signature is given below as our Attorney to doinour name and our behalf all or any of the acts, deeds or things necessary or incidental to our bid for the work ……. (name of work), including signing and submission of application/proposal, participating in the meetings, responding to queries, submission of information/documents and generally to represent us in all the dealings with RITES or any other Government Agency or any person, in connection with the works until culmination of the process of bidding, till the Contract Agreement is entered into with RITES and thereafter till the expiry of the ContractAgreement.

We hereby agree to ratify all acts, deeds and things lawfully done by our said Attorney pursuant to this Power of Attorney and that all acts, deeds and things done by our aforesaid Attorney shall always be deemed to have been done by us.

(*Add in the case of a Joint Venture)*

Our firm is a Member/Lead Member of the Joint Venture of..... , ……. and ……

Dated this the …… day of …… 20…….

……..

(Signature and name of authorized signatory being given Power of Attorney)

……..

(Signature and name in block letters of *All the partners of the firm, *Authorized Signatory for the Company)

(**Strike out whichever is not applicable*)

Seal of firm/ Company

Witness 1:	Witness 2:
Name:	Name:
Address:	Address:
Occupation:	Occupation:

Notes:

- In case the Firm/Company is a Member of a Joint Venture, the authorized signatory has to be the one employed by the Lead Member.
- The mode of execution of the Power of Attorney should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executant(s) and when it is so required the same should be under common seal affixed in accordance with the required procedure.

ANNEXURE IV

FORMAT FOR POWER OF ATTORNEY TO LEAD MEMBER OF JOINT VENTURE

- DELETED -

ANNEXURE V

FORM OF AGREEMENT

(ON NON-JUDICIAL STAMP PAPER OF APPROPRIATE VALUE)

Agreement No. …… dated …….

THIS AGREEMENTis made on …… day of…… Two thousand ……. ……. between RITES Ltd. a Government of India Enterprise and a Company registered under Companies Act, 1956 having its registered office at SCOPE Minar, Laxmi Nagar, Delhi - 110092 and its Corporate Office at RITES BHAWAN, Plot No.1, Sector 29, Gurgaon (Haryana) representing through ……, RITES LIMITED acting for and on behalf of and as an Agent/Power of Attorney Holder of……. hereinafter called the Employer (which expression shall, wherever the context so demands or requires, include their successors in office and assigns) on one part andM/s……. hereinafter called the Contractor (which expression shall wherever the context so demands or requires, include his/ their successors and assigns) of the other part.

WHEREAS the Employer is desirous that certain works should be executed viz. …… (brief description of work) and has by Letter of Acceptance dated ……. accepted a tender submitted by the Contractor for the execution, completion, remedying of any defects there in and maintenance of such works at a total Contract Price of Rs……. (Rupees..... only)

NOW THIS AGREEMENT WITNESSETH as follows: -

1. In this Agreement words and expressions shall have the same meaning as are respectively assigned to them in the Conditions of Contract hereinafter referred to.
2. The following documents in conjunction with addenda/corrigenda to Tender Documents shall be deemed to form and be read and construed as part of this agreement viz.

   The Letter of Acceptance dated …….

   Priced Schedule (Bill) of Quantities

   Notice Inviting Tender and Instructions to Tenderers.

   RITES Tender and Contract Form **[DELETED]**

   Special Conditions

   Schedules A to F

   Technical Specifications

   Drawings

   Amendments to Tender Documents (List enclosed)

   General Conditions of Contract (read with Correction Slip Nos. 1 to --) comprising of

   (i) Conditions ofContract
   (ii) Clauses ofContract
   (iii) RITES SafetyCode
   (iv) RITES-Model Rules forthe protection ofHealth and Sanitary arrangements for Workers
   (v) RITES – Contractor's Labour Regulations

3. InconsiderationofthepaymenttobemadebytheEmployertotheContractorashereinafter mentioned, the Contractor hereby covenants with the Employer to execute, complete, remedy defects therein and maintain the works in conformity in all respects with the provisions of the Contract.

4. The Employer hereby covenants to pay to the Contractor in consideration of the execution, completion, remedying of any defects therein and maintenance of the works, the contract price or such other sum as may become payable under the provisions of the contract at the time and in the manner prescribed by theContract.

IN WITNESS whereof the parties hereto have caused their respective common seals to be hereinto affixed (or have herewith set their respective hands and seals) the day and year first above written.

SIGNED, SEALED AND DELIVERED BY

…….	…….
In the capacity of ……	Representing RITES LIMITED In the capacity of Agent/Power of Attorney Holder
On behalf of M/s ……	For and on behalf of ……
(The Contractor)	(The Employer)
In the presence of	In the presence of
Witness (Signature, Name & Designation)	Witness (Signature, Name & Designation)
1.	1.
2.	2.

ANNEXURE VI

INTEGRITY PACT

Between

RITES LTD. acting for and on behalf of and as an Agent/Power of Attorney Holder of …….. hereinafter called the "Employer" AND ……...…….. hereinafter referred to as "The Bidder/Contractor"

Preamble

The Employer intends to award, under laid down organizational procedures, contract/s for.....The Employer values full compliance with all relevant laws and regulations, and economic use of resources, and of fairness and transparency in his relations with the Bidder/s and/or contractor/s.

In order to achieve these goals, the Employer will appoint an Independent External Monitor (IEM) who will monitor the Tender process and execution of the contract for compliance with the principles mentioned above.

Section 1 – Commitments of the Employer

(1) The Employer commits himself to take all measures necessary to prevent corruption and to observe the following principles:-

1. No employee of the Employer, personally or through family members, will in connection with the tender or for the execution of the contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitledto.
2. The Employer will, during the tender process, treat all Bidders with equity and reason. The Employer will in particular, before and during the tender process, provide to all Bidders the same information and will not provide to any Bidder confidential/additional information through which the Bidder could obtain an advantage in relation to the tender process or the contractexecution.
3. The Employer will exclude from the process all known prejudicedpersons.

(2) If the Employer obtains information on the conduct of any of his employees which is a criminal offence under the IPC (Indian Penal Code)/PC (Prevention of Corruption) Act, or if there be a substantive suspicion in this regard, the Employer will inform its Chief Vigilance Officer and in addition can initiate disciplinary action.

Section 2 – Commitments of the Bidder/Contractor

(1) The Bidder/Contractor commits himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the tender process and during the contract execution.

1. The Bidder/Contractor will not directly or through any other person or firm, offer, promise or give to any of the Employer's employees involved in the tender process or the execution of the contract or to any third person any material or other benefit which he is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.
2. The Bidder/Contractor will not enter with other Bidders into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions, to restrict competitiveness or to introduce cartelization in the bidding process.
3. The Bidder/Contractor will not commit any offence under the relevant IPC/PC Act; further the Bidder/Contractor will not use improperly, for purposesof competition or personal gain, or pass on to others, any information or document provided by the Employer as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.
4. The Bidder/Contractor will, when presenting his bid, disclose any and all payments he has made, is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of thecontract.
5. Foreign bidders shall disclose the name and address of agents and representative in India.
6. Indian Bidders shall disclose their foreign principals or associates.

(2) The Bidder/ Contractor will not instigate third persons to commit offences outlined above or be an accessory to suchoffences.

Section 3 – Disqualification from tender process and exclusion from future contracts

If the Bidder/Contractor, before award or during execution has committed atransgression through a violation of Section 2 above, or in any other form such as to put his reliability or credibility in question, the Employer is entitled to disqualify the Bidder/Contractor from the tender process or take action as per the procedure mentioned in the "Guideline on Banning of Business Dealing" annexed and marked as Annexure "A".

Section 4 – Compensation for Damages

(1) If the Employer has disqualified in terms of the provisions in Section 3, the Bidder/Contractor from the tender process prior to the award of contract, the Employer is entitled to demand and recover the damages equivalent to Earnest Money Deposit/Bid Security.

(2) If the Employer has terminated the contract during execution in terms of the provisions under Section 3, the Employer shall be entitled to demand and recover from the Contractor the damages equivalent to Earnest Money Deposit, Security Deposits already recovered and Performance Guarantee, which shall be absolutely at the disposal of the Employer.

Section - 5 Previous transgression

(1) The Bidder/Contractor declaration that no previous transgression occurred in the last 3 years with any other Company in any country conforming to the Anti-Corruption approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.

(2) If the Bidder/Contractor makes incorrect statement on this subject, he can be disqualified from the tender process or action can be taken as per the procedure mentioned in "Guideline on Banning of Business Dealing".

Section - 6 Equal treatment of all Bidders/Contractors/Sub-Contractors

(1) The Bidder/Contractor undertakes to demand from all partners/sub-contractors (if permitted under the conditions/clauses of the contract) a commitment to act in conformity with this Integrity Pact and to submit it to the Employer before signing thecontract.

(2) The Bidder/Contractor confirms that any violation by any of his partners/sub-contractors to act in conformity with the provisions of this Integrity Pact can be construed as a violation by the Bidder/Contractor himself, leading to possible Termination of Contract in terms of Section 4.

(3) The Employer will disqualify from the tender process all bidders who do not sign this Pact or violate its provisions.

Section 7- Criminal charges against violating Bidders/Contractors/Sub-Contractors

If the Employer obtains knowledge of conduct of a Bidder, Contractor or Partners/Sub-Contractor, or of an employee or a representative or an associate of a Bidder, Contractor or Sub- Contractor, which constitutes corruption, or if the Employer has substantive suspicion in this regard, the Employer will inform the same to its Chief Vigilance Officer.

Section -8 Independent External Monitor/Monitors

(1) The Employer shall appoint competent and credible Independent External Monitor for this Pact. The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.

(2) The Monitor is not subject to instructions by the representatives of the parties and will perform his functions neutrally and independently. He will report to the CMD/RITES Ltd.

(3) The Bidder/Contractor accepts that the Monitor has the right of access without restriction to all Project documentation of the Employer including that provided by the Contractor. The Contractor will also grant the Monitor, upon his request and demonstration of a valid interest, unrestricted andunconditionalaccess to his project documentation. The same is applicable to Partners/Sub-Contractors. The Monitoris under contractual obligation to treat the information and documents of the Bidder/Contractor/Partners/Sub-Contractor with confidentiality.

(4) The Employer will provide to the Monitor sufficient information about all meetings among the partiesrelatedtotheProjectprovidedsuchmeetingscouldhaveanimpact on the contractual relations between the Employer and the Contractor. The parties offer to the Monitor the option to participate in such meetings.

(5) As soon as the Monitor notices or has reason to believe that violation of the agreement by the Employer or the Bidder/Contractor, has taken place, he will request the Party concerned to discontinue or take corrective action, or to take any other relevant action. The Monitor can in this regard submit non-binding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner or refrain from action or tolerate action. The role of Monitor will be advisory and his advice will not be legally binding.

(6) As far as possible, the Monitor will submit a written report to the CMD/RITES Ltd. within 10 days from the date of reference or intimation to him by the Employer and should the occasion arise, submit proposal for correcting problematicsituations.

(7) If the Monitor has reported to the CMD/RITES Ltd. of a substantiated suspicion of an offence under relevant IPC/PC Act, and the CMD/RITES Ltd. has not, within reasonable time, taken visible action to proceed against such offender or reported it to the Chief Vigilance Officer, the Monitor may also transmit this information directly to the Central Vigilance Commissioner.

(8) Issues like warranty/guarantee etc. shall be outside the purview of IEMs.

(9) The word Monitor would include both singular andplural.

Section – 9 Pact Duration

This pact begins when both parties have legally signed it. It expires for the Contractor when his Security Deposit is released on completion of the Maintenance Period and for all other Tenderers six months after the Contract has been awarded.

If any claim is made/lodged during this time the same shall be binding and continue to be valid despite the lapse of this pact specified above, unless it isdischarged/determined by CMD/RITES Ltd.

Section 10 Other Provisions

(1) This agreement is subject to Indian Law. Place of performance and jurisdiction shall be as stated in the ContractAgreement.

(2) Changes and supplements as well as termination notices need to be made in writing.

(3) If the Contractor is a partnership or Joint Venture, this agreement must be signed by the Partner in charge/Lead Member nominated as being in charge and who holds the Power of Attorney signed by legally authorized signatories of all the partners/Members. The Memorandum of Understanding /Joint Venture Agreement will incorporate a provision to the effect that all Members of the Joint Venture will comply with the provisions in the Integrity Pact to be signed by the Lead Member on behalf of the Joint Venture. Any violation of Section 2 above by any ofthe Partners/Members will be construed as a violation by the Joint Venture leading to possible Termination of Contract in terms of Section 3.

(4) Should one or several provisions of this agreement turn out to be invalid, the remainder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

(5) A person signing the IP shall not approach courts while representing the mattrers to IEMs and he/she will await their decision in the matter.

(6) In case the sub-contracting, the principal contractor shall take the responsibility of adoption of IP by the sub-contractor,

RITES Ltd.
Agent / Power of Attorney Holder
……..
……..
(For & on behalf of the Employer) (For the bidder/Contractor)
(Official Seal) (Official Seal)

Place:……

Date: …….

Witness 1:

(Name & Address)……
……
……
……

Witness 2

(Name & Address)……
……
……
……

ANNEXURE-A

Guidelines on Banning of Business Dealings

1. Introduction

1.1 RITES, being a Public Sector Enterprise and 'State', within the meaning of Article 12 of Constitution of India, has to ensure preservation of rights enshrined in Chapter III of the Constitution. RITES has also to safeguard its commercial interests. It is not in the interest of RITES to deal with Agencies who commit deception, fraud or other misconduct in the execution of contracts awarded / orders issued to them. In order to ensure compliance with the constitutional mandate, it is incumbent on RITES to observe principles of natural justice before banning the business dealings with any Agency.

1.2 Since banning of business dealings involves civil consequences for an Agency concerned, it is incumbent that adequate opportunity of hearing is provided and the explanation, if tendered, is considered before passing any order in this regard keeping in view the facts and circumstances of the case.

2. Scope

2.1 The procedure of (i) Suspension and (ii) Banning of Business Dealing with Agencies, has been laid down in these guidelines.

2.2 It is clarified that these guidelines do not deal with the decision of the Management not to entertain any particular Agency due to its poor/inadequate performance or for any otherreason.

2.3 The banning shall be with prospective effect, i.e., future business dealings.

3. Definitions

In these Guidelines, unless the context otherwise requires:

i) 'Bidder/Contractor/Supplier' in the context of these guidelines is indicated as 'Agency'.

ii) 'Competent Authority' and 'Appellate Authority' shall mean the following:

a) The Director shall be the 'Competent Authority' for the purpose of these guidelines. CMD, RITES shall be the 'Appellate Authority' in respect of such cases.

b) CMD, RITES shall have overall power to take suo-moto action on any information available or received by him and pass such order(s) as he may think appropriate, including modifying the order(s) passed by any authority under theseguidelines.

iii) 'Investigating Department' shall mean any Department, Division or Unit investigating into the conduct of the Agency and shall include the Vigilance Department, Central Bureau of Investigation, the State Police or any other department setup by the Central or State Government having powers to investigate.

iv) 'Banning Committee' shall mean a Committee constituted for the purpose of these guidelines by the competent authority. The members of this Committee shall not, at any stage, be connected with the tendering process underreference.

4. Initiation of Banning/Suspension

Action for banning/suspension business dealings with any Agency should be initiated by the department/unit having business dealings with them after noticing the irregularities or misconduct on their part.

5. Suspension of Business Dealings

5.1 If the conduct of any Agency dealing with RITES is under investigation by any department, the Competent Authority may consider whether the allegations under investigation are of a serious nature and whether pending investigation, it would be advisable to continue business dealing with the Agency. If the Competent Authority, after consideration of the matter including the recommendation of the Investigating Department/Unit, if any, decides that it would not be in the interest to continue business dealings pending investigation, it may suspend business dealings with the Agency. The order to this effect may indicate a brief of the charges under investigation. The order of such suspension would operate for a period not more than six months and may be communicated to the Agency as also to the Investigating Department.

The Investigating Department/Unit may ensure that their investigation is completed and whole process of final order is over within such period.

5.2 As far as possible, the existing contract(s) with the Agency may be continued unless the Competent Authority, having regard to the circumstances of the case, decidesotherwise.

5.3 If the Agency concerned asks for detailed reasons of suspension, the Agency may be informed that its conduct is under investigation. It is not necessary to enter into correspondence or argument with the Agency at thisstage.

5.4 It is not necessary to give any show-cause notice or personal hearing to the Agency before issuing the order of suspension. However, if investigations are not complete in six months time, the Competent Authority may extend the period of suspension by another three months, during which period the investigations must becompleted.

6 Grounds on which Banning of Business Dealings can beinitiated

6.1 If the security consideration, including questions of loyalty of the Agency to the State, so warrants;

6.2 If the Director/ Owner of the Agency, proprietor or partner of the firm, is convicted by a Court of Law for offences involving moral turpitude in relation to its business dealings with the Government or any other public sector enterprises or RITES, during the last fiveyears;

6.3 If there is strong justification for believing that the Directors, Proprietors, Partners, owner of the Agency have been guilty of malpractices such as bribery, corruption, fraud, substitution of tenders, interpolations, etc.;

6.4 If the Agency employs a public servant dismissed/removed or employs a person convicted for an offence involving corruption or abetment of suchoffence;

6.5 If business dealings with the Agency have been banned by the Govt. or any other public sectorenterprise;

6.6 In case any information/document which may result in the tenderer’s disqualification

is concealed by the Tenderer or any statement/information/document furnished by the Tenderer or issued by a Bank/Agency/third party and submitted by the tenderer, is subsequently found to be false or fraudulent or repudiated by the said Bank/Agency/Third Party.

6.7 If the Agency uses intimidation/threatening or brings undue outside pressure on the Company (RITES) or its official in acceptance/performances of the job under the contract;

6.8 If the Agency indulges inrepeated and/or deliberate use of delay tactics incomplying with contractual stipulations;

6.9 Based on the findings of the investigation report of CBI/Police against the Agency for malafide/unlawful acts or improper conduct on his part in matters relating to the Company (RITES) or even otherwise;

6.10 Established litigant nature of the Agency to derive undue benefit;

6.11 Continued poor performance of the Agency in several contracts;

(Note: The examples given above are only illustrative and not exhaustive. The Competent Authority may decide to ban business dealing for any good and sufficient reason).

7 Banning of BusinessDealings

7.1 A decision to ban business dealings with any Agency shall apply throughout the Company.

7.2 If the Competent Authority is prima-facie of view that action for banning business dealings with the Agency is called for, a showcause notice may be issued to the Agency as per paragraph 8.1 and an enquiry held accordingly.

8 Show-cause Notice

8.1 In case where the Competent Authority decides that action against an Agency is called for, a show-cause notice has to be issued to the Agency. Statement containing the imputation of misconduct or mis-behaviour may be appended to the show-cause notice and the Agency should be asked to submit within 30 days a written statement in its defence. If no reply is received, the decision may be taken ex-parte.

8.2 If the Agency requests for inspection of any relevant document in possession of RITES, necessary facility for inspection of documents may be provided.

8.3 On receipt of the reply of the Agency, or in case no reply is received within the prescribed time, the Competent Authority shall refer the case along with relevant details to the Banning Committee, which shall examine the reply of the Agency and other facts and circumstances of the case and submit its final recommendation to the Competent Authority for banning or otherwise. In case the action contemplated against the Agency includes forfeiture of EMD also besides Banning of Business Dealings, the Banning Committee will also examine whether Clause 9.4 of Tender and Contract Document is attracted and recommend forfeiture or otherwise of EMD considering all facts and circumstances of the case. A final decision on forfeiture or otherwise of the EMD and for Company-wide banning or otherwise shall be takenby the Competent Authority. The Competent Authority may consider and pass an appropriate speaking order:

a) For completely exonerating the Agency; or
b) For forfeiture of EMD but for not banning of business dealings with the Agency; or
c) For forfeiture of EMD and banning the business dealing with theAgency.

8.4 The decision should be communicated to the Agency concerned along with areasoned order. If it decided to ban business dealings, the period for which the ban would be operative may be mentioned.

9 Appeal against the Decision of the CompetentAuthority

9.1 The Agency may file an appeal against the order of the Competent Authority banning business dealing, etc. The appeal shall lie to Appellate Authority. Such an appeal shall be preferred within one month from the date of receipt of the order banning business dealing, etc.

9.2 Appellate Authority would consider the appeal and pass appropriate order which shall be communicated to the Agency as well as the Competent Authority.

10 Review of the Decision by the Competent Authority

Any petition/application filed by the Agency concerning the review of the banning order passed originally by Competent Authority under the existing guidelines either before or after filing of appeal before the Appellate Authority or after disposal of appeal by the Appellate Authority, the review petition can be decided by the Competent Authority upon disclosure of new facts/circumstances or subsequent development necessitating such review.

11 Circulation of the names of Agencies with whom Business Dealings have been banned.

11.1 Depending upon the gravity of misconduct established, the Competent Authority of RITES may circulate the names of Agency with whom business dealings have been banned, to the Ministry of Railways and PSUs of Railways, for such action as they deem appropriate.

11.2 If Ministry of Railways or a Public Sector Undertaking of Railways request for more information about the Agency with whom business dealings have been banned a copy of the report of Inquiring Authority together with a copy of the order of the Competent Authority/Appellate Authority may be supplied.

12 Restoration

12.1 The validity of the banning order shall be for a specific time & on expiry of the same, the banning order shall be considered as "withdrawn".

12.2 In case any agency applies for restoration of business prior to the expiry of the ban order, depending upon merits of each case, the Competent Authority which had passed the original banning orders may consider revocation of order of suspension of business/lifting the ban on business dealings at an appropriate time. Copies of the restoration orders shall be sent to all those offices where copies of Ban Orders had been sent.

ANNEXURE VII

MANDATE FORM

To
RITES Ltd.
……
……

Dear Sir,
Authorization for payments through Electronic Fund Transfer System (RTGS/NEFT)

We hereby authorize RITES Ltd. To make all our payments, including refund of Earnest Money, through Electronic Fund Transfer System (RTGS/NEFT). The details for facilitating the payments are givenbelow:

(TO BE FILLED IN CAPITAL LETTERS)

1	NAME OF THE BENEFICIARY	
2	ADDRESS WITH PIN CODE	
3	(A) TELEPHONE NO. WITH STD CODE	
	(B) MOBILE NO.	
4	BANK PARRTICULARS	
A	BANK NAME	
B	BANK TELEPHONE NO. WITH STD CODE	
C	BRANCH ADDRESS WITH PIN CODE	
D	BANK FAX NO. WITH STD CODE	
E	11 CHARACTER IFSC CODE OF THE BANK (EITHER ENCLOSE A CANCELLED CHEQUE OR OBTAIN BANK CERTIFICATE AS APPENDED)	
F	BANK ACCOUNT NUMBER AS APPEARING IN THE CHEQUE BOOK	
G	BANK ACCOUNT TYPE (TICK ONE)	SAVING CURRENT LOAN CASH CREDIT OTHERS
H	IF OTHERS, SPECIFY	
5	PERMANENT ACCOUNT NUMBER (PAN)	
6	E-MAIL ADDRESS	

I / We hereby declare are that the particulars given above are correct and complete. If the transaction is delayed or credit it not effected at all for reasons of incomplete or incorrect information, I / We would not hold RITES Ltd. responsible. Bank charges for such transfer will be borne by us.

Date:

SIGNATURE

(AUTHORISEDSIGNATORY)
Name…….……

BANK CERTIFICATION

Itiscertifiedthattheabove-mentionedbeneficiaryholdsbankaccountNo…..... with our branch and the Bank particulars above are correct.

Date:

SIGNATURE
(AUTHORISED SIGNATORY)
Name …….……
OFFICIAL STAMP

ANNEXURE VIII

-BLANK-

ANNEXURE IX

PRE-QUALIFICATION PERFORMA

Name of work				
Tender No.				
Name of the Bidder				
Details of Cost of Tender Document paid by Banker's Cheque/Pay Order/Demand Draft	Name & Address of Issuing Bank	Amount	Date of Issue	Instrument placed at
Details of EMD paid by Banker's Cheque/Pay Order/Demand Draft				

Annual Financial Turnover

S. No.	Financial Years	Turn Over (Rs. In Lacs)	Documents placed at:	Remarks
1				
2				
3				

Profitability

S. No.	Financial Years	Profit with (+) sign or Loss with (-) sign (In Lacs)	Documents placed at:	Remarks
1				
2				
3				

Similar Work Experience

S. No.	Name of work	Name of Client	Actual Date of Start	Actual Date of Completion	Actual Completion Cost	Completion Certificates placed at:	Remarks
1							
2							
3							
4							

Construction Experience in Key Activities/Specified Components (if applicable)

S. No.	Key Activity/ Component	Quantity of Key Activity/ Component Executed	Amount of Key Activity/ Component Executed	Name of work	Name of Client	Actual Date of Completion ofKey Activity / Component	Certificate placed at:	Remarks
1								
2								
3								
4								

Net Worth

S. No.	Financial Years	Net Worth (in Rs.)	Documents placed at:	Remarks
1				

Other Documents to be submitted along with Tender Documents:

S. No.	Particulars	Documents placed at:	Remarks
1	Declaration by the Bidder as per Proforma-3		
2	Self-attested copy of Partnership Deed/Memorandum and Articles of Association of the Firm		
3	Self-attested copy of Written Power of Attorney of the signatory of the Tender on behalfof the tenderer. (Annexure-III or Annexure IV as applicable)		
4	Self-attested copy of a certificate, confirming that the applicant is working contractor or has executed any work within the last seven years reckoned from the date of opening of tender, for Railways, CPWD, MES, DOT, RITES, State PWD or any other Central/State Government Department, Central/State Government Undertaking or their subsidiaries, Municipal Body, Autonomous Body of Central/State Governments or Public Ltd., Companies listed on Stock Exchange in India or Abroad or subsidiaries of suchcompanies		
5	List of similar works satisfying qualification criterion completed during the last 7 years as perProforma-1		
6	Integrity Pact as per Annexure-VI		
7	Self-attested copy of Guidelines on Banning of Business Dealings as per Annexure-A		
8	Self-attested copy of Corrigendum/Minutes of Pre-Bid Meeting, ifany.		

S. No.	Particulars	Documents placed at:	Remarks
9	RTGS/NEFT details as per Annexure-VII		
10	Self-attested copy of GST RegistrationCertificate		
11	Declaration by the Bidder as per Annexure XI		

ANNEXURE X

List of 60 Districts covered under IAP

S. No.	State	District
1	Andhra Pradesh	Adilabad
2	Andhra Pradesh	Khammam
3	Bihar	Arwal
4	Bihar	Aurangabad
5	Bihar	Gaya
6	Bihar	Jamui
7	Bihar	Jehanabad
8	Bihar	Nawada
9	Bihar	Rohtas
10	Chhatisgarh	Bastar
11	Chhatisgarh	Bijapur
12	Chhatisgarh	Dantewada
13	Chhatisgarh	Jashpur
14	Chhatisgarh	Kanker
15	Chhatisgarh	Kawardha
16	Chhatisgarh	Koriya
17	Chhatisgarh	Narayanpur
18	Chhatisgarh	Rajnandgaon
19	Chhatisgarh	Surguja
20	Jharkhand	Bokaro
21	Jharkhand	Chatra
22	Jharkhand	Garhwa
23	Jharkhand	Gumla
24	Jharkhand	Hazaribagh
25	Jharkhand	Kodarma
26	Jharkhand	Latehar
27	Jharkhand	Lohardaga
28	Jharkhand	Pachim Singhbhum
29	Jharkhand	Palamu
30	Jharkhand	Purbi Singhbhum
31	Jharkhand	Ram Garh

S. No.	State	District
32	Jharkhand	Saraikela
33	Jharkhand	Simdega
34	Madhya Pradesh	Anuppur
35	Madhya Pradesh	Balaghat
36	Madhya Pradesh	Dindori
37	Madhya Pradesh	Mandla
38	Madhya Pradesh	Seoni
39	Madhya Pradesh	Shahdol
40	Madhya Pradesh	Sidhi
41	Madhya Pradesh	Umaria
42	Maharashtra	Gadchiroli
43	Maharashtra	Gondiya
44	Orissa	Balangir
45	Orissa	Debagarh / Deogarh
46	Orissa	Gajapati
47	Orissa	Kalahandi
48	Orissa	Kandhamal / Phulbani
49	Orissa	Kendujhar / Keonjhar
50	Orissa	Koraput
51	Orissa	Malkangiri
52	Orissa	Mayurbhanj
53	Orissa	Nabarangapur
54	Orissa	Nuapada
55	Orissa	Rayagada
56	Orissa	Sambalpur
57	Orissa	Sonapur
58	Orissa	Sundargarh
59	Uttar Pradesh	Sonbhadra
60	West Bengal	Paschim Medinipur

Annexure XI

Bid Security Declaration

(Affidavit on Non-Judicial Stamp Paper of Rs.10/- duly attested by Notary/ Magistrate)

Date:_____ Tender No._____

To
RITES Ltd.

…….

I/We. The undersigned, declare that:

I/We understand that, according to your tender conditions, bids must be supported by a Bid Security Declaration.

I/We accept that I/We may be disqualified from participating for any tender of RITES Ltd. for a period upto two years from the date of issue of LOA, if I am / We are in a breach of any obligation under the tender conditions, because I/We.

a) have withdrawn/ modified/ amended, impairs or derogates from the Bid in any respect during the period of bid validity of your Bid; or

b) fail or refuse to furnish the Performance Guarantee within the period specified under Clause 1 of "Clauses of Contract" or fails to commence the work without valid reasons within the period as specified in schedule F after the date of issue of Letter of Acceptance or from the first date of handing over of the site, whichever is later.

I/We understand this Bid Securing Declaration shall cease to be valid if I am/we are not the successful Bidder, upon the earlier of (i) the receipt of your notification of the name of the successful Bidder; or (ii) thirty days after the expiration of the validity of my/our Bid.

SEAL, SIGNATURE & NAME OF THE BIDDER

Signing this document

(Note: It is manadatory to submit Bid Security Declaration along with Bid Document in place of Earnest Money. In case of a Joint Venture, the Bid Securing Declaration must be in the name of all partners to the Joint Venture that submits the bid)

SECTION 2

TENDER AND CONTRACT FORM FOR WORKS

-DELETED-

SECTION 3

SPECIAL CONDITIONS

SECTION 3

SPECIAL CONDITIONS

(i) Special Conditions relating to existing Clauses of Contract
(ii) Additional Special Conditions

Applicable in the case of Railway Works only

SPECIAL CONDITION RELATING TO UPLOADING OF PAYMENT OF WAGES AND OTHER PAYMENTS TO CONTRACT LABOUR ON RAILWAY WORKS

A) Contractor is to abide by the provisions of Payment of Wages act & Minimum Wages act in terms of clause 19 B of RITES' General Conditions of Contract for Works. In order to ensure the same, an application has been developed and hosted on website 'www.shramikkalyan.indianrailways.gov.in'. Contractor shall register his firm/company etc. and upload requisite details of labour and their payment in this portal. These details shall be available in public domain. The Registration/updation of Portal shall be done as under:

a) Contractor shall apply for one-time registration of his company/firm etc. in theShramikkalyan portal with requisite details subsequent to issue of Letter of Acceptance. Engineer-in-Charge shall approve the contractor's registration on the portal within 7 days of receipt of such request.

b) Contractor once approved by the Engineer-in-Charge can create password withlogin ID (PAN No.) for subsequent use of portal for all LOAs pertaining to Railway works issued in his favour.

c) The contractor once registered on the portal, shall provide details of his Letterof Acceptances (LoA)/Contract Agreements on shramikkalyan portal within 15 days of issue of any LoA for approval of concerned engineer. Engineer-in-Charge shall update (if required) and approve the details of LoA filled by contactor within 7 days of receipt of such request.

d) After approval of LoA by Engineer-in-Charge, contractor shall fill the salient details of contract labours engaged in the contract and ensure updating of each wage payment to them on shramikkalyan portal on monthly basis.

e) It shall be mandatory upon the contractor to ensure correct and promptuploading of all salient details of engaged contractual labour & payments made thereof after each wage period.

B) 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-in-Charge or his representatives that "I have uploaded the correct details of contract labours engaged in connection with this contract and payments made to them during the wage period in Railway's Shramikkalyan portal at 'www.shramikkalyan.indianrailways.gov.in' till_____ Month, _____Year"

1. 0. ADDITIONAL SPECIAL CONDITIONS OF CONTRACT

1.1 SCOPE OF WORK

The scope of work under this contract Supply, Installation, Wiring, Testing and Commissioning of Signalling and Telecommunication P.I. work of Bhojudih Coal Washery Yard of BCCL at Bhojudih of Adra Division in South Eastern Railway.

1.2 The Contractor has to work along with other agencies in and around the area allotted for his works. He should execute all his works in complete co-ordination and co-operation with all such agencies and provide access to other agencies so that at no time either his work or the work of other agencies is stopped or delayed. In case of any dispute in this regard, the decision of Engineer-in-charge or his representative will be final and binding on the Contractor. No claim for idle labour, plant and machinery under any circumstances will be entertained by the BCCL/RITES.

1.3 For work close to railway line, road telephone line, power line (both underground and overhead) and structures, all precautions should be taken for ensuring that during the execution of the work no damage is caused to such assets and also no obstruction is caused to the movement of trains/road traffic.

The work to be governed by this contract shall cover Design, Procurement, Installation, Transportation to destination in safe custody at site, Insurance, Supply, Erection, Testing and commissioning of the S&T system.

1.4 INSPECTION AT SITE BY THE TENDERER

1.5 Tenderer are advised to inspect and examine the site and its surroundings and satisfy themselves before their tenders, as to the nature of the ground and sub-soil (as far as is practicable), the form and nature of the site, the means of access to the site, the accommodation they may require and in general shall themselves obtain all necessary information as to risks, contingencies and other circumferences which may influence or affect their tender. A tenderer shall be deemed to have full knowledge of the site whether he inspects it or not and no extra charges consequent on any misunderstanding or otherwise shall be allowed. The tenderer shall be responsible for arranging and maintaining at his own cost all materials, tools & plants, water, electricity, access, facilities for workers and all other services required for execute the work unless otherwise specifically provided for in the contract documents. Submission of a tender by a tenderer implies that he has read this notice and all other contract documents and has made himself aware of the scope and specifications of the work to be done and of conditions and rates at which stores, tools and plant etc. will be issued to him by the employer and local conditions and other factors having a bearing on the execution of the work.

1.4.1. Design & Drawings

1.6 Design of S&T system including Signal Interlocking Plan, SWRD, Cable core chart,cable route plan, circuit diagram etc. as per concerned Railways practice complete in all respect as per tentative plan attached shall be submitted by the contractor and approved by RITES/Rlys, before starting of work. The contractor shall prepare detail S&T drawings & designs as per site condition/ system requirement/SIP and submit to RITES/ Rlys for obtaining approvals of

RITES and/or Rlys, if required. All expanses in preparation and obtaining the necessary approvals shall be included in the cost.

1.7 **APPROACH ROAD**: Contractor will provide approach road/roads for movement of materials as per direction of Engineer-in-charge. Contractor will also maintain these approach roads in safe and fit condition at his own cost. He will however have no authority to prevent use of such roads by BCCL/RITES and other bonafide contractors working at site. BCCL/RITES will, however, have the authority to disallow any movement on the road, which in their opinion is not in the interest of work. If the contractor fails to provide service road to the satisfaction of the Engineer-in-charge it will be provided by the Engineer-in-charge at Contractor's cost. However in case any such road is not required for the purpose of the work, nothing shall be deducted from contractor's payments on this account.

1.8 The contractor is required to execute the work in stretches/areas which are made available to him and which may or may not be in continuous stretches. Decision of Engineer-in-charge shall be final in this regard and binding on the contractor. Contractor shall have no claim if the stretches /areas are not available for the construction /repair at the same time. Extra time where requested by the Contractor on this account shall be considered by the Engineer-in-charge on case to case basis.

1.9 The contractor shall provide a detailed schedule of work along with material and labour deployment on monthly basis and revise or update the same every month.

1.10 The contractor shall procure all the materials well in advance so that there is sufficient time for testing of the materials and clearance of the same before using in the works. Testing of the materials i.e. concrete cubes/reinforcement steel/moorum/earth/stone dust/cement/aggregate and any other materials shall be carried out in Govt. Engineering College, National Test House, RITES Laboratory at Liluah, or any other approved laboratories as directed by Engineer In charge and as per the frequency mentioned in relevant IS Code. Cost of testing of materials shall be borne by the contractor.

1.11 The concreting work shall be done with proper and assured system of curing in duly identified areas with date of concreting marked in paint. In hot weather the contractor shall take relevant care to cover the work with wet gunny bags/ Hessian cloth or use continuous sprinkling of water on surface so as to keep the surface wet.

1.12 The contractor shall, after completion of work, clear the site of all debris and left over materials, at his own expense to the entire satisfaction of Engineer In charge.

1.13 Contractor should be registered with the concerned department of Employees Provident Fund Organization (EPFO). **No payment shall be released to the contractor until and unless the contractor submits the registration certificate and upto date deposit receipt of provident fund due to be deposited by him.**

1.14 At the time of submission of RA/Final bill a certificate shall be submitted by the contractor regarding up to date clearance of payment to his/their sub-contractors, vendors, suppliers, labour contractor etc. if any.

1.15 Contractor shall submit to RITES/BCCL the entry challan of incoming materials like cement, steel structural and reinforcement etc. for verification of Stores and record.

1.16 Contractor should maintain the daily cement consumption register. Engineer - in - charge or his representative may check the registers and the challans at any time.

1.17 **NIGHT WORK**: The contractor would be required to carry out the work even at night, without conferring any right on the contractor for claiming for extra payment for introducing night working. The decision of the Engineer-in-charge in this regard will be final and binding on the contractor. Contractor shall make his own arrangement for sufficient illumination at site. Nothing extra will be paid for doing works at night.

1.18 **FIRST AID**: The contractor shall maintain in a readily accessible place first aid appliance including an adequate supply of sterilized dressing and sterilized cotton wool. The appliances shall be placed under the charge of responsible person who shall be readily available during working hours.

1.19 The contractor shall also provide, fix & be responsible for the maintenance of all stakes, templates profiles, levels marks, points etc. and must take all necessary precautions to prevent these being removed altered or disturbed and will be held responsible for the consequences of such removal, alteration or disturbances should the same take place and for their efficient reinstatement.

1.20 NOTICE UNDER LOCAL LAWS

The purchaser, shall thought out the continuance of the contract and in respect of all matter arising out of the contract, serve all notices and obtain all consents and way leaves, approvals and permissions required to be taken by the purchaser under any regulations required to be taken by the purchaser under any regulations and by-laws of the local or other authority, which shall be applicable to the work.

1.20.1 The Contractor shall within 10 days of issue of award letter, establish an office at a convenientplace, closest to the site, for progressing designs and drawings and fieldwork expeditiously,in consultation and with the approval of the purchaser. He shall intimate the purchaser, the address thereofin that all correspondence shall be sent.Any communication sent to the contractor by post at his said address shall be deemed to have reached the contractor duly and in time .Important documents shall be sent by Registered Post.

1.20.2 LOSS IN TRANSIT

If loss or damage occurs to the stores or any part thereof during transit by rail, the contractor shall have only such remedy as is available to the public against the carrier under the Indian Railways (Amendment) Act 1961, No 39, of 1961.

1.21 HANDING OVER OF SITE:

1.21.1 Efforts will be made by the Employer to hand over the site to the Contractor free of encumbrance. However, in case of any delay in handing over of the site to the Contractor, the Employer shall only consider suitable extension of time for the execution of the work. It should be clearly understood that the Employer shall not consider any other compensation whatsoever viz. towards idleness of contractor’s labour equipment etc.

1.21.2 The Employer reserves the right to hand over the site in parts progressively to the Contractor. The Contractor will be required to do the work on such released-fronts in parts without any reservation whatsoever.

1.21.3 The access roads near, to the work site may not be available at the time of Mobilization by the Contractor. The Contractor shall plan his work within the plant area as per available roads at site. All drainage of works area and all other weather truck able/haulage roads as required by the Contractor shall be constructed and maintained during the construction period by the Contractor at his own cost.

1.22 The Contractor has to make temporary diversion of course of water during execution of any work conveniently free of cost.

1.23 The Contractor will bear all the charges for testing of materials.

1.24 Contractor will have to arrange water supply and electricity connection at his own expenses.

1.25 Contractor will have to arrange water supply and electricity connection at his own expenses for his own establishments

1.26 1. Contractor's rate shall be inclusive of cost of dewatering/shoring wherever required. No extra payment shall be made for any type of dewatering/shoring during execution of the work.

2. The tenderer shall hold the offer open till such date as may be specified in the tender. It is understood that the tender documents have been sold/issued to the tenderer and the tenderer is being permitted to tender in consideration of the stipulations on his part that after submitting his tender, he will not resale from his offer or modify the terms and conditions thereof, in a manner not acceptable to RITES.

3. If a tenderer expires after the submission of his tender or after the acceptance of his tender, RITES shall deem such tender as cancelled. If a partner of a firm expires after the submission of their tender or after the acceptance of their tender, RITES shall deem such tender as cancelled unless the firm retains its character.

4. RITES/BCCL also reserve the right to accept tender either for full quantity of work or part thereof or divide the works amongst more than one contractor without assigning any reason for any such action.

5. When the tender is submitted by the tenderer(s), it will be understood that the tenderer(s) has/have gone through carefully in detail all the instructions, conditions, General and Special conditions of contract all General and Special instructions/ specifications for execution of the work and that the tenderer(s) has/have got himself/ themselves clarified on all points and doubts and interpretations by the proper authority of RITES Ltd.

6. Contractor's store houses, yards etc. for stocking materials issued by RITES shall be located in the site premises only at locations approved by Engineer-in-charge.

7. The work shall conform to various specification indicated in Indian Railway Signalling& Telecommunication Manual for such works.

8. If there is any conflict between description given in schedule of quantity and conditions mentioned in the special conditions, the schedule of quantity shall prevail.

9. After handing over of the existing section to the contractor, the same section will be maintained and guarded by the contractor, till all the works are completed in all respect and handed over back to the Engineer-in-charge

10. The S&T materials as per "Schedule of Quantities" in the tender documents required for the work and to be supplied by the Contractor as per BOQ shall have to be supplied from RDSO approved manufacturers duly inspected by Railways/RDSO/RITES where such approval exists

11. Before commencing the work, joint inventory of existing materials in the track is to be taken by the representatives of RITES/BCCL and the contractor and entered in the inventory register and jointly signed.

12. The contractor will be responsible for the safe custody of S&T materials issued to him till completion of the works and handing over the line. The contractor will also be responsible to account for the S&T materials issued to him and surplus if any, has to be returned by him at his cost at the depot from which these were issued. For S&T materials remaining not accounted for by being executed or returned to the depot, recovery will be affected from the contractor's dues at rates to be decided by the Engineer-in-charge which will be final and binding.

13. It should be clearly understood that it is entirely the contractor's responsibility and liability to find, procure and use the required tools and plants and accessories at his own cost for efficient and methodical execution of the work. RITES shall have the right to check the sufficiency or quality of the Contractor's tools from time to time and the Contractor shall carry out all reasonable instructions of RITES in this respect.

14. In the event of any accident at the work spot, or while transporting S&T materials, if it is established by the enquiry by RITES representative/Clients' representatives or Railway/local Civil authority that the accident occurred wholly or partly due to any act tantamount to negligence on part of the contractor, he shall render himself liable for all damages and also legal proceedings.

15. All S&T materials required for the works and to be supplied free of cost by the Employer as per Contract Conditions will be issued at any of RITES/Clients Store Depot or in stacks from time to time during the period of work. The contractor should transport these materials for use in the work by his own means of suitable transport, including loading, unloading, sorting, stacking with all lead, lift, crossing Railway tracks etc. However, no material(s),in the instant case shall be supplied by Principal/RITES.

16. It should be clearly understood that it is entirely the contractor's responsibility and liability to find, procure and use the required tools and plants and accessories at his own cost for efficient and methodical execution of the work. RITES shall have the right to check the sufficiency or quality of the Contractor's tools from time to time and the Contractor shall carry out all reasonable instructions of RITES in this respect.

17. In the event of any accident at the works pot, or while transporting materials, if it is established by the enquiry by RITES representative/Clients' representatives or Railway that the accident

occurred wholly or partly due to any act tantamount to negligence on part of the contractor, he shall render himself liable for all damages and also legal proceedings.

18 The labour engaged by the contractor for the works should be conversant with the execution and maintenance of S&T works including safety rules.

19 In case the released S&T materials are left over at site, the contractor has to employ security/chowkidars day and night at his own cost till the S&T materials are handed over to the Engineer-in-Charge of work at his nominated depot. Till they are returned /handed over at the nominated depot, the released materials will continue to remain in the custody of the contractor.

20 Shifting of labour camp from place to place as the work advances will be at the cost of the contractor.

21 The contractor will co-operate with the Engineer-in-Charge in maintaining various registers, charts and records etc. in connection with the works.

22 The following registers will be maintained by the RITES representative at the cost of contractor who should sign the registers so maintained by RITES in token of his acceptance of the entries made therein.

a. Register of joint inventory.
b. Register of materials issued.
c. Register of site order.
d. Register of materials laid in track.
e. Register of materials received back from contractor.
f. Register of miscellaneous items, etc.
g. Register of Hindrance.
h. Other relevant registers.

23 A separate register should also be maintained by the contractor for the deployment of contract labour at site. The registers should be made available to Employer/RITES personnel, as and when required.

24 While stacking S&T materials on cess/side, care should be exercised to ensure that those stacks do not infringe the Railway's moving dimensions.

25 Time shall be regarded as the essence of the contract and failure on the part of contractor to complete the work by the date stipulated in the agreement and work order will entitle RITES Administration to recover liquidated damages/penalty.

26 RITES Administration reserve the right to alter the detailed plan and sections and to carry out minor alteration in the plans resulting in corresponding increase or decrease in the quantity of works without being liable to pay enhanced rates for the work or to allow extra time for completion of the work.

27 No new facilities such as roads, level crossing etc., other than those already in existence will be made available to the contractor.

28 The Schedule of items of work to be carried out, provided in the SCHEDULE OF QUANTITIES" gives only brief description of each of the items. Execution of these items will be governed by the **Technical specifications**. **For detailed specifications reference may be made to Section 5 "Technical Specifications" in general and in particular to the various Guidelines and Specifications listed in Para 1.0 "Preamble to Technical Specification" of Section 5**. RITES' representative at site will be fully empowered to provide guidance in the matter of execution of the works and his instructions will be final and binding in this regard.

29 In case any workman is found incompetent or otherwise undesirable by the RITES' representative at site, he should not be allowed to work under the Contractor. In this matter, the opinion of the Engineer-in-Charge will be final and binding on the contractor. Any violation of this requirement by the Contractor shall be treated as fundamental breach of contract entitling RITES to rescind the contract by giving 7 days-notice.

30 Particulars of work done during each day, with location where the work is done, will have to be recorded in a register by the Contractor's site in charge and the register will be kept available for inspection/scrutiny by RITES' representative. A site order book will also have to be maintained where instructions regarding work to be carried out will be recorded by RITES' representative at site.

31 RITES's representative shall have the right at all times to supervise the contractor's work and instruct the contractor and the contractor shall execute the work as per the instructions without any lapse of time. For this purpose the Contractor shall maintain a Site Order Book. Failure to comply with RITES' representative's instructions shall be deemed to be a fundamental breach of contract on the part of the Contractor entitling RITES to rescind the Contract at the Contractor's risk and cost after serving a notice of 7 days.

32 On-account payments to Contractor shall be made periodically based on the quantity and item of work executed at the rates accepted under this contract, and upon a certificate by the RITES' representative that work has been done to proper specification and to the satisfaction of its representative.

33 The Contractor will make all arrangements for getting passes/authorities for his men including making necessary application with photos for each labourer deployed for this work and will bear all costs, if any. Housing accommodation and watering arrangements for contractor's labour will have to be arranged by the contractor.

34 The Contractor will bear all medical expenses and make immediate arrangement for medical attention to his labourer, if injured on duty. He will provide "Medical Aid" Box at site of work at his cost.

35 **BCCL will only for supply items provide Way Bill (If applicable)**.

36 On completion of the work, the contractor should submit Royalty Clearance Certificate if available or should apply for Clearance Certificate from the concerned State Government under intimation to RITES Engineer-in-Charge. In case the contractor is not able to furnish Royalty Payment Certificate, an Indemnity Bond indemnifying the Employer against any legal action by

the State Government for non-payment of Royalty should be submitted by the Contractor before releasing Security Deposit.

37 The tender is being invited on behalf of BCCL, payment will be made to the Contractor within 10 (ten) days from the date of receipt of fund from M/s. BCCL.

38 Tenderers may please note:

i. The Employer is the Principal Employer for this work**.**

ii. In case of any dispute between RITES Ltd. and contractor, RITES Ltd. being merely an agent, client should be made first respondent and should be liable for all monetary losses.

iii. RITES Ltd. is only agent /consultant acting on behalf of the client/employer and in case of arbitration the client shall be the first respondent.

39 No payment will be made unless copy of the current & valid S.T.C.C. or exemption certificate is submitted prior to or along with the bills.

40 STORES TO BE SUPPLIED BY THE CONTRACTOR

(i) The quoted rates should also be inclusive of Inspection Charges and charges for loading, transportation, unloading and stacking at site store near/within the premises of Pathardih siding as per the direction of Engineer-in-Charge of RITES Ltd. at Private Railway Siding for Bhojudih Coal Washery Yard of BCCL at Bhojudih, P.O. Santaldih, Dist. Purulia, West Bengal. The quoted rates shall remain firm during the currency of the Contract.

(ii) Actual quantity delivered at site will be considered for the purpose of effecting payment.

(iii) Consignee: Additional Controller of Stores/BCCL or his authorized representative at Private Railway Siding for Bhojudih Coal Washery Yard of BCCL at Bhojudih, P.O. Santaldih, Dist. Purulia, West Bengal.

(iv) RITES Ltd on behalf of BCCL underreserves the right to undertake any test, if required, before acceptance of the materials on contractor's cost.

(v) Any materials and accessories, found to be damaged at the time of receipt will not be accepted and shall have to be replaced by good ones free of cost after being duly inspected.

41 **Period of Maintenance/Defect Liability period**: As per clause 17 of clauses of contract in GCC applicable to this work.

42 After handing over of the existing section to the contractor, the same section will be maintained and guarded by the contractor, till all the works are completed in all respect and handed over back to the Engineer-in-charge.

42.1 Completion Drawings:

42.2 Completion drawings for the works executed, shall be prepared by the contractor at his own cost.

42.2.1 Completion drawing will be prepared on tracing paper.

42.2.2 **Contractor will supply of drawing, 6 copies of completion drawing along with Original tracing & soft copy with the final bill.**

42.2.4 No new facilities such as roads, level crossing etc., other than those already in existence will be made available to the contractor. Every month the contractor will issue a certificate to BCCL about having made full payment to all labourers/suppliers/vendors under him engaged for this work.

42.2.5 No new facilities such as roads, level crossing etc., other than those already in existence will be made available to the contractor.

42.2.6 Every month the contractor will issue a certificate to BCCL about having made full payment to all labourers/suppliers/vendors under him engaged for this work.

42.2.7 All the electrical items should be as per latest RDSO/CORE drawings & Specification numbers and shall comprise of all parts and accessories listed in the drawing except, where otherwise stated. **All S&T fittings should be procured from valid RDSO approved manufacturers where such approval is given.**

42.2.8 The contactor shall intimate in advance for readiness of material for inspection

42.3 Quality Assurance Program in Supply and Erection:

a) All materials used in the work shall be of the best quality and of the class most suited for the purpose specified and procured from the sources approved by Research Design and Standard Organization, Lucknow / Railway Electrification, Allahabad / RITES LTD, Gurgaon. It is essential that the manufacture(s) from whom supply is arranged should have long experience of design and manufacture of equipment, components, materials and fittings. The requisite facilities for testing prototype supplied against this contract should be available with the manufacturer. In the case of those equipment's, components, materials and fittings. The requisite facilities for testing prototypes supplied against this contract should be available with the manufacturer. In the case of those equipment's, components or fittings for which the requisite facilities for testing prototypes are not available with the manufacturer, the manufacturer shall arrange to carry out the prototype tests at his own cost in a Testing Laboratory approved by the purchaser. Only tested quality steel shall be used. The contractor shall ensure that the purchaser's prescribed quality assurance standards are rigidly followed in the manufacturer and erection/installation of all the materials/components and fittings/equipment's required for the work.

b) Quality of materials &installation: All erection and installation work carried out shall also be of the best quality, acceptable to the purchaser.

c) **OTHER STORES:** If the material is arranged by the purchaser from the Railway on loan basis, the terms as conditions as stipulated by the Railway shall be applicable and the contractor shall pay the interest charges with materials cost as may be demanded by the Railway. The purchaser shall not be bound to arrange for the supply at the cost quoted above or at any other cost nor will this fact be accepted as an excuse for delay in execution of the work.

42.4.1 QUALITY ASSURANCE:

(a)**Materials**: All the equipment's, materials, fittings and components will be subject to Quality Control Program of the manufacturer, being a part of the Quality Assurance Program of the contractor. The materials may also be inspected by the purchaser of his representative either at the manufacturer works or at the contractor depot. The purchaser or his representative shall have the right to be present during all the stages of manufacture and shall be afford free of charge all reasonable facilities for inspection and testing as well as to examine the stage inspection report of the manufacturer in addition to the quality audit which the contractor may institute as a part of his Program so to satisfy himself that the materials are in accordance with specifications, approved drawings and designs and purchasers prescribed quality assurance standards.

(b) All erection work will also be subjected to the Quality Assurance Program including inspection by the purchase or his representative to ensure that the work is done in accordance with the specifications and approved drawings and designs and purchaser's prescribed quality Assurance Standards.

(c) **Expenses of purchasers Representative**: All the expenses of purchaser's representative shall be borne by the contractor whether the inspected materials is finally utilized in work or not.

(d) The decision of the General Manager or his successor shall be final is respect of acceptability or other wise of any material, fittings, component or equipment required for the work.

(e) **Quality Assurance Plan:** For proper control of quality and to ensure that the materials, equipment's and fittings are manufactured according to specification and the erection is according to approved instruction, drawings, specifications, the contractor shall adopt a suitable quality assurance Program to ensure quality at all necessary points, whether at manufacture's works, or in his depot or at works as well as durin gerection. Such quality assurance Program shall also meet the requirement of CORE, Indian Railway, prescribed quality assurance standards. This Program of the contractor shall generally cover the following:

1. **Theorganizationtomanageandimplementthe Quality AssurancePlan.**

2. **Thedocumentationcontrolsystem:**
   - i) Basic control system
   - ii) Adopted at manufacturer'sworks
   - iii) Adopted at the contractor's Depot and work site.

3. **Procedureadoptedfor:**
   - i) Sourceinspection
   - ii) Incoming raw material inspection
   - iii) Verification of materials purchased
   - iv) Fabrication control
   - v) Site erection control

4. **Inspection and Test Procedure for:**
   1. i) Manufacturer and Quality Control Procedure
      ii) Fieldactivities.

   2. Systemofhandlingandstorage

3. Systemofqualityaudit
4. Systemofmaintenanceofrecords

5. For the purpose of obtaining 'On Account Payment', the contractor shall submit alongwith the invoice, the documents indicated in the prescribed quality assurance standard which should inter-aliacover the following as may be applicable in each case:

i) Material test reports on the raw materials used.
ii) Material type and routine test report on component specification.
iii) Inspection plan with reports of the Inspection plan check points.
iv) Routine test report.
v) Factory test result as required under the specification.
vi) Quality audit report including test check report of purchaser's representative, if any.

42.4.2 The contractor is required to execute the work in stretches/areas which are made available to him and which may or may not be in continuous stretches. Decision of Engineer-in-charge shall be final in this regard and binding on the contractor. Contractor shall have no claim if the stretches /areas are not available for the construction /repair at the same time. Extra time where requested by the Contractor on this account shall be considered by the Engineer-in- charge on case to case basis.

The contractor shall provide a detailed schedule of work along with material and labour deployment on monthly basis and revise or update the same every month.

The concreting work shall be done with proper and assured system of curing in duly identified areas with date of concreting marked in paint. In hot weather the contractor shall take relevant care to cover the work with wet gunny bags/ Hessian cloth or use continuous sprinkling of water on surface so as to keep the surface wet.

Contractor shall submit to RITES/BCCL the entry challan of incoming materials like cement, steel structural and reinforcement etc. for verification of Stores and record.

Contractor should maintain the daily cement consumption register. Engineer - in - charge or his representative may check the registers and the challans at any time.

42.4.3 SAFETY MEASURE

a) The contractor shall take all precautionary measures in order to ensure the protection of his own personnel moving about or working on the Railway Premises, but shall then conform to the rules and regulations or the Railway. If and when, in the course of the work there is likely to be any danger to persons in the employment of the contractor due to running traffic while working in the Railway sidings and premises, the contractor shall apply in writing to the purchaser to provide flagmen or lookoutmen for protection of such persons. The purchaser will, however, decide as to whether it is necessary to post such flagmen forvarious types of work and also the number of such men required to protect the gang or gangs or contractor's staff work ingatsite. The purchaser shall remain indemnified by the contractor in the event of any accident occurring in the normal course of work, arising out of the failure of contractor or his mento exercise reasonable precaution at all places of work whether or not the purchaser decides to post flag

menatany particular site of work. They decides to post flag menatany particulars site of work. The flagmen will be appointed by the purchaser and no expenseon this account will be charged from the contractor.

(b) Blasting of rock for foundation work shallbedone only after due notice is given to the purchaser and times and dates for blasting operations agreed to by the purchaser. Blasting, if required to be done in the vicinity of the track, shall not be under taken until the purchaser's flagmen onduty, take necessary steps to protect trains and the track is adequately protected by the contractor against damage by blasted rock. The contractor shall follow detailed instructions, which will be issued to him regarding blasting operations in the vicinity of tracks.

(c) During stringing operation severy care shall be taken to prevent conductors hanging low over tracks on which traffic block as not been given. All conductors shall be pulled out before traffic block is cleared so that such conductor donot infringe with moving traffic.

(d) Ladder trolleys shall be used with caution. They shall notbe put ontracksuntil the purchaser's flagmen are on duty to protect the trolley sand the purchaser's representative authorized in writing for the trolleys to be put on the tracks. Ladder trolleys shall be promptly removed on instructions from the purchaser's representative and well in advance of trains.

No claim shall rest on the purchaser in the event of a ladder trolley being runover by train.

(e) The contractor shall abide by all Railway regulations in force for the time being and ensure that the same is followed by his representative, agents or sub-contractors or workmen. He shall give due notice to his employees and workers about provision of the para.

(f) While working with instation limits, especially on passenger platforms, the contractor shall ensure that all times sufficient space is left for free movement of passenger traffic. He must cover and/or barricade the excavations carriedout in such are as and continue to maintain these, till the work is complete, with a view to avoid any accident to public or to Railway Staff.

(g) The works must be carried to most carefully without any infringement of the Indian Railway Act or the General and subsidiary Rules inforce on the Railway, in such away that they do not hinder Railway operation or affect the proper functioning of or damage any Railway equipment, structure of rolling stock except as a greed to by the purchaser, provided that all damage and is figuration caused by the contractor at his own cost failing which cost of such repairs shall be recovered from the contractor.

(h) If safety of track or track drainage etc. is affected, as a consequence of works undertaken by the contractor, the contractor shall take immediate steps to restore normal conditions. In case ofdelay, the purchaser shall, after giving due notice to the contractor inwriting, take necessary steps and recover the costs from the contractor.

(i) Moreover, if anytime the works to be carriedout directly concern the safety trains,

the contractor's staff must comply fully with the Railway regulations given to him by the authorized Railway staff. The contractor's employees and workers may for no reason operate installations concerning trains safety or train movement. They shall notify the authorized representative of the purchaser who will take all necessary steps in this regard.

(j) The contractor shall be responsible for safe custody of all equipment'still provisional acceptance.

(k) The contractor's liability to meet third party claims of the type outlined above will be applicable only in cases where accidents have been caused by the bad design, workmanship materials or negligence on the part of the contractor.

The contractor shall ensure that unauthorized, careless of in adverten to peration of switch gear, which may result in accident to staff and/or damage to equipment, does not occur.

42.4.4 ACCIDENTS

(a) The contractor shall, in respect of all staff engaged by him or by his sub-contractor, indemnified and keepthe purchaser of all times indemnified and protected agains tall claims made and liabilities incurred under workman's compensation Act, Compensation Act, the Factories Act and the payment of Wages Act and rules made there under from time to time or under any other labor and industrial legislation made from time to time.

(b) The Contractor shall indemnify and keep the purchaser indemnified and harmless against all actions, suits, claim, demands, costs, charges or expenses arising in connection with, any death or injury sustained by any person or persons within the purchaser and/or the Railway premises and any loss or damage to the purchaser's the Railway's property sustained, due to the acts or omission of the Contractor, his sub-contractors, his agents or his staff during the execution of this contract irrespective of whether such liability arises under the workmen's Compensation Act, or Fatal Accident Act or any other status in force for the time being.

(c) The contractor's liability to meet third party claims of the type outlined above will be applicable only in cases where accidents have been caused by bad design, workmanship, material or negligence on the part of the Contractor.

Note: It may be noted that the beneficiary of the insurance policy should be the purchaser or the policies should be pledged in favor of the purchaser. The contractor shall keep the policy/ policies current till the installations are handed over to the purchaser. It may also be noted that in the even to contractor's failure to keep the policy current and alive, renewal of the policy will be done by the purchaser, for which the cost of the premium will be recovered from the contractor.

(d) Clearing damaged installations: The Contractor shall arrange for expeditious clearing of the Railway track/ softraction installations, obstructing or fouling the tracks when they are damaged as a result of railway accident or any other cause, until installations are provisionally handed over to the purchaser. If the contractor fails inspite of prompt written instructions served to him by the purchaser to clear the tracks expeditiously and within reasonabletime, the purchaser will arrange to

clear the tracks of the damaged installations and recover the expenses incurred from the contractor. If during such clearance operations further damage is caused to the installations, the purchaser is not liable to reimburse the contractor the cost of such further damage in the installations.

(e) The contractor shall arrange for temporary slewing of overhead equipment for crane operations for derailment of rolling stock due to accidents for which the contractor is not responsible if required by the Railway or the purchaser, at the cost of the purchaser, until the installations are provisionally handed over to the purchaser. If the contractor fails to slew the overhead equipment within reasonable time the purchaser will arrange to slew the equipment and recover the extra expense incurred, if any, from the Contractor. After the crane operations are completed, the Contractor shall restore the overhead equipment to its normal position.

42.5 **Inspection**

42.5.1 Inspection is to be carried out by the **RITES Quality Assurance (QA) Division**, New Delhi/ Kolkata/Chennai/ Mumbai/ Bhilai for material value above than Rs.5 lakh and RPO/KOLKATA will inspect the material value less than Rs.5 lakh and the material as given in schedule before effecting dispatch of the materials. Inspection certificates with all supportive documents will have to be submitted along with the bills as documentary evidence.

Representative of RPO/KOLKATA/RANCHI is authorized to visit at any time to the nearer manufacturer premises before final inspection for checking of materials quality.

Pre-delivery Inspection & Approval:

The contractor shall offer the pre-delivery inspection of all the materials at manufacturers work to the Engineer-in-charge. The intimation for such inspection shall be given at least 15 days in advance from the date of proposed inspection. RITES along with CLIENT representative may inspect any/all the materials required in this project. All the testing facilities man power and all the consumables including the fuel etc. shall be provided by the contractor and nothing extra shall be paid on this account to the contractor.

Inspection fee such as stage inspection, in progress inspection and final inspection will born by the contractor. Re inspection of rejected material, Call cancellation due to non-availability of material or other valid reason includes inspection call withdrawn by the contractors /manufacturer will be charged and shall be borne by the contractor which is included in the LOA. The Call cancellation fee is Rs.5000/- (for local) and Rs.10,000/- for (out station) plus tax as applicable. If inspection done by RPO/KOLKATA/RANCHI and for RITES QA as applicable to the standardize rate of QA.

Rate of inspection fee for final and Re inspection of rejected lot will be same and equivalent to the fee structure of RITES/QA Division subject to minimum fee of Rs.9000/- + tax as applicable. Contractor is advised to confirm the details of manufacturer and complete works address for different items to be procured to RPO/KOLKATA/ RANCHI office prior to the final inspection call.

Inspection at site after receiving of material:

After receipt of inspected material at store/site, RITES /Consignee will also check all the

material visually, dimensially if necessary may send the sample for testing at any independent laboratory and expenditure towards testing will be born by the contractor. If the material fails in any test, the whole lot will be rejected and contractor will replace the whole lot by fresh inspected lot.

42.6 **Consignee: Addl. Controller of Stores, (BCCL), at Private Railway Siding for Bhojudih Coal Washery Yard of BCCL at Bhojudih, P.O. Santaldih, Dist. Purulia, West Bengal or his authorized representative**.

42.7 RITES Ltd on behalf of **BCCL** reserves the right to undertake any test, if required, before acceptance of the materials on contractor's cost.

42.8 Any materials and accessories, found to be damaged at the time of receipt will not be accepted and shall have to be replaced by good ones free of cost after being duly inspected.

42.9 **Terms of payment**

42.9.1 The measurements shall be recorded in measurement form in computerized Measurement Book (Refer clause 6A of GCC), as the case may be, by authorized representative of RITES LTD in the presence of the Contractor or his authorized representative at site. The Contractor or his authorized representative will sign measurement forms/measurement book in token of his acceptance of the measurements. Payment will be made by RITES LTD, Kolkata to the contractor on submission of bills duly certified by the authorized representative of RITES. The anticipated date of release of payment will be approximately 45 days from the date of submission of bills to RITES. RITES will not be responsible for any delay in releasing payments of running bills beyond 45 days due to non-availability of funds with RITES. The Contractor will not be entitled to any claim on RITES for delay in payment due to non-availability of funds. No interest will be paid on any delay on the payment of running / final bills to the contractor.

42.9.2 **PAYMENT AGAINST BOQ ITEMS OF SUPPLY OF S&T MATERIALS:**

(i) On production of documents along with the Running Bill & Notarized Indemnity Bond executed in accordance with the "Annexure- VI" on non–judicial stamp paper of requisite value, 80% cost of materials shall be paid to the contractor for the supplied materials duly inspected and received by RITES at site.

(ii) 10% cost of supplied materials shall be paid to the contractor after certification by authorized representativeof RITES about the satisfactory installation of the materials in the works at site.

(iii) Balance 10% cost of materials supplied & installed and balance 20% cost of materials supplied but uninstalled shall be paid along with the Final Bill to the contractor after testing & commissioning of S&T installation and reconciliation of material duly certified by the authorized representative of RITES & Railways and handing over the balance uninstalled material to Railway/BCCL.

(iv) On the basis of completion certificate issued by the authorized representative of RITES for all the S&T subsystem in all the section covered in this contract, the final bill for the balance payment for each item/subitem along with final completion certificates shall be submitted by

the contractor's along with a "**NO CLAIM CERTIFICATE"**.

The completion certificate shall be issued by the authorized representative of RITES when-

• They have accepted the work wholly after conducting the acceptance tests on each item of work.

• All the released materials, if any, are handed over by the contractor correctly to RITES/Railway/BCCL and stacked as advised.

• Material reconciliation done and all the unused materials returned to Railway/BCCL stores in good condition after the successful completion of installation & commissioning of whole system duly verified and reconciled by the RITES/Railways.

42.9.3 **PAYMENT AGAINST BOQ ITEMS OF EXECUTION OF S&T WORKS:**

(i) 90% cost of executed quantity shall be paid to the contractor on certification by the authorized representative of RITES after satisfactory completion of erection/ installation as per item/items of BOQ.

(ii) Balance 10% cost of execution shall be paid to the contractor after testing, commissioning of the S&T system and rectification of deficiencies, if any, duly certified by the authorized representative of RITES and handing over assets to Railway/BCCL.

42.9.4 **PAYMENT OF COMPOSITE ITEMS INVOLVING SUPPLY, INSTALLATION AND EXECUTION:**

On certification by the authorized representative of RITES, the contractor against such items shall be paid as under -

(i) 65% cost of such schedule item will be paid to the contractor on receipt of duly inspected equipments/ materials against the BOQ item(s) at site/depot and also on completion of other formalities as applicable to payment against supply items.

(ii) (a) 25% costs of such schedule items shall be paid after successful erection / installation of the materials/ equipments duly certified by the authorized representative of RITES.

(b) Balance 10% cost of supplied & installed for such item shall be paid after testing & commissioning of the S&T system and rectification of deficiencies, if any, duly certified by authorized representative of RITES.

(iii) Balance 35% cost of supplied but un-installed for such schedule item shall be paid along with the Final Bill to the contractor after testing & commissioning of S&T installation, reconciliation of materials duly certified by the authorized the representatives of RITES and handing over the balance uninstalled material to Railways.

42.9.5 **Final Bill:**

On the basis of Final Completion Certificate issued jointly by the authorized representatives of RITES Ltd. & Railways for all the S&T sub systems in all the sections covered in this contract, the final bill for the balance payment of each item/sub item along with final completion certificate shall be submitted by the contractor along with a **"NO CLAIM CERTIFICATE"**.

42.9.6 **OVER PAYMENT AND UNDER PAYMENT**

42.9.6 (a) Whenever any claim for the payment of a sum of money to M/s RITES arises out of or under this Contract against the Contractor/supplier the same shall be deducted by RITES/from any sum then due or which at any time thereafter may become due to the contractor under this contract and failing that under any contractwith RITES or from any other

sum due to the contractor from RITES which may be available with RITESor from his security deposit, or he shall pay the claim on demand.

42.9.6 (b) RITES reserve the right to carry out post payment audit and technical examination of the final billincluding all supporting vouchers, abstracts, etc. RITES further reserve the right to enforce recovery of anyoverpayment when detected.

42.9.6 (c) If as a result of such audit and technical examination any over payment is discovered in respect of anywork done by the contractor or alleged to have been done by him under the contract, it shall be recovered by RITES from the contractor/supplier by any or all of the methods prescribed above and if any under payments is discovered, the amount shall be duly paid to the contractor/supplier by RITES.

42.9.6 (d) Provided that the aforesaid right of RITES to adjust over payments against amounts due to the contractor/ supplier under any other contract with RITES shall not extend beyond the period of two years from the date of payment of the final bill or in case the final bill is a MINUS bill, from the date the amount payable by the contractor under MINUS final bill is communicated to the contractor/supplier.

42.9.6 (e) Any amount due to the contractor/supplier under this contract for underpayment may be adjusted against any amount than due or which may at any time thereafter become due before payment is made to thecontractor, from him to RITES on any other contract or account whatsoever.

43. **Defect Liability Maintenance/Defect Liability period**: As per clause 17 of clauses of contract in GCC applicable to this work, the period of maintenance/defect liability period for this work shall be **12** (twelve) months from the date of issue of final completion certificate or till the final bill has been passed whichever is later.

44. **Co-ordination**
During the course of execution of the work, relating to Railway premises, the Contractor is required to co-ordinate with Sr.DSTE/Dy.CSTE and Chief Signal & Telecommunication Engineer (S&T) of S.E. Rly. as well as other Rly. Officials to commission the system quickly and smoothly.

45. The Schedule of Rates is to be read in conjunction with relevant RDSO/RITES's Specifications and the Explanatory Notes enclosed with the Tender Documents.

46. No 'D' form against Sales Tax shall be issued.

47. Contractor may arrange to obtain Traffic of the existing Section from Sr.DSTE/Co & Sr. DOM from S.E. Rly.

48. Any surplus materials brought to site within the schedule (Bill) of quantity will have to be deposited to BCCL's store / Railway's store/Hand Over to Operation and Maintenance Department of BCCL from site by the contractor at his own expenses under direction of Engineer-in-Charge.

49. All released materials should be handed over to BCCL.

50. EI/Electronics System shall be supplied in Water Proof Boxes.

51. The contractor shall take all possible precautions to ensure that none of his workers knowingly or

unknowingly or otherwise cause interference to the circuits or equipment in use and give rise to unsafe conditions or dislocation of traffic.

52. **Special Instructions**

52.1 The tenderer is advised to visit the site and familiarize the present conditions in terms of Para 1.0 of Section-3.

52.2 The tender is invited for Supply, Installation, Wiring, Testing and Commissioning of Signalling and Telecommunication P.I. work of Bhojudih Coal Washery Yard of BCCL at Bhojudih of Adra Division in South Eastern Railway. The scope of work covers co-ordination with Rly. both at Headquarters and Divisional level and obtain necessary approval for the working drawings/completion drawings from Railway officials, CSTE, CRS etc. as required.

52.3 Contractors shall take due care and caution to avoid any damage during execution of work. Any damage/loss occurs due to negligent working of contractors shall be made good or realized from the payments due to them.

52.4 Contractors shall take due care and caution to avoid any damage during execution of work. Any damage/loss occurs due to negligent working of contractors shall be made good or realized from the payments due to them.

52.5 If a tenderer expires after the submission of his tender or after the acceptance of his tender, RITES shall deem such tender as cancelled. If a partner of a firm expires after the submission of their tender or after the acceptance of their tender, RITES shall deem such tender as cancelled unless the firm retains its character.

52.6 RITES/BCCL also reserve the right to accept tender either for full quantity of work or part thereof or divide the works amongst more than one contractor without assigning any reason for any such action.

When the tender is submitted by the tenderer(s), it will be understood that the tenderer(s) has/have gone through carefully in detail all the instructions, conditions, General and Special conditions of contract all General and Special instructions/ specifications for execution of the work and that the tenderer(s) has/have got himself/ themselves clarified on all points and doubts and interpretations by the proper authority of RITES Ltd.

Contractor's store houses, yards etc. for stocking materials issued by RITES shall be located in the site premises only at locations approved by Engineer-in-charge.

The work shall conform to various specification indicated in Indian Railway AC Traction Manual for such works.

If there is any conflict between description given in schedule of quantity and conditions mentioned in the special conditions, the schedule of quantity shall prevail.

52.7 After handing over of the existing section to the contractor, the same section will be maintained and guarded by the contractor, till all the works are completed in all respect and handed over

back to the Engineer-in-charge.

52.8 The S&T materials as per "Schedule of Quantities" in the tender documents required for the work and to be supplied by the Contractor as per BOQ shall have to be supplied from RDSO approved manufacturers duly inspected byRailways/RDSO/RITES where such approval exists.

52.9 Before commencing the work, joint inventory of existing materials in the track is to be taken by the representatives of RITES/BCCL and the contractor and entered in the inventory register and jointly signed.

52.10 The contractor will be responsible for the safe custody of S&T materials issued to him till completion of the works and handing over the line. The contractor will also be responsible to account for the S&T materials issued to him and surplus if any, has to be returned by him at his cost at the depot from which these were issued. For S&T materials remaining not accounted for by being laid on track or returned to the depot, recovery will be effected from the contractor's dues at rates to be decided by the Engineer-in-charge which will be final and binding.

52.11 It should be clearly understood that it is entirely the contractor's responsibility and liability to find, procure and use the required tools and plants and accessories at his own cost for efficient and methodical execution of the work. RITES shall have the right to check the sufficiency or quality of the Contractor's tools from time to time and the Contractor shall carry out all reasonable instructions of RITES in this respect.

53. **Time Schedule**

53.1 Time is the essence of contract. In order to complete the work within the scheduled time, the tenderer is required to submit a detailed construction programme with "**BAR CHART**" for various activities indicating the time required for the same within 15 days of awarding the contract in consultation with the Engineer.

53.2 The programme shall clearly indicate major key event, indicating mobilization time of equipment,deployment of manpower, fabrication of the various components, structure and other ancillary works.

53.3 All works shall be carried out by the contractor as per specification and contractor shall offer for stage-wise inspection of items carried out. Any work rejected by inspecting official shall be rectified /replaced as per instruction and decision of Site-in- charge which shall be final in this regard.

A separate register should also be maintained by the contractor for the deployment of contract labour at site. The registers should be made available to Employer/RITES personnel, as and when required.

While stacking S&T materials (new or second hand or released) on cess/side, care should be exercised to ensure that those stacks do not infringe the Railway's moving dimensions.

Time shall be regarded as the essence of the contract and failure on the part of contractor to complete the work by the date stipulated in the agreement and work order will entitle RITES Administration to recover liquidated damages/penalty.

The labour engaged by the contractor for the works should be conversant with the execution and maintenance of S&T works including safety rules.

NOTICE UNDER LOCAL LAWS

The purchaser, shall thought out the continuance of the contract and in respect of all matter arising out of the contract, serve all notices and obtain all consents and way leaves, approvals and permissions required to be taken by the purchaser under any regulations required to be taken by the purchaser under any regulations and by-laws of the local or other authority, which shall be applicable to the work.

The access roads near, to the work site may not be available at the time of Mobilization by the Contractor. The Contractor shall plan his work within the plant area as per available roads at site. All drainage of works area and all other weather truck able/haulage roads as required by the Contractor shall be constructed and maintained during the construction period by the Contractor at his own cost.

The Contractor has to make temporary diversion of course of water during execution of any work conveniently free of cost.

The Contractor will bear all the charges for testing of materials.

Contractor will have to arrange water supply and electricity connection at his own expenses.

Contractor will have to arrange water supply and electricity connection at his own expenses for his own establishments.

Contractor’s rate shall be inclusive of cost of dewatering/shoring wherever required. No extra payment shall be made for any type of dewatering/shoring during execution of the work.

No new facilities such as road, level crossing etc. other than those already in existence will be made available to the contractor. Every month the contractor will issue a certificate to BCCL about having made full payment to all labourers/suppliers/vendors under him engaged for this work.

The Contractor will make all arrangements for getting passes/authorities for his men including making necessary application with photos for each labourer deployed for this work and will bear all costs, if any. Housing accommodation and watering arrangements for contractor's labour will have to be arranged by the contractor.

The Contractor will bear all medical expenses and make immediate arrangement for medical attention to his labourer, if injured on duty. He will provide "Medical Aid" Box at site of work at his cost.

54. **EMPLOYMENT OF LOCAL LABOUR**

Contractors should employ skilled staff who posses sufficient knowledge on safety rules while

working near high voltage line. However preference may be given to local project affected people who are so suited and pay wages not less than the minimum wages fixed by the Law of the Land".

55. **APPLICATION OF PRICE VARIATION CLAUSE 10CC OF CLAUSES OF CONTRACT:**

Not applicable.

56. For any S&T materials any Specification is not mentioned/Changed or upgated in Schedule of Quantity or BOQ description is required. Then Specfication mentioned in the DETAILED TECHNICAL SPECIFICATIONS FOR SIGNALING in Section 5 list attached to be followed or latest specification mentioned in RDSO Vendor directory to be considered, no separate amendent in description of item is required, agency can go for procure of materials on written intimation to Engineer-in-charge with supporting documents.

57. If any ambiguity in description of BOQ or Schedule of Quatity TECHNICAL SPECIFICATIONS FOR SIGNALING in Section 5 to be refered and followed with intimation with Engineer-in-charge.

SECTION 4

PROFORMA OF SCHEDULES

SECTION 4
PROFORMA OF SCHEDULES

SCHEDULE 'A'

Schedule of Quantities (As per Bill of Quantities attached)

SCHEDULE 'B' – NOT APPLICABLE

Schedule of materials to be issued to the contractor. (Refer Clause 10 of Clauses of Contract)

S.No.	Description of items	Quantity	Rates in Figures & words at which the material will be charged to the contractor	Place of Issue
1	2	3	4	5

SCHEDULE 'C' — NOT APPLICABLE

Tools and plants to be hired to the contractor. (Refer clause 34 of Clauses of Contract).

S.No.	Description	Hire charges per day	Place of Issue
1	2	3	4

SCHEDULE 'D' - NOT APPLICABLE -

Extra schedule for specific requirements/documents for the work, if any.

SCHEDULE 'E'– NOT APPLICABLE -

Schedule of component of Cement, Steel, Other materials, POL, Labour etc. for price escalation. (Refer Clause 10CC of Clauses of Contract): Not Applicable

CLAUSE 10 CC		**NOT APPLICABLE**
Component of Cement (Xc), expressed as percent of total value of work.	**:**	--
Component of steel (Xs), expressed as percent of total value of work.	**:**	--
Component of other materials (Xm), (except cement & steel) expressed as percent of total value of work.	**:**	--
Component of labour (Y), expressed as percent of total value of work.	**:**	--
Component of P.O.L (Z), expressed as percent of total value of work	**:**	-
TOTAL	**:**	--

SCHEDULE 'F' **Reference to General Conditions of contract**		
Name of Work -	:	Supply, Installation, Wiring, Testing and Commissioning of Signalling and Telecommunication P.I. work in connection with Renovation / Strengthening of the existing Railway Siding at Bhojudih Coal Washery, Santhaldih, West Bengal under S.E. Railway, Adra Division.
Estimated cost of work -	:	**Rs.13,31,82,673/-**
Earnest money :	:	**Bid security declaration as per Annexure XI to be submitted.**
Performance Guarantee (Ref. Clause 1) -	:	3% of Tender value.
Security Deposit: (Refer clause 1A) -	:	5% of Tender value.
Notice Inviting Tender and Instruction to Tenderers Officer inviting tender :	:	General Manager (Project), RITES Ltd, Regional Project Office, Ranchi, House No.: 146C, Road No.: 1, Mandir Marg, Ashok Nagar, Ranchi-834002, Jharkhand **for & on behalf of BCCL.**
CONDITIONS OF CONTRACT Definitions		
2 (iv) Employer	:	**BCCL**
2 (v) Engineer-in-Charge	:	General Manager (Project), RITES Ltd, Regional Project Office, Ranchi, House No.: 146C, Road No.: 1, Mandir Marg, Ashok Nagar, Ranchi-834002, Jharkhand.**for & on behalf of BCCL.**
2 (vii) Accepting Authority	:	**General Manager (P),** RITES Ltd, Regional Project Office, Ranchi – 834002
2 (ix) Percentage on cost of materials and labour to cover all overheads and profits.	:	15%
2 (x) Standard Schedule of Rates	:	
2(xiii) Date of commencement of work		15 days from the date of issue of LOA or the first date of handing over of site whichever is later.
9(a)(ii) General Conditions of Contract	:	RITES General conditions of contract **July-2019** Edition as modified & corrected up to Correction Slip 10 dated 23.03.2021.

CLAUSES OF CONTRACT. **Clause 1.**	:	
i) Time allowed for submission of Performance Guarantee (P.G.) from the date of issue of Letter of Acceptance.	:	15 days
ii) Maximum allowable extension beyond the period provided in (i) above.	:	07 days.

Clause 2. Authority for fixing compensation under Clause 2	**:**	**General Manager (P),** **RITES Ltd, Regional Project Office, Ranchi – 834002.**
Clause 2A. Whether Clause 2A shall be applicable	**:**	NO
Clause 5. i) Time allowed for execution of work:	**:**	**09 (Nine) months** from the 15th day the date of issue of Letter of Acceptance or from the first day of handing over of the site, whichever is later, in accordance with the phasing, if any, indicated in the Tender Documents.

5.1 (b) TABLE OF MILESTONE(S) – NOT APPLICABLE.

Sl.No.	Description of Milestone (Physical)	Time allowed in days (from date of start).	Amount to be withheld in case of non-achievement of milestone.
1			
2			
3			

Clause 5A – Shifting of stipulated date of completion.

Competent Authority	**:**	**General Manager (P),** **RITES Ltd, Regional Project Office, Ranchi – 834002.**

Clause 6A (Computerized Measurement book) : NOTAPPLICABLE.

Clause 7 (Payment on intermediate certificates to be regarded as Advances) Gross work to be done together with net payment/adjustment of advances for material collected, if any, since the last such payment for being eligible to interim payment	**:**	**Rs. 40.00 Lakh**
Clause 10A (Materials to be provided by the Contractor): i) Whether Material Testing Laboratory is to be provided at site. ii) If "YES" list of equipment to be provided		**NOT APPLICABLE**
Clause 10 B Whether Clause 10 B (ii) to (v) applicable.	**:**	**NOT APPLICABLE**
Clause 10 CC. Whether Clause 10CC is applicable.	**:**	**NOT APPLICABLE**

Clause 11 Specifications to be followed for execution of work	**:**	**Civil Work :** a) RDSO Guideline on earth work b) RITES Technical Specification **S&T Work** a) RITES Technical Specification. b) RDSO Specification. c) Railway Guideline. **Electrical work** a) RITES Technical Specification b) All relevant IS codes c) All relevant IEC code d) Railway Guideline. **OHE Work** a) RITES Technical Specification. b) RDSO/CORE Specification.
Clause 12	**:**	
Clause 12.2,12.3 & 12.5 Deviation Limit beyond which Clauses 12.2,12.3 & 12.5 shall apply	**:**	i) For Non-foundation items. Plus - 25% Minus- No limit
	:	i) For Foundation Items. Plus-100% Minus-No limit
	:	**Note: For Earthwork, individual classification quantity can vary to any extent but overall Deviation Limits will be as above.**
12.5 Definition of Foundation item if other than that described in Clause 12.5		**Sch-B all items.**
Clause 16 Competent Authority for deciding reduced rates	**:**	**General Manager (P),** **RITES Ltd, Regional Project Office,** **Ranchi – 834002.**
Clause 17 Maintenance Period	**:**	**03 (Three) Months.** **(Post Commissioning)**
Clause 18 List of mandatory machinery, tools & plants to be deployed by the Contractor at site:-	**:**	1. Ladder. 2. Spanner Set 3. Multimeter 4. Soldier Iron 5. Concrete mixer. 6. Vibrators 7. Shuttering & Scaffolding with all accessories 8. Earth tester 9. Dummy wheel 10. Heavy Duty Drill Machine 11. Light Drill Machine

		12. Other measuring & required equipment for S&T works. 13. Tong Tester 14. Megger 15. Laptop
Clause 25 Appellate Authority:	**:**	Executive Director (RI), RITES Ltd, Corporate Office, RITES Bhawan, No.1, Sector-29, Gurgaon-122001.
Appointing Authority:	**:**	Director Projects, RITES Ltd, Corporate Office, RITES Bhawan, No.1, Sector-29, Gurgaon-122001.
Whether Clause 31A or 32 is applicable	**:**	**NOT APPLICABLE.**
Clause 36 (i) & (iii) Minimum Qualifications & Experience required and Discipline to which should belong.		**APPLICABLE.**

Designation	**Minimum Qualification.**	**Minimum working experience (Years).**	**Discipline to which should belong.**	**Number.**
Principal Technical Representative	Project Manager with degree in corresponding disipline of Engineering	10 (ten)	Signal & Telecom	01
Technical representative	Graduate Engineer (B.E/B.Tech)	05 (five)	Signal & Telecom	01
Project/ Site Engineer And Project Planning/ Billing Engineer	Graduate Engineer (B.E/B.Tech) (or) Diploma Engineer	NIL (for Graduate) & 5 (for Diploma)	Signal & Telecom	02

Clause 36 (iv) Recovery for non-deployment of Principal Technical Representative and Deputy Technical Representative			**APPLICABLE.**
Designation			**Rate of recovery per month (in Rs.) for non-deployment.**
Qualifications	**Experience (Years)**	**:**	
Graduate Engineer	10	**:**	Rs.55,000.00
Graduate Engineer	5	**:**	Rs.40,000.00
Graduate Engineer	Nil	**:**	Rs.25,000.00
Diploma Engineer	5	**:**	Rs.25,000.00
Clause 42			**Not Applicable**
i)(a) Schedule / statement for determining theoretical quantity of cement & bitumen on the basis of Delhi Schedule of Rates printed by CPWD.		**:**	

ii)	Variations permissible on theoretical quantities:		
a)	Cement - for works with estimated cost put to tender not more than Rs. 5 lakhs.	:	
	- for works with estimated cost put to tender more than Rs.5 lakhs.	:	
b)	Bitumen for All Works	:	
c)	Steel Reinforcement and structural steel sections for each diameter, section and category.	:	
d)	All other materials.	:	

RECOVERY RATES FOR QUANTITIES BEYOND PERMISSIBLE VARIATION.

Sl. No.	Description of Item.	Rates in figures and words at which recovery shall be made from the Contractor.	
		Excess beyond permissible variation.	Less use beyond the permissible variation.
1	Cement	**NOT APPLICABLE.**	
2	Steel reinforcement		
3	Structural Sections		
4	Bitumen issued free		
5	Bitumen issued at stipulated fixed price		

Clause 46		
Whether Clause 46.10 shall be applicable (**Site Office for the Employer to be made available by the contractor to be stipulated**).	:	**NOT APPLICABLE.**
Whether Clause 46.11.1A shall be applicable.	:	NO
Whether Clause 46.13A shall be applicable.	:	YES
Clause 46.17	:	
City of Jurisdiction of Court.	:	**KOLKATA.**
City of Jurisdiction of Court for all matter.	:	**KOLKATA.**
Clause 47.2.1 Sum for which Third Party Insurance to be obtained.	:	**Rs. 5.0 lakhs per occurrence with the no of coccurences limited four.**
Clause 55	:	
Whether clause 55 shall be applicable.	:	NO
If yes, time allowed for completion of sample floor/unit.	:	NO

SECTION 5

TECHNICAL SPECIFICATIONS

PREAMBLE TO TECHNICAL SPECIFICATIONS

The work under this contract will be strictly carried out as per the specification mentioned in this tender document or its latest version/amendment. If this part of tender is silent about the specification to be followed for any part of the work, the relevant specifications followed by the Railway will be adopted. In such a case, if necessary guideline cannot be obtained from Railway's relevant Technical Specifications, Signal and Telecommunication Engineering Practices shall be followed as per the directives issued by the Engineer. In all such cases the decision of Engineer shall be final and binding on the contractor.

The standard specifications referred to in are available with the respective organization. The tenders may purchase/obtain these specifications at their own cost.

The Contractor shall supply the equipment and materials required for the works complying with the IRS/IS/BRS/RDSO specifications and drawings mentioned in items of Bill of Quantities (BOQ). The materials/equipment of RDSO specifications/drawings shall be procured from RDSO approved suppliers only.

The requirements specified for sections provided with 25KV AC traction will be complied with both for Signaling and Telecommunication systems.

TECHNICAL SPECIFICATIONS

SIGNAL & TELECOM.

The detailed specifications for the work which are to be carried out by the Contractor are as stipulated hereunder:-

The work shall be carried out according to the drawings and Specifications supplied. The Contractor shall be solely responsible for the proper execution of the work as per Specification. The Signal Interlocking Plan (Schemetic) of the station is enclosed for better appreciation of the work.

Wherever reference is made in the Technical specification and Bill of quantities in regard to specification number and codes to be met by the goods and materials to be furnished, and work performed or tested, the provisions of the latest current edition or revision of the relevant standards and codes in effect shall apply, unless otherwise expressly stated in the Contract.

DETAILED TECHNICAL SPECIFICATIONS FOR SIGNALING

List of signalling materials with their specification/drawings- Signalling & Telecom Materials to be supplied by the contractor will be as per the following specifications/drawings with the latest revisions & amendments. Specifications and drawings may be purchased from RDSO, Lucknow.

S.No	SIGNALLING ITEM	DTE	SPEC./DRG.NO.	PAGE
	A. BLOCK INSTRUMENT:			
1.	**BPAC:**			
	(A) Axle Counter Based (Block Proving by MUX, UAC)	SIG	Drg No. S-32001(DL) & S-32010(SL)	34
	(B) SSBPAC (DIGITAL) For Double Line and Single Line	*SIG*	*Spec No.: RDSO/SPN/175/2005 Ver-1*	*35*
	(C)Block Proving By Axle Counter (BPAC) using UFSBI (For double line and single Line)	SIG	IRS:S-105/2012(Ver.0)	36
2.	Universal Fail safe Block Interface	SIG	IRS: S-104/ 2012 Ver.0	37
3.	Double Line Block Instrument	QA	IRS:S-22/91	38
4.	Single line Block instrument (token less):			
	(A) Push Button Type Single Line tokenless Block Instrument	QA	IRS:S-32/66	39
	(B) Single Line Tokenless Block Instrument Handle type	QA	IRS: S-98/2001 (Amd..3)	40
	(C) Push Button TLBI with UFSBI	*SIG*	*IRS: S-32-66 Drawing No of S & T Workshop S.Rly Podanur-CWM01203 and with UFSBI, UFSBI SPN IRS S: 104/2012 Ver 0.*	*41*
5	Single Line Neale's Ball Token, Type 'A'	QA	Drg No. SA-20701& RDSO/SPN/114/91	42
6	**Block Bell Equipment :**			
	(A) Block Bell Equipment Used In 25KV AC Electrified Area	QA	IRS:TC-44/88 (Amd.1)	43
	(B) DTMF Based Block Bell And Telephone Equipment	*QA*	*RDSO/SPN/191/2005 (Ver.0)*	*44*
7	Filter Unit for Use in Conjuction With Block Instrument In 25kv, 50 Hz, Ac Traction Areas	QA	IRS:S-68/89	45
	B. CABLE:			
8	PVC Insulated Armoured, Unscreened Underground Power Cable	QA	IRS:S-63/2014 & (Rev.4.0) IS:1554 (Part-1)	46-50
9	**Signalling Indoor cable:**			
	(A) PVC Insulated Railway Signalling Indoor Single Core Cable	*QA*	*IRS:S-76/89 (Amd. 3)*	*51-53*
	(B) PVC Insulated Railway Signalling Indoor Multi Core Cable	QA	IRS:S-76/89 (Amd. 3)	54-56
10	PVC Insulated Armoured, Unscreened, Underground Railway Signaling Cable	QA	IRS:S-63/2014(Rev.4.0)	57-65
	C. COLOUR LIGHT SIGNALS:			
11	**COLOR LIGHT SIGNAL UNIT/HOUSING:**			
	(A) Multi Unit Type - Without Side Light	QA	IRS:S-26/64 DrgNo:.SA 23001 A/M (Adv.) DrgNo:.SA 23002 A/M (Adv.) DrgNo:.SA 23003 A/M (Adv.)	66-67
	(B) Shunt Signal- Position Light Type	QA	DrgNo:. SA-23840(Adv.)	68
	(C) Route Indicator Direction Type 5 Lamps Unit Arms (1 To 6 Way)	QA	IRS:S-66/84 Amd.1 & Drg No.SA-23401-06(Adv.), SA-23761(Adv.),SA- 21281	69
	(D) Non-Metallic Colour Light Signal Housings of Various Types for Railway Signalling	*QA*	*RDSO/SPN/194/2006 Rev.2.0*	*70*
12	**LED SIGNAL LAMPS:**			
	(A) LED Signal- Lighting Units for	SIG	RDSO/SPN/153/2011 Rev. 4.1	71-72

S.No	SIGNALLING ITEM	DTE	SPEC./DRG.NO.	PAGE
	Railway Signalling			
	(B) LED Signal Lamps For Main Color Light Signal For Railway Signalling	*SIG*	*RDSO/SPN/199/2010 Rev1.1*	*73-74*
13	Battery operated LED Based Flashing Tail Lamp for Railway Vehicles	QA	RDSO/SPN/200/2010 Rev-2.0	75
14	FOG PILOT ASSISTANCE SYSTEM for SAFETY (FOG PASS)	SIG	RDSO/SPN/201/2010 Ver.2.0	76
15	Fuse Auto Change Over System for Railway Signalling	QA	(Type-I/IISystem) RDSO/SPN/209/2012 Rev.2.0	77-78
	D. ELECTRO-MECHANICAL ITEMS:			
16	Circuit Controller (Modified Design) Lever and Arm, DW Lever Circuit Controller (Rotary Type)	QA	Drg No.SA20245, 46,66,67, 76,77,86,87 Drg.No. SA-22401, 420, 430 & 440	79
17	Electric Point & Lock Detector	QA	IRS:S-49/74 (Amd.1) Drg.No.SA-23331, 32,33(Adv.)	80
18	Electric Key Transmitter	QA	IRS:S-21/2001 & Drg. No. SA-22601 (Alt 4)	81
19	Electric Point Machine (Non-Trailable Type)	QA	IRS:S-24/2002 (Amd.- 1)	82-83
20	Motors For Electric Point Machine	QA	IRS:S-37/82 (Amd. 3) with Drg No. S-10910	84-85
	E. FUSES, FUSE BLOCK & TERMINALS BLOCK:			
21	Non Deteriorating Type of Low Voltage Electric Fuses For Railway Signalling	QA	IRS:S-78/92	86
22	120/160/200 Way TAG Blocks For Signalling Installations	QA	IRS:S-77/2006 (Rev.1) with Drg.No.SA-24751,52,53	87
23	**TERMINAL/FUSE BLOCKS:**			
	(A) ARA Terminal Blocks And Fuse Blocks- Made of PBT/Polycarbonate	*QA*	*IRS: S-75/2006 (Rev.2) & Drg.SA-23741A(Alt.4), SA23745(Alt.5) ,SA-23746, SA-23748(Alt.4), SA-23756(Alt.3)*	*88-89*
	(B) Multiway Isolating Terminal Blocks (Barrier Type) For Signalling Installations	QA	IRS:S-79/92 (Amd.2) & DRG No. SA-24811(Alt.2) & SA-24812(Alt.2)	90
	(C) Modular Terminal Blocks, Fuse Terminal Blocks & Miniature fuse link of international standard for Railway signaling	SIG	RDSO/SPN/189/2004 Rev.2.0	91-92
	F. POWER SUPPLY EQUIPMENTS:			
24	**BATTERY CHARGER FOR S&T:**			
	(A) Battery Charger For Railway S&T Installations	QA	IRS:S-86/2000(Amd. 4)	93-94
	(B) Track Feed Battery Charger	QA	IRS: S-89/2013 Ver.1.0	95-96
	(C) Valve Regulated (Sealed) Lead Acid Stationary Battery Charger for Railway S&T Installations	*QA*	*IRS:S-93/96(B) (Amd. 1)*	*97*
	(D) Transformer-Rectifier Set For Railway S&T Installations	QA	IRS:S-91/2014 Ver 1.0	98
25	SITEL' Primary Cells (Dry, Lachlanche Type) For Railway S&T Installations	QA	IRS:S-95/96 (Amd. 1)	99
26	**SECONDARY BATTERY /CELLS FOR S&T:**			
	(A) Low Maintenance Lead Acid	*QA*	*IRS:S-88/2004*	*100-102*

S.No	SIGNALLING ITEM	DTE	SPEC./DRG.NO.	PAGE
	Stationary Secondry Cells For S&T Instalations			
	(B) Valve Regulated (Sealed) Lead Acid Stationary Battery For Railway S&T Installations	QA	IRS:S-93/96(A) (Amd. 1)	103-104
27	TRANSFORMER 230/110 V 1KVA to 5KVA	QA	IRS:S-72/88 (Amd.2)	105-106
28	DC-DC Converter For Railway S&T Instalations	QA	IRS:S–96/2000	107
29	Inverter For Railway Signaling Installations For 'On- Line' Applications	QA	IRS:S-82/92 (Amd. 2)	108
30	Ferro Resonant Type Automatic AC Voltage Regulator For Railway signalling Installations	QA	IRS:S-74/89 (Amd. 6)	109
31	SMPS Based Integrated Power Supply (IPS)	QA	RDSO/SPN/165/2012 (Ver.3.0)	110
32	Earth Leakage Detector	QA	RDSO/SPN/256/2002	111
33	Code of practice for earthing and bonding system for signaling equipment	SIG	RDSO/SPN/197, Ver.1.0	112
	G. RELAYS			
34	**RELAYS (METAL TO CARBON) :**			
	(A) RELAYS -- Universal Plug-in type AC Lamp Proving Relay (M-to-C Contact) for LED Signal Lamp	QA	BRS:941A STS/E/RELAYS/AC LIT LED SIGNAL/09-2002 , Amdt.-1	113-114
	(B) Relays - 'Q' Series Neutral Line (ACI & NON-ACI)	*QA*	*BRS:930 & BRS:931A*	*115-118*
	(C) Relays – Plug in Type, Track Relay 9 & 4 Ohm (ACI & Non-ACI)	QA	BRS: 938A, 939A, 966 & Appendix F2	119-121
	(D) Relays – Special Type (Metal-to-Carbon)	QA	BRS: 930, 931A, 932A, 933A, 934A, 935A, 937A, 943, 960 & RDSO/SPN/84 ver.2.0	122-126
35	**RELAYS (METAL TO METAL) :**			
	(A) Relays - Neutral Line (Metal-to-Metal Contact) , (ACI & Non-ACI)	QA	IRS:S-46 & firm'sspecn.	127-128
	(B) Relays – Special Type (Metal to Metal)	QA	IRS:S-46 & Firm's Spec	129-130
	(C) Relay – Metal to Metal 110V AC LED ECR for LED Signal Lamp	QA	IRS:S-46 & STS/E/Relays/AC Lit LED Signal/09-2002 Amdt.- 1	131
	(D) Relays – Point Contactor Unit	*QA*	*IRS:S-46 & Firm's Spec*	*132*
36	Relays – 3-Position DC Polarized (Metal to Metal)	QA	IRS:S-31/80 (Amd.1)	133
37	Relay Contacts – SIG– (For'Q' series plug-in type relays only)	QA	IRS:S-67/85 (Amd.2)	134
38	Fail Safe Electronic Time Delay Device For Railway Signalling	QA	IRS:S-61/2000 (Amd.-.2)	135-136
39	Fail- safe electronic flasher device	QA	RDSO/SPN/173/2002 (Amdt-2)	137
	H. TRACK CIRCUIT EQUIPMENT:			
40	Audio Frequency Track Circuit	SIG	RDSO/SPN/146/2001	138
41	**DIGITAL AXLE COUNTER:**			
	(A) Single Section Digital Axle Counter	SIG	RDSO/SPN/177/2012 (Ver.3)	139
	(B) High Availability Single Section Digital Axle Counter	*SIG*	*RDSO/SPN/177/2012 (Ver.3)*	*140*
	(C) Multi Section Digital Axle Counter	SIG	RDSO/SPN/176/2013 Ver.-3 &Manufacturers's Spec.	141-142
42	Choke Coil for single rail track circuits on 25 KV 50 Hz AC electrified sections	QA	IRS: S-65/83 (Amdt 3)	143
43	Track Feed Resistance (Porcelain Base, Phenolic	QA	Drg No. SA-20161- 66/M	144-145

S.No	SIGNALLING ITEM	DTE	SPEC./DRG.NO.	PAGE
	Moulding Base) 7.5 Ohm, 15 Ohm, 30 Ohm			
44	**INSULATION FOR TC:**			
	(A) Nylon Insulated Joints	*QA*	*IRS:S-40/84 with Amdt.1* *Drg:Nos.SA-22101 (Alt.6) 52Kg;* *SA-22171 (Alt.2) 60Kg;* *SA-22181 (Alt.2) 60Kg(UIC)* *SA-22191 (Alt.2) 90R*	*146*
	(B) Thermoplastic Poly Urethane Insulators for railway Signalling	QA	RDSO/SPN-168/2005 Rev.2 Drg.No. SA22101,SA22171, SA22181,SA22191	147
	I. ELECTRONIC SIGNALLING EQUIPMENT:			
45	Electronic Interlocking	SIG	1. RDSO/SPN/192/2019 Ver.2.0 2. RDSO/SPN/203/2011	148-150
46	Data logger system for Railway S&T Installations	SIG	IRS:S-99/2006 (Amdt-3)	151
47	Train Collision Avoidance System (TCAS)	SIG	RDSO/SPN/196/2012 Ver.-3.2	152
48	Advanced Auxiliary Warning System (AAWS)	SIG	RDSO/SPN/213/2014 Ver.1.0	153
	J. MISCELLANEOUS SIGNALLING ITEMS:			
49	Electric Lifting Barrier	QA	RDSO/SPN/208/2012 (Ver 2.0)	154-157
50	Automatic Fire Detection & Alarm System for Signalling installations (AFDAS)	SIG	RDSO/SPN/217/2018 Ver.2.0	158
51	Power supply arrangements for level crossing gate/intermediate block working/intermediate relay hut	SIG	RDSO/SPN/215/2018 Ver 2.0	159

TELECOMMUNICATION ITEMS

S.No	TELECOMMUNICATION ITEMS	DTE	SPECN./DRG.NO.	PAGE
	A. CONTROL TELEPHONE & ASSOCIATED EQUIPMENT:			
1	4 Wire / 2 Wire TrainTraffic Control Equipment with Dual Tone Multi Frequency (DTMF) Signalling	QA	IRS TC:60/2007 Amdt.-1	161
2	Control Communication Equipment for OFC Using 2-Wire Telephones (CCEO)	TEL	RDSO/SPN/TC/66/2007 (Amdt. 3)	162
3	Emergency Control Room Equipment	QA	IRS TC:61/93 (Amdt.1 & 2)	163
4	Universal Wayside DTMF Control Telephone	QA	IRS :TC 82/2005 (Amdt.-3)	164
5	Portable control telephone			
	(A) Light Weight Portable Control Telephone (4 wire/ 2 wire)	*QA*	*IRS TC: 78/2000 (Amdt.3)*	*165*
	(B) 4-Wire/2 Wire Portable Control Telephone	QA	IRS TC: 75/99 (Amdt-4)	166
6	Way station control telephone			
	(A) 2 –Wire Way Station Control Telephone	*QA*	*IRS TC 37/97 (Amdt.2)*	*167*
	(B) 4-Wire Way Station Control Telephone	QA	IRS TC: 38/97 (Amdt.2)	168
7	**MAGNETO TELEPHONE:**			
	(A) Magneto Telephone	*QA*	*IRS TC: 36/97 (Amdt.2)*	*169*
	(B) Desk Type Electronic Magneto Telephone	QA	IRS TC:79/2000(Amdt.4)	170
8	Desk Type 2 Wire, 12 Way DTMF Telephone	QA	IRS TC 80/2000 (Amdt.3)	171
9	**POWER SUPPLY FOR TELECOM:**			
	(A) Power Supply Unit (PSU)For Telecom Installations At Way Side Stations In 25 KV Electrified Areas	QA	IRS TC: 72/97 (Amdt.1)	172
	(B) SMPS Based Power Plant For Indian Railways Telecom Equipments	QA	RDSO/SPN/TL/23/99 (Ver-4) (Amdt.1)	173-176
	(C) SMPS Based Telecom Integrated Power Supply System For Station (TIPSS)	*TEL*	*RDSO/SPN/TC/102/2013 Ver 1.0 Amendment 1*	*177*
10	Auto Dialling System For Emergency Socket	QA	IRS:S-83/2007 (Amdt.2)	178
11	**V.F. TRANSFORMERS:**			
	(A) V.F. And Signalling Transformers Used For Derivation And Termination Of Underground Telecommunication Cable Circuits	QA	IRS:TC:22/76	179
	(B) Two/Three V.F Transformers (2T/3T) For Derivationand Termination Of Underground Telecom Cable Circuit	*QA*	*IRS: TC: 76/2000 (Amd-1)*	*180*
12	Six Pin Emergency Plug And Socket	QA	IRS:TC : 42/87 (Amd .1 to 3)	181
13	Voice Data Logger/ Monitor for Control Circuits	TEL	RDSO/SPN/TC/38/2002 (Rev.1.1) (Amdt-2)	182
14	Voice Frequency Communication System For Underground Quad cable	QA	RDSO/SPN/TC/34/2002 (Ver. 4) (Amdt.-1)	183
	B. MULTIPLEXER:			
15	Primary Digital Multiplexing Equipment	QA	IRS: TC 68/2012 (Amdt.-1)	184
	C. TELECOM CABLE & ACCESSORIES:			
16	Polythene Insulated Polythene Seathed Jelly Filled Telephone Cable with Poly-AL Moisture Barrier	QA	IRS:TC- 41/97(Amd. 1 to 3)	185-186
17	**QUAD CABLES :**			
	(A) Underground Railway Jelly Filled Telecom Quad Cables For Signaling And Telecom Installations	*QA*	*IRS:TC 30/2005 (Ver.-1) (Amd. 1 to 5)*	*187-190*
	(B) 1.4 mm dia Copper Conductor 4/6 Quad Cable	QA	RDSO/SPN/TC/72/2007 (Rev.0)	191-193

			(Amdt.1 & 2)	
18	24 Fiber Armoured Optic Fiber Cable	QA	IRS:TC:55/2006 Rev-1 (Amdt. 1.1,2.0 & 3.0)	194-196
19	**TELECOM JOINTING KITS:**			
	(A) Thermo Shrink Jointing Kit For Jointing Underground Quad Cable (0.9 mm Conductor Dia.)	*QA*	*IRS: TC 77/2012 (Rev.3.0) with (Amdt.-1 to 3)*	*197*
	(B) Thermo Shrink Jointing Kit For Jointing Underground PIJF Cable	QA	RDSO/SPN/TC/57/2015 (Rev.1) Amdt-1	198
D. MISCELLANEOUS TELECOMMUNICATION ITEMS:				
S.No	**TELECOMMUNICATION ITEMS**	**DTE**	**SPECN./DRG.NO.**	**PAGE**
20	Emergency Socket Box Of FRP Material	TEL	RDSO/SPN/TC/44/2002 Ver.2, Amd- 1 to 3	199
21	**L.C. GATE COMMUNICATION SYSTEM:**			
	(A) ELECTRONIC L.C. GATE TELEPHONE SYSTEM	TEL	RDSO/SPN/TC/ 51/2011 (Rev.3.0) Amdt-1	200
	(B) Level Crossing gate control Equipment	*TEL*	*RDSO/SPN/TC/49/2003 Ver. 3.0 Rev. 1*	*201*
	(C) Level Control Gate Control &Monitoring System	TEL	RDSO/SPN/TC/49/2012 Ver. 0,Amdt.-1	202
22	Integrated Passenger Information System Consisting of train indication,coach guidance and P.C. based announcement System.	TEL	RDSO/SPN/TC/61/2015, (Rev.-4.0) Amdt.-2	203-205
23	Digital Clock with GPS Synchronization	QA	RDSO/SPN/TC/62/2008, Rev-3 (Amdt.-2)	206-207
24	VHF Based Secured Station Communication Equipment (SSCE)	TEL	RDSO/SPN/TC/73/2008 Rev 0 Amdt. -2	208

ANNEXURE-A

S.NO.	SIGNALLING ITEM	DTE	SPEC./DRG.NO.
1	Electric Lamp for Railway Signalling	QA	IRS:S-57/2005 (Rev. 4)
2	Electric Lamp Filament Switching Unit For Colour Light Signals	QA	IRS:S-100/2002 Drg No:.SA-24851 and SA-24852
3	Light Unit- Lamp Holder Unit, CLS Lamp Holder Unit (For Tripple Pole Lamp)	QA	IRS:S:75/2006 (Rev. 2) Drg.No. S-23030/M Drg No. SA-24831
4	Lenses (Glass)-Clear, Green, Red, Yellow.	QA	IRS:S-7/92 (Amd. 4)
5	Roundels- Green, Yellow & Red	QA	IRS:S-7/92 (Amd. 4)
6	Signal Colour Light – Lenses (Polycarbonate) Clear, Red ,Green.	QA	IRS:S-7/92 (Amd. 4) Drg No. S-24845
7	Elecrtic Lever Lock & Circuit Controller 200 mm stroke &(D.W.) 40 mm stroke	QA	Drg No SA 22701(Adv.) & SA-21201/M (Adv.)
8	DC IRS Post Type Electric Signal Reverser	QA	IRS:S- 19/2000 (Amd.1) Drg. No. SA22201,02,03,04,(Alt.3) SA22333,34 (Adv.)
9	Colour Light Signal Transformer	QA	IRS:S-59/77 (Amd.2)
10	Current Transformer For Lamp Proving (H, L & I Types For The Use in Controlled Signal Territories)	QA	IRS:S-62/92
11	Relays -- Plug-In Type Tractive Armature, AC Lamp Proving Relay (Metal-To-Carbon Contact) Signal Lamp (ON, OFF, ROUTE, SHUNT ECR)	QA	BRS:941A & 942
12	Relays - ECRs (Metal-To-Metal Contact) (ON, OFF, ROUTE & SHUNT aspect)	QA	IRS:S-46 & Firm's Specn.
13	Axle Counter Equipment	QA	Drg No. S-15602-04, IRS:S-42/85

(This list is valid upto 31/12/2021)

SN	Item description	Specification
1	PVC Insulated Armoured, Unscreened, Underground Railway Signaling Cable	IRS:S-63/2014(Rev.4.0)
2	Multi Section Digital Axle Counter	RDSO/SPN/176/2013 Ver.-3 &Manufacturers's Spec
3	Electronic Interlocking	1. RDSO/SPN/192/2005 Ver.1.0 2. RDSO/SPN/203/2011
4	Underground Railway Jelly Filled Telecom Quad Cables For Signaling And Telecom Installations	IRS:TC 30/2005 (Ver.-1) (Amd. 1 to 5)

(a) Existing Boards guidelines for placement of developmental orders on new sources shall be followed by Railways.

(b) Following critical item will continue to be inspected by RDSO as per instruction contained in Board's letter No.74/RS(G)/379/2Pt. dated 4/3/91 and 18/6/91:-

i. All types of signalling relays;
ii. Block instruments;
iii. Axle counter equipments;
iv. Signal machines;
v. Point machines;
vi. Colour light signal transformers
vii. Electrical signal lamps;
viii. Voltage stabilisers and other power supply equipment.
ix. Electric signal reversers;
x. Signal roundels and lenses;
xi. Electric lever lock and circuit controller.
xii. Circuit controller;
xiii. Electric key transmitter;
xiv. Fuses, Fuse Block & Terminal blocks (PBT Type);
xv. Electric Point and lock detector

SIGNALLING WORK

1.0 DESIGN CRITERIA

Design criteria for the Signaling systems detailed in Indian Railway Standard Specification IRS-S-36/87 with latest amendments for the Relay interlocking systems & Indian Railway Signal Engineering Manual (IRSEM) shall be applicable. For the Telecommunication system the criteria detailed in Indian Railway Telecommunication manual shall be applied. The requirements specified for sections provided with 25KV AC traction will be complied with both for signaling and telecommunication systems.

2.0 CABLE LAYLING

2.1 CABLE PLAN:
Cable plan with distribution chart for each cable shall be prepared for each station by the contractor leaving adequate spare conductors in each cable as laid down in Para 15.3.2 of chapter XV of pt.II SEM i.e. 20% of working conductors on each cable shall be left spare up to outer most points and 10% beyond outer most points. A distance of approximately 10 cm. must be maintained between Telecommunication cable and Signaling cables. The Signaling cables must be separated from Power cables by a row of bricks between them.

2.2 CABLE TRENCH:
Excavation of cable trench shall be made in all kinds of soils including clearing roots of trees, rocks etc. to a depth of 1.0 M and to a width of not less than 0.35 M provide proper protection as required by Railways while crossing Power cables, pipe lines etc. The bottom of the Trench shall be leveled and got rid of any sharp materials. Trenches shall be straight as far as possible and steep angles shall be avoided. Alignment of the Main cable route as well as track/road crossings will be indicated in the Cable layout Plan.

(a) Signalling/Power cables shall be laid as close to the track as possible in the station limit but not less than 3 m from the nearest track center. The cable track separation distance both within station limits and in the block section generally not to exceed 6 m. However outside the station limits, the cables should generally be laid at not less than 5.5 m from the center or the nearest track.
(b) It is desirable that the excavation of trenches is not done in long lengths and does not remain uncovered overnight. It is preferable that trenches are dug, cable laid and refilling done on the same day.
(c) Wherever if rock formation is experienced and trenching cannot be done to a depth of 1m, the trench shall be dug as far as possible and protective measures taken to avoid damages of cable as decided by site Engineer. However, the minimum depth shall not be less than 300 mm for laying RCC pipes in hard moorum. Whenever rocky soil is experienced, concreting has to be done for a depth of 150 mm after laying the cables to protect them.
(d) During excavation of the trenches, the earth should not be thrown on the ballast. The earth should be thrown by the side of the trenches, away from the track. Complete excavated earth shall be back filled in the trench after laying the cable and well rammed.
(e) Wherever Power Cables are to be laid along with other cables bricks are to be laid lengthwise approximately, five bricks per meter for separating Power Cables from other Signaling Cables.

2.3 Spreading of river sand in the excavated cable trench to a depth of 75mm and after laying of underground Signaling cables/Power cable as per the cable plan covering the cable, with river sand to a depth of 75mm. The river sand shall be spread in the cable trench in the station section.
2.4 Before the cables are laid, a visual inspection of cable shall be made and it shall be tested for insulation and continuity of cores. The insulation resistance of new cable shall not be below 500 Mega Ohms per KM at 20 degrees Celsius.

If there is wide disparity between insulation of different conductors, the conditions of the cable should be thoroughly checked before permitting its use. Bedding and armouring shall be inspected to see that there has been no damage during transit or in storage. In case where the wheels are not available or the area is not convenient for rolling the wheels along with route, the drum shall be mounted on the axle at one end of trench and cable paved out. It should be carried out by adequate number of men ensuring that the insulation of the cable is not damaged and no kink/twist is formed. In no case shall the drum be rolled on the road for laying of cables and the cable dragged on the ground for laying purposes. The cables shall be laid gently into the trench and not thrown out under any circumstances. Before laying of cable in the trench, a visual inspection shall be adequate for any damage or defect throughout its length.

Normally, cable laying should be commenced only after the Relay room and cable termination box on the route at the respective stations are ready, and the cable should be duly terminated at the Relay room/Location Boxes, immediately after the cables are laid. However, if for any reasons the cables are to be laid in advance, special care should be taken to ensure that the coiled cable near the relay room/Location Box is fully protected before and during final termination. The coiled cable should be fully covered with a layer of bricks in its entire length and provided with adequate number of cable markers. On no occasion the ends of the cable should be left unprotected. The cable ends shall be sealed with cable sealing compound. All the cable terminals shall be written describing the function.

2.5 At each end of the Main cable/Tail cable/Power cables an extra coil length of 5 m should be kept.

2.6 At the time of commissioning of cables, the insulation values of the cable should again be

checked and the value obtained shall not be below 500 mega Ohms per KM at 20 degree C. If there is wide disparity between insulation of different conductors, the conditions of the cable should be thoroughly checked before permitting its use. The reading shall be recorded in the register for all cables.

2.7 The Contractor thereafter shall supply the completion cable layout/termination plan andcable route plan showing the distance of cables from the nearest track centre at every 30 M interval and location of Location boxes. The distance of location box from nearest track centre shall be indicated.

2.8 Contractor shall be fully responsible for making necessary preventive arrangements to avoid theft/damage to cables, during construction period and also upto handing over of station after commissioning.

3.0 TRACK/ROAD CROSSINGS

Wherever Signaling / Telecom cable has to cross the track / road, it shall be ensured that:

- The cable crosses the track/road at right angles.
- The cable normally does not cross in between or inside points and crossings.
- The track/road crossings to be carried out as per the drawing no. RITES/SIG/GEN/028-98.

- The work includes removal of ballast, cutting of trench across track/road at the places indicated by the Site Engineer and covering the trenches after placing DWC/HDPE/G.I pipe/pipes in position.
- DWC/HDPE/G.I pipe/pipes 100/150 mm inner dia shall be provided for track/road crossings.
- Before any track/road crossing permission to be obtained from concern authority.

For each track crossings, DWC/HDPE/G.I with collar shall be provided. For each road crossing, required number of DWC/HDPE/G.I with collar shall be provided depending upon the width of the road.

4 FOUNDATIONS

4.1 The top level of the foundation shall be in level with the existing rail level. The proportion of cement, sand, ballast shall be in the proportion of 1:3:6 for casting foundations for signals, location boxes, and the proportion will be cured for a period not less than 7 days.

4.2 Fine aggregate must consist of sand, stone ballast not exceeding 40mm x 40mm size and cement. The sand and ballast must be clean and free from soil, clay, shells, soft or flaky materials or any vegetable. Ballast must be washed when necessary to ensure cleanliness.

4.3 Sand used must be tidal river sand and must be free from any salts.

4.4 Water used for mixing must be clean and free from any oil, alkali, and acid.

4.5 Materials for concrete must be carefully and accurately measured for every batch.

4.6 Mixing must be done in a mixing trough or a M.S. Sheet which should not be more thanhalf full at the time of mixing. Two men shall use square ended shovels and not phowrahs. Water must be added by pouring water must be continuous until all materials and water is thoroughly mixed and uniformly combined.

4.7 When batch if fully mixed, it must be used without any delay. The aggregate shall bedeposited in uniform layer not exceeding 15 cms. Tamping and spreading of each layer tobe done as to cause it to settle thoroughly in the form and produce a dense mass.

4.8 Forms must be drenched with water before the concrete is placed against them and mustnot be removed in less than 36 hours afterwards.

4.9 A template for each foundation should be prepared suiting the holes in the base of thelocation box or signal post (for which foundation is cast) in order to hold the anchor bolts inposition till the foundation is cured. The template shall be removed before the top of thefoundation is given fine finishing.

4.10 The exterior surface of the foundation should be finely finished leaving 4 cms. of threadportion of the anchor bolt free to enable erection of signal post or location boxes. Allfoundations shall be cast under the direct supervision of the Site Engineer of the work.Curing must be done for all foundation for not less than 7 days.

5.0 LOCATION BOX/ APPARATUS CASE

5.1 The work consists of pit excavation, casting foundations with bolts of adequate sizehaving cement concrete of ratio of 1: 3: 6 with stone ballast of 40 mm size. The position ofLocation Boxes will be finalized by the Site Engineer. It shall be fixed taking care that staffworking on location boxes does not in danger from running train.

5.2 All Location Boxes/safety battery boxes shall be erected on concrete foundation andplumbed. It should be clear of infringement when the doors kept open perpendicular to thetrack. All foundations shall be plastered on all sides and earth work shall be made upto therequired level. All the Location Box/battery boxes used shall be painted on inner side withwhite paint before fixing the shelf planks and terminal board after a primary coating withred oxide and with Aluminum paint on outer side after installation at site.

5.3 Teak Wood planks of 20 to 25 mm thick/HYLAM SHEET to be used and planned for fixing ARATerminal/fuse block. Wood screws of proper size shall be used. Size of terminal boardsand shelf planks shall be finalized by Railways Site Engineer. Two holes on either side ofterminal/fuse block shall be made if required for carrying out wiring termination. Shelfplank be securely fixed in level on suitable M.S. angle brackets. Wood polish/varnish ofgood quality shall be applied before fixing terminal/gadgets. In place of teak wood thick10mm Hylam sheet of P-3 grade may also be used.

5.4 The underground Signalling cable shall be taken into the Location Box/battery boxes andproperly secured by wooden clamps/cable gland plates.

5.5 The cables shall be neatly skinned, bunched and terminated. All cores of cable shall beterminated on the terminal board at locations and in Relay rack at the required places inthe order as approved by Site Engineer. All the power cables (Copper) shall beprovided with copper lugs using crimping tool.

5.6 All Location Boxes shall be provided with 'E' type lock arrangements on both thedoors as per instructions at site. Contractor shall procure material and fabricate for fixingof 'E' type lock if such provision did not exist on the Location.

5.7 After all the Signaling cables are taken inside the Location Box/battery box the sideopening shall be closed with masonry work and plastered. The inner side is then filled withsand and finally the bottom is sealed with sealing compound.

5.8 The armours of all the cables and Location Box/battery box shall be earthed Excavation ofa pit at a given location on natural soil, fixing earth pipe covering the same with a mixtureof 2 Kg. Of charcoal, 2 kg of common salt an earth. This includes brick masonry aroundthe earth. G.I. pipe of size 50mm x 3.5 M with 12mm dia holes on the sides at intervals of300mm. If more than one Location boxes are grouped at a place, one earth shall beprovided for each Location box.

5.9 The earth resistance shall not be more than 10 Ohms. Earth resistance and date are to bepainted on earth pit.

5.10 Track Relays, Line Relays, Point Contractors, Overload Relays, transformers, Bty.chargers, rectifiers, charged secondary cells, track feed resistance, EKT, telephone plugs etc. shall be fixed neatly in the Location Box as required. The wiring shall be carried out ina neat manner with 3/0.75mm or16x02 sq.mm or 7x0.75 sq.mm PVC copper wires or by 1 x 1.5 mm cable conductor andterminated as required, bunched and tested. The relays wherever fixed shall be fixed in such a manner that they cannot be easily removed or tilted. Details of cable terminations andwiring particulars shall be painted inside the Location Boxes door in addition todocumentation. Contractor shall procure and fabricate M.S. flats/angle for relay fixing, inside Location Box. The design of such fabrication will be issued by Site Engineer. Relayfixing arrangements shall be firm and rigid to avoid any chance of vibration due to trainmovements.

5.11 All electrical equipment wherever provided shall be earthed. Description of equipment,relay etc. shall be neatly painted inside the Location Boxes door. All the internal wiringshall be tested from Point to point in full, jointly by contractors authorized Engineer andSite Engineer/ Supervisor.

5.12 Charged secondary cells if installed inside Location Boxes, shall be fixed firmly leavingworking space for taking Specific Gravity reading and distilled water topping. Anti-corrosive black paint to be coated inside the Location Box. Additional ventilationarrangements shall be made. The date of installation, capacity and serial number shall bepainted on each cell and the inner side of the door. The record shall be maintained in aproper format for each battery set as per railways laid down practice.

5.13 Battery links (lead) with suitable bolts and nuts shall be used for connecting cells.Petroleum jelly is to be applied on terminals immediately after connection. The specificgravity and voltage reading shall be recorded in a separate register and handed over toSite Engineer duly signed.

6.0 SIGNALS

6.1 The work includes excavation of pits and casting of Signal foundations, the exactposition/location of signals will be indicated/decided by the site Engineer.

6.2 Foundation for Signal post should be of cement concrete in the ratio of 1: 3: 6 usingstone ballast of 40 x 40mm size to be cast at location shown by Site Engineer. Thefoundations are to be plastered in all sides.

6.3 Signal pole shall be securely fixed to surface base and erected on signal foundation andplumbed. The gap between the signal pole and surface base shall be filled up with lead wool or any other approved substance to avoid tilting. Multi-unit Colour Light Signal up to2/3/4 aspect shall be

properly mounted on Signal post with or without route indicator. Soon after installation, the pole shall be painted with Aluminum/white enamel aftergiving a coat of primer and the Signal unit shall also be painted as per the Standard practice.

6.4 Wherever Route indicator Junction type is to be erected, it shall be mounted on the topof the Signal pole and a large off set bracket shall be fixed with 'U' Bolts of 20 mm dia 2Nos. on the Signal pole for mounting multi-unit Colour Light Signal. A 21.5mm throughhole shall be drilled on pole just below the offset bracket and a through bolt provided toprevent the offset bracket from sliding down. The tail cable shall be first terminated onthe route indicator and separate wiring (PVC 3/0.75 copper) shall be run to Colour LightMulti unit Signal from Route indicator.

6.5 To take the wires into the Multi unit, a vertical slot of not more than 25mm x 37mm in sizeshall be made on the Signal pole. Suitable protection shall be provided on the slottedpole before cable is taken through it and care shall be taken that no damage to insulationof tail cable is caused.

6.6 Signal units door shall be locked using Universal locks.

6.7 Necessary earthwork shall be made for each signal as required by Railways. The cablesare to be taken through the pole to the unit without damaging the insulation and Armourthen skinned and terminated.

6.8 All the signal units are to be wired as per approved practice of RITES. The wiring is tobe tested jointly.

6.9 The signal post shall be properly plumbed and fitted with ladder having a platform andguarding on the top. Necessary ladder supports as required shall be provided. All thesignal posts and signals shall be installed clear of infringements (i.e. 2.36 Mts. from thecentral line of the nearest track. Extra clearance to be catered for, to commensurate withthe degree of curvature, if the, signal to be installed is situated on the curve). Markersand number plates shall be fixed wherever necessary as per Signal Interlocking Planusing suitable clamps. Signal No. has to be painted on the "Number plate" as well as onthe door outside. All fittings are to be tightened properly. Signal unit shall be lookedproperly. The back cover of the signal shall be crossed by white lines (X).

6.10 All the signals shall be provided with wire mesh.

7.0 **TRACK CIRCUITS**

7.1 The work includes bonding of rail joints which shall be made with 8 SWG soft solid wire, 7.2mm holes are to be drilled close to fish plates on the web of rail and the bond wiresare fixed by driving channel bond pin, tightly. In point track circuit parallel jumpers bondwires/cables shall be provided as required by the Railways.

7.2 Two TLJ boxes one at track feed end and another at relay end shall be fixed clear ofinfringement and the respective track circuit tail cable 2 x 2.5 Sq.mm PVC copper conductor from the Location Box shall be terminated. In case of point zone track circuit, extra TLJB required for jumper cable.The connection from the TLJ boxes to the rail should be through the solid G.I. soft wire 8 SWG/Track jumpers which should be fixed to the Rail by channel Bond pin both at feed and relay ends. The G.I. wire from TLJ boxes to sleepers should be covered with suitable PVC coloured sleeve and there uponneatly clipped on the sleepers to prevent shorting with rails. Insulations/grommets-PVCshall is provided on TLJ box to prevent G.I. wire earthing. Double lead

wires shall beprovided both of feed and relay ends.

7.3 All TLJ boxes shall be painted and track circuits shall be neatly numbered as requiredby Railways.

7.4 Rail joint insulation RDSO type shall be provided with long bolts and nuts at placesmarked by Railways. The required long bolts and nuts will be supplied by Railways.Every rail joint insulation shall be tested jointly after installation. Wherever point trackcircuit is involved, the gauge/crossing tie plates/Stretcher bars and switch extensionpieces shall be insulated. Only non-insulated gauge tie plate/crossing plate/leading andfollowing stretchers for the above will be supplied by the Railways. Contractor shallprocure and fix suitable MS flat 10mm. Thick of required size and drill suitable holes bothin leading/following stretchers and MS flat for providing stretcher insulation. Contractorshall procure and provide proper size bolts and nuts, spring washers to keep firm theinsulation joint against vibration. Insulation shall be provided correctly and tested jointly.After providing insulation, it should be inserted in the presence of Railway representativeonly. The switch extension pieces/'D' clamp fittings also should be insulated. Thecontractor shall supply all insulations as per Schedule.

7.5 Polarity bonding in point zone track circuit in duplicate shall be provided for each point trackusing 8 SWG G.I. soft wire insulated/track jumperand clipped to sleeper.

7.6 After completing the installation of track circuit, it shall be energized, tested, adjusted andreadings recorded in a register/track circuit history cards. The bonding and jumping planshall be prepared for each track circuit.

7.7 The additional work like skimming of fish plates, insulation of fish plate holes etc. required in connection with provision or RDSO type insulation Joint for track circuits shallbe done by contractor. The insulation provision shall not be required where glued jointsare supplied by Civil Engineers for Track Circuit.

8.0 CONTROL PANEL – Not Applicable

9.0 CABLE TERMINATION RACK:

9.1 Cable termination racks shall be erected in the relay room at the required location asshown by the Engineer with suitable foundation bolts and cement concreted. The cabletermination racks shall be painted soon after installation before cable termination work istaken up.Suitable cable ducts wherever required shall be provided to bring all outsides cables tothe termination rack. All the cables are to be neatly skinned, fixed on the cable bracketand terminate in order. The cable armours and the rack should be earthed. Internalwiring and termination particulars are to be written with paint.

9.2 6Way/1Way/WAGO terminal blocks are to be fixed on suitable 12 mm thick Hylum sheet, which are fitted to the cable termination racks and held rigidly by machined screws. The number of 6Way/1Way/WAGO terminals is to be painted serially on the C.T Rack and details of termination are Painted on Decolam/Hylam sheet and fixed in the relay rack.

9.3 All the cables shall be identified by punched labels tied on each cable. Paintedcable termination index board shall be fixed in the relay room showing the terminalnumbers circuit wise. As made

terminal particulars shall be prepared in linen/ polyestertracing signed and handed over to the Railways. It is pointed out that the panel wiringshall be as route setting type and therefore the planning of the work maybe done accordingly.

10.0 WIRING:

10.1 The equipment are to be wired in relay room, Cabin Master's Office, power supplyarrangements, location box, CT box, battery box and in other locations as per circuitdiagram. These circuit diagrams shall be prepared and submitted by contractor inadvance for approval. The two copies of each Wiring Diagram shall be checked by Engineer and one approved copy shall be returned to contractor for necessary carrying out the work.

10.2 Contact numbering for the relays shall be made by the contractor as per the approvedcircuit diagram issued by the Engineer and type of relay proposed to be used on theinstallation.

10.3 The wiring between the terminal board of the panel and the unwired tag block on therelay rack is to be carried out using multi-core cables (40 cores or 60 cores) 0.63mm/1.0mmdia annealed lined copper wire to IS-694. The wiring on the Q series relay rack is tobe carried out by 16/0.2sq.mm dia single core multi strand flexible A.T. copper wire toIS.694.

10.4 Soldering at the tag block terminals shall made using good quality solder and flux (60:40).Care must be taken to prevent dropping of excessive solder from terminal therebycausing failure/unwanted connection or short by fusing of PVC insulation in row below it.It is advisable to raise the wires by mechanical means and temporarily interposing awooden or plastic sheet between the adjacent rows while soldering, to collect theexcessive solder that may be dropping out.

10.5 After testing, the loose wires on the cable ladder shall be neatly bunched and laced withtwine black. The contractor shall adopt suitable Colour code for wiring as required bythe Railway's representative. Spare conductors to an extent of 10% are to be providedon the interconnecting wire runs for future developments.

10.6 Colour code for wiring as required by the Railway's representative. Spare conductors’ toan extent of 10% are to be provided on the interconnecting wire runs for futuredevelopments.

10.7 Various supplies associated with Signaling viz., 110V AC, 110V DC, 24V DC, 12/24VAC and 12/24V DC flashing are to be brought out to the relay/equipment room as perinstructions. Necessary measuring instruments are to be mounted on the Hylam sheet10mm thick fitted to the 'K1' relay rack with suitable switches and HRC fuses.

10.8 The incoming cables to the relay room are to be neatly arranged and fixed to the cablesupporting and guiding rack. The duct shall be filled with sand and plastered neatly toavoid entry of mice or reptiles.

10.8 Suitable arrangements shall be made in the relay rack for fixing condenser andresistance unit, required for slow to release feature. Letter painting shall be madeagainst each unit to identify circuit for which it is used.

10.9 All circuits shall be carefully protected by individual fuses in the relay room and locationsgrouped preferably to facilitate easy fault location. Fuses shall be so arranged that theycan be easily be placed without causing interference of fuses and the circuits in whichthey are used shall

be prepared and kept in the relay room. Fuses for all Signallingcircuits shall be of the non-deteriorating type as per RDSO specification.

11.0 LEAD ACID/LOW MAINTENANCE BATTERIES

11.1 The charged Low Maintenance Batteries shall be provided in the Battery room/ locationsas perdrawing instructions.

11.2 The battery stand shall be given anti-corrosive black paint before installation of batteryand shall be mounted on porcelain insulators. The cells shall be arranged neatly withsufficient working space for maintenance.

11.3 Cells are to be connected with suitable links sufficient to carry full load.Immediately, after connection, petroleum jelly shall be applied on battery terminals. Thewiring shall be carried out by PVC 7/1.4mm copper wire/10 Sq.mm multi strand copperwire and terminated in the terminal board in the battery room. The details of batteriesand the capacity, circuit, date of installation etc., should be painted. The specific gravityand voltage reading& rate of Charging/discharging shall be recorded for each set of cell in a separate register, along withthe guarantee certificate of the supplier and handed over to the Railways duly signed. Awooden stand for keeping Hydrometer shall be fixed in each battery room.

11.4 All connections terminations shall be tested by the contractor and after satisfying himself and then to be tested jointly with Railway's representative. Any alterations shall becarried out by the contractor before commissioning of installation. In case of IPS systemthe maintenance free batteries shall be kept as per design of the IPS equipment andRDSO specifications.

12.0 EARTHING:

Earthing shall be carried out as per provisions given in the tender schedule. The workincludes excavation of a pit at a given location on natural soil, fixing earth electrodepipe covering the same with a mixture of 2 Kg. of charcoal, 2 Kg. of common salt andearth. This includes cement concrete enclosure around the Earth Electrode as per drgNo, SIG/GEN/014-98.

Earth electrode shall be in conformity with DrgNo.SIG/GEN/013-98.

The equipments to be earthed shall be connected to the earth pipe by means of GI Wire 8 SWG by neatly soldering at equipment end and earth pipe end.Earth resistance shall be measured and painted on the earth pipe with date. The earthresistance shall be always less than 10 Ohms. For maintenance free earth, the earth resistance should be less than 2 ohms for electrical equipments & less than 1 ohm for electronics equipments.

13.0 POINT MACHINES

13.1 Electrically operated point machines IRS type shall be fitted on all points. Machinesshall be mounted on long sleepers with extended insulated gauge tie plate, clear ofinfringement as per the latest RDSO Drg. For switches of 1:12 and 1:8 ½ with 143 mmthrow electric point machine with RDSO drawing S-10800 shall be installed.

The point machine shall be installed after cleaning both inside and outside themachine, after greasing/oiling to all moving parts. The point machine shall be handoperated and detection and motor-controlling contacts shall be adjusted before takingto site. All unwanted openings shall be

covered with MS sheets.

The point machines shall be fixed with proper bolts, nuts and flat/spring washers withcorrect size of holes through the special sleepers to avoid lateral/longitudinal play, onextended insulated Gauge Tie Plate.

All point connecting rods shall be connected to point machines without any strain andwith minimum offset. All connecting rods shall be in level and correct size of bolts andnuts shall be used to avoid longitudinal play. Any changes in the connecting roddingsduring installation which necessitates welding and offset shall be carried out by theContractor at site. The welding shall be by forged smithy process. Lengthy roddingsshall be supported suitably by roller guides assembly. The point roddings shall besuitably provided with insulation joints as per track circuit requirements.

Wherever point machine is installed on wooden sleepers, all such wooden sleepers onwhich the point machine is installed shall be strapped on both sides with 50mm x20mm M.S. Strap. Necessary holes 21.5mm dia shall be drilled on the strap and20mm dia bolts and nuts shall be used for fixing to the sleepers.

Separate junction box/boxes shall be installed clear of infringement near the pointmachine and the respective cables shall be terminated. The leading in wires from theboxes shall be taken through flexible conduit PVC/GI pipes and securely fixed. Thewiring inside the point machine for motor and detector circuit shall be carried outall the electrical wiring shall be tested for insulation and earth and all connectionstightened. 3/0.75mm. PVC copper wire/cable shall be used for wiring pointmachines as per Standard practice approved by Railways.

Point machines and track lead junction boxes shall be painted and point numbers shallbe painted neatly. Wiring diagram shall be painted on the inside of the point machinecover. The point switches web shall also be written with point number.

The point machines shall be wired in such a manner so that independent operationand detection feature is obtained in point control and detection circuit. Nosuperimposed detection shall be used. The point group relay shall be of modifieddesign in light of Railway Board letter no. 2004/signal/Awr/1 dtd. 29.1.2005.

13.2 **ADJUSTMENT AND TESTING**

The point machine shall be worked by crank handle and the housing of switch rail withthe stock rail shall be checked.

The point machine shall be worked both ways with proper feed without undue frictionand working current shall be recorded.

The point detector and lock connections are adjusted in such a way that with a 1.25mm thick test piece obstruction placed between the switch and stock rail at150mm from the toe of switch, detection contacts are make& point locked. The point machinede- clutch arrangement should be properly adjusted so that it works satisfactorily undercondition of obstruction. The feed to motor shall also be disconnected after a period of 9 to 11 seconds.

The point detector and lock connections are adjusted in such a way that with a 5 mmthick test piece obstruction placed between the switch and stock rail at 150mm fromthe toe of switch.
The point does not get locked.The point detection circuit is not completed.

14.0 AXLE COUNTER

The installation of indoor/outdoor equipment must be carried out as per detailedinstructions given in installation procedure issued by RDSO or indicated by Railways.The 6 quad cable shall be laid for digital counters from relay/axle counter room to In-count and out-count detection points.

15.0 PAINTING:

All Signalling equipment shall be painted in accordance with signal engineeringmanual chapter XI. The colouring scheme shall be as per Para 1102 Annexure 'A'.

15.1 SIGNAL POSTS AND FITTINGS:

COLOUR LIGHT SIGNAL:

i) Post 'White' (Aluminum paint should be used)
ii) Fittings (Hood and Mechanism box) 'Black'

The rear of the mechanism box and background may be painted white where necessary,with the approval of Chief Signal & Telecommunication Engineer.

15.2 Electrical Signalling:

Point machines, key transmitters…. 'Black'

15.3 Junction Boxes, battery boxes and Location Boxes:

a) Junction Boxes - Post type :
i) Inside .. 'White'
ii) Outside .. 'Chocolate' (Red oxide paint should be used).
b) Junction Boxes - Ground type and Location Boxes:
i) Inside .. 'White'
ii) Outside .. 'White' (Aluminum paint should be used).

16.0 INDOOR PAINTING:

16.1 Painting the complete relay rack/cable termination rack and ladder and its fixtures and other equipment installed in the relay room as per the instructions of Site Engineerand writing all cable termination numbering particulars in rack and also on board, relaynumbering, nomenclature and other details both on relays and racks, rack numbering,particulars of condensers and fuses, resistances both at fixing boards as well as in theparticulars board, axle counter equipment details, cable numbering as cables. And anyother details requires in Relay Room for panel interlocking circuits by Site Engineer.

16.2 Painting all termination particulars in the panel, block instruments, EKT's CrankHandle box, resetting plunger box in the SM's Office/Panel room.

17.0 OUTDOOR PAINTING:

Supply of approved quality of paint and painting the following equipment in two coatsduly scrapping the rust as directed by Site Engineer at site. The colours to be used areas given in Para above.

a) Colour light signal post complete with route indicators, ladders, calling on signals,shunt signals are to be painted both insides and outside including numbering ofsignals, cable termination details as per Standard practice.

b) Location boxes both inside and outside with location number, particulars of cabletermination and other equipment kept inside the location.

c) Track circuits: Painting block joint numbers fed/relay end details on rails, TLDs,details of feed equipment with track circuit numbers and battery with track circuitnumber and date of installation.

d) Point Machine lay out complete including Point Number, Circuit Diagram insidethe cover, Junction box details Point contactor unit number in location box etc.

18.0 TESTING AND COMMISSIONING:

The different stages and procedures for testing of indoor and outdoor equipments aregiven below as guidance:

18.1 TESTING OF OUTDOOR GEARS

Testing of outdoor gears consisting of:

a) Signals
b) Motor operated points
c) Track circuits
d) Axle counters
e) LC gates (Interlocked)

18.2 TESTING AND COMMISSIONIONG OF OUTDOOR EQUIPMENTS

18.2.1 Cable meggaring and pairing up of conductors shall be done.

18.2.2 After the power cables are energised, check up each limb of the power cable whetherany earth fault exists using multimeter. Thus will indicate whether any cable conductoris faulty (i.e. earthed).

18.3 TESTING OF SIGNALS

i) Signals shall be initially tested from the LOC box to attend to minor troubles of LED Signal Units, wiring etc.

ii) All the aspects shall be checked by giving 110 V AC feed from Loc. Box and thenthe test shall be repeated by giving feed from Relay room CT rack. This test shallbe done for each aspect, route and shunt signals.

iii) Care shall be taken to ensure that no train is approaching during this test to avoidmisleading information to drive.

iv) Ensure that signal number plate is provided and unit back door is fastened andlocked properly. Door locking is very important to prevent sun rays falling on tolenses to give phantom indications.

18.4 TESTING OF TRACK CIRCUIT.

i) All the track circuits shall be energised and outgoing TPR voltage checked.
ii) Check whether cross protection wiring is done for TPR circuit.
iii) Shunt the track circuit at various places on the track and check whether the trackrelay drops every time it is shunted. (Especially near fouling marks).
iv) Check the correspondence between TR and TPR in relay room.

v) Track circuit shall be adjusted properly and readings recorded. TSR value shall be recorded.
vi) Check whether the track circuit is protecting the fouling point.
vii) Ensure that atleast one polarity rail is in series connection.
viii) Check up in put AC voltage to the track feed charges is sufficient and battery isgetting charged.

19. Electronic Interlocking: - N.A.

Design & supply of Distributed type EI system for Patherdih Washery Yard complete as per RDSO specification No. RDSO/SPN/192/2005 ver.1 or latest with amendments, as per special condition of contract and technical specifications (including all relevant and latest RDSO Technical Advisory Note (TAN) and SIP, mainly consisting of following: Central Microprocessor equipment with HOT standby architecture, Interface equipment as per RE requirement, interface suitable for one CCIP and one operator VDU, interconnecting cables etc. All types of racks for relays & EI equipments, fixture mounting arrangements and accessories necessary to make EI system functional. Video Display unit control terminal (VDU) having industrial grade fanless PC with minimum 65 inch or more LED Monitor and it's furniture (work station & revolving chair) with UPS minimum one hour backup, maintenance terminal having industrial grade fanless PC with 65 inch LED monitor and it's furniture (workstation and revolving chair) with UPS minimum one hour backup Supply, OFC connectivity (Patch Cords) as per requirement of system, all type of interface relays used in EI system and Supply, installation, wiring, testing, validation and commissioning of data logger system along with all interface equipment like a protocol converter etc. (required to connect data logger with EI system have to be supplied by contractor as per of this item) DC-DC converter, if any , required for EI (un-stabilized 230VAC or 110V DC from the battery set of IPS will be provided by railways), lightening and surge protection device (class A,B,C and D) suitable for EI as per latest RDSO spec. and TAN and other their connection with earthing arrangement (covered separately under schedule B) and accessories necessary to make EI system functional (inspection by RDSO).

NOTE: 1. Tenderer may quote any RDSO approved SSI/EI system with complete details of all module, cards and accessories etc. Along with necessary spares (refer special condition of contract) as per RDSO spec. no. RDSO/SPN/192 of 2005 with latest amendments. Please give full details of quantities (Station wise) and unit base rates item wise, the total amount of which must be equal to the given LAR of this item in separate annexure in a format given in annexure IV of vol. I of tender document the rate quoted in percentage above/at par/below for entire tender shall be applicable for the rates quoted in the annexure IV of vol. I also 2. 110V AC will be used for lightening signal lamps. 3. System design should cater to accommodate 25% additional cars as per para 6.6 of RDSO spec. 4. System must be compatible with working in RE area 5. Rate of EI system per station are assessed based on latest updated LAR. (Inspection: RDSO- Any sub item which is not inspected by RDSO will be inspected by Consignee) Per Unit= Set Station.

Supply of Documents (i) Technician / Jr. Engineer (Installation and Maintenance Level) - Manual for Installation, Testing, Commissioning and Maintenance of the System. (ii)Technician / Jr. Engineer (Installation and Maintenance Level) - Manual for Installation, Testing, Commissioning and Maintenance of the System. (iii)Higher Management Level- Functioning and System Over View. (iv) Completion Documents as per special condition of Contract. (v)Supply of documents as per Technical specification Para - 10.1 of RDSO Specification no RDSO/SPN/192/2005.

Supply of Instruments / Kits: (a) Tool kit & Measuring Instruments for technicians / Jr. Engineers for Testing, Maintenance and repair at site. (b) Instruments and Tool kits required for Trouble Shooting and Repair.

Latest TAN including earlier issued or latest Technical circular including earlier issued technical

circulars or guidelines issued by Railway Board/RDSO shall be strictly followed along with the RDSO specification as given herein the tender documents for acceptance of Centralized Electronic Interlocking by Railway.

Dual VDU to be wired as per standard Railway practice, multi core indoor copper cables, 60X0.6 mm/1 mm/CAT/OFC cables, shall be used for connections between EI andVDU.

Factory Acceptance Test (FAT) shall be conducted on EI equipment at OEM Premises before installation at site by EI manufacturer. All necessary arrangement for FAT shall be made by EI manufacturers or supplier.

20. Data Logger

Data Logger with power supply arrangements complete as per RDSO specification No. IRS-S-99/2006.(amd-3).
(1) Data logger shall have the following module:
(i) Processor module
(ii) Input module (Digital/Analog)
(iii) Signal conditioning module,
(iv) Printer 80 Col. Dot matrix.as per RDSO specification
(2). The modem suitable for connecting data logger, through both the mediums i.e. through OFC and Quad cable, to other stations and front end processor, shall be supplied along with the data logger.

21 GENERAL

21.1 Signal and interlocking fittings All signal and interlocking fittings should be inaccordance with I.R.S. Specification No.S-10 unless otherwise specified.

21.2 Sealing of equipment where required shall be done.

22.0 AS MADE DETAILS:

After commissioning of the entire installation and approval of draft completion drawingstracings of documents and plans shall be made by the contractor on tracing film toRailway Standard size and also 6 copies of the following neatly bound shall be handedover to the RITES duly signed: One CD shall also be handed over for their records.
1. Signalling Plan,
2. Track bonding diagram.
3. Cable plan.
4. Cable route plan.
5. Location Box wiring diagram, termination and cable particulars.
6. Cable termination rack particular.
7. Cable meggering readings.
8. Relays and other equipment detail (field equipment), Power supply diagram
9. Wiring diagrams, Contact analysis chart.
10. Any other drawings required by RITES in connection with this work.
11. Technical equipment pamphlets and guarantee cards.
12. Power Equipment layout diagram, Fuse Analysis Chart, Equipment Layout,
13 All telecom Drawings.

PVC insulated Armoured, unscreened, U/G Railway signalling cable

The Contractor shall supply PVC insulated unscreened cable as per RDSO specification no IRS:S-

63/2007 with amendment-2 from the RDSO approved Firm only, followed by RDSOInspection before making over the material to the consignee.

INDOOR SIGNALLING CABLE

The contractor shall supply PVC insulated and PVC sheathed cable for indoor railway signaling. Copper conductor single core, nominal area of cross section of conductor mentioned and conform to specification no. IRS: S-76/89 with latest amendment, if any; which shall be procured from RDSO approved firms only.

PVC WIRE

The contractor shall supply PVC insulated un-sheathed single core copper conductor flexiblecord in coil of 100m, conforming to specification No. IRS: S-76/89 with latest amendment, if anyand of 1100 volts grade.

(i) 16/0.2 mm PVC wire in black color having conductor nominal area of cross section being0.5 sqmm.

The material shall be procured from RDSO approved firms only, followed by RDSO inspectionbefore making over the supply to consignee.

COLOUR LIGHT SIGNAL UNIT MULTIPLE ASPECT:

The contractor shall supply Color Light Signal unit multiple aspect as mentioned in schedule asfollows:-

(i) The mounting socket (S 23005/M Alt.1 or latest) shall suit mounting on 140 mm outsidediameter type.

(I) For 2 aspect Signal unit:

The unit shall be as per RDSO Drawing No. SA 23003 A/M (Advanced) Alt.9 or latestwithout side light and without lamp, lenses, and transformer suitable for LED Signal unit.

The aspect sequence shall be red at bottom and green at top or red at bottom and yellow attop.

(II) For 3 aspect Signal unit:

The unit shall be as per RDSO Drawing No. SA 23002 A/M (Advanced) Alt.9 without side light and without lamp, lenses, and transformer suitable for LED Signal unit. The aspect sequence shall be from bottom to top red, yellow and green or yellow, green and yellow.

The material shall be procured from RDSO approved firms only, followed by RITES/consignee inspection before making over the supply to consignee.

LED BASED SIGNAL UNIT:

The contractor shall supply signal unit Light Emitting Diode based conforming to RDSOSpecification No. RDSO/SPN/153/2011 Rev.4.1or RDSO/SPN/199/2010 Rev.1.0 with latest amendment if any, along with mountingarrangement, procured from RDSO approved firms only, followed by RDSO's inspection before making over the supply to consignee.

i.Universal AC/DC Red main signal with LED aspect, with in-built current regulator.
(ii) Universal AC/DC Yellow main signal with LED aspect with in-built current regulator.
(iii) Universal AC/DC Green main signal with LED aspect, with in-built current regulator.
(iv) Route Aspect with in-built current regulator.
(v) Shunt Aspect with in-built current regulator.
(vi) Calling on with in-built current regulator.
(vii) Audio Visual Alarm unit for ASM's office.

CALLING ON SIGNAL:
The contractor shall supply Calling ON signal conforming to drawing no. SA: 24351 Alt.1 withlatest amendment, if any, but without lenses, lamps suitable for LED Signal unit and with off setbracket 3.5" dia. The Calling On signal shall be procured from RDSO approved firms only. Thematerial shall be inspected by RITES/ consignee before accepting it from the contractor.

SHUNT SIGNAL POSITION LIGHT TYPE:

(I) DEPENDENT TYPE:
Shunt signal position light type conforming to Drg. No. SA-23840/Adv. Alt.2 but without lamps and lenses suitable for LED Signal unit, with mounting socket to Drg. No. S-23844/Adv (90 mm dia) suitable for off set bracket to Drg. No.SA-23080/Adv. (90 mm dia) which is suitable for 140mm dia main signal post, complete with off set bracket to Drg. No. SA –23080 (Adv) (90 mm dia) as already mentioned.

(II) INDEPENDENT TYPE:
Shunt signal position light type conforming to Drg. No. SA – 23840/Adv. Alt.2 but without lamp and lens suitable for LED Signal unit, with mounting socket to Drg. No. S-23845/Adv (90mm dia) suitable for C.I. base 90 mm dia to Drg, No.S-23202 which is suitable for 90mm dia 1.5 meter length pipe complete with CI base and 90 mm dia 01 meter length pipe as mentioned earlier.

NOTE: Shunt signal position light shall be procured from RDSO approved firms duly inspected by RITES/ Consignee and the inspection of CI off set bracket, CI base and 90mm pipe shall be done by consignee and then material shall be handed over to consignee.

JN. ROUTE INDICATOR (DIRECTION TYPE):
The contractor shall supply Direction type Jn. Route indicator 5 Unit arm, as mentioned inSchedule, which shall be procured from RDSO approved firms only, followed by RITES/Consignee inspection, before making over the supply to consignee.

The unit shall be equipped with the following:-
(i) Mounting socket to Drawing No. S 23006/M Alt.1 for 140mm outside dia post.
The 5 unit arm shall be supplied as per Drawings mentioned below:-
(ii) 1-way as per Drg. No. SA 23401 Alt.2 with latest amendment if any and as mentioned inthe schedule.
(iii) 2-way as per Drg. No. SA 23402 Alt.2 with latest amendment if any and as mentioned inthe schedule.
(iv) 3-way as per Drg. No. SA 23403 Alt.2 with latest amendment if any and as mentioned inthe schedule.
(v) 4-way as per Drg. No. SA 23404 Alt.2 with latest amendment if any and as mentioned inthe schedule.
(vi) 5-way as per Drg. No. SA-23405 Alt.2 with latest amendment if any and as mentioned inthe schedule.
(viii) 6-way as per Drg. No.SA-23406 Alt.6 with latest amendment if any and asmentioned in the schedule and as mentioned in the schedule.

COLOUR LIGHT SIGNAL POSTS:

CLS POST 3.6 M LENGTH: The contractor shall supply tubular steel signal post for colorLight

signal of 3.6M length as per Table II of RDSO specification No. IRS: S-6/81 with latestamendment, if any, having nominal wall thickness of 4.5 mm duly inspected by RITES/Consignee, before making over the supply to consignee.

CLS POST 4.6 M LENGTH: The contractor shall supply tubular steel signal post for color lightsignal of 4.6M length as per Table II of RDSO specification No. IRS: S-6/81 with latestamendment, if any, having nominal wall thickness of 4.85 mm duly inspected by RITES/Consignee, before making over the supply to consignee.

CLS POST 5.6 M LENGTH: The contractor shall supply tubular steel signal post for color lightsignal of 5.6M length as per Table II of RDSO specification No. IRS: S-6/81 with latestamendment, if any, having nominal wall thickness of 7.0 mm duly inspected by RITES/Consignee, before making over the supply to consignee.

LADDER FOR COLOUR LIGHT SIGNALS:

The contractor shall supply the ladder complete with all accessories viz. Ladder foundation,guard rail, platform, and number plate with clamps and stay for color light signal multiple unittype as per drawings mentioned below:

(a) Platform to Drawing No. SA 23134 Alt.1= 1 No.
(b) Guard rail (complete) to Drawing No. SA 23138 Alt.1=1No.
(c) Number plate to Drawing No. S 23149 Alt.1 =1 No.
(d) Number plate clamps to Drawing No. S 23148 Alt.1 =2 Nos.
(e) Ladder foundation to Drawing No. S 203/M =1 No.
(f) Stay clamp to Drawing No. SA 2062/M =2 No.
(g) Rail Clamp to Drawing No. S 2066/M =1 No.

The ladder shall be supplied as mentioned in the Schedule:-

(i) For 3.6 m post: The ladder shall conform to IRS drawing No. SA 23150 Alt. 1 withlatest amendment if any with the following accessories:
Ladder stays (small) to Drawing No. S 23159 Alt. 1 =2 no.
Ladder section to Drawing No. SA 23151 Alt. 1 =1 No.

(ii) For 4.6m post: The ladder shall conform to IRS drawing No. SA 23153 Alt.1 with latestamendment if any with the following accessories:
Ladder stays (small) to Drawing No. S 23159 Alt. 1
Ladder section to Drawing No. SA 23154 Alt. 1

(iii) For 5.6m post: The ladder shall conform to IRS drawing No. SA 23156 Alt.1 with latestamendment if any with the following accessories:
Ladder stays (small) to Drawing No. S 23159 Alt. 1
Ladder stays (large) to Drawing No. S 23160 Alt. 1
Ladder section to Drawing No. SA 23157 Alt. 1

The contractor shall procure the above ladders form reputed firms only followed byRITES/ Consignee inspection before accepting it.

EQUIPMENT IN THE RELAY ROOMS.

• Supply, erection, testing and commissioning of the equipment shall conform to paragraphs -9, 10

&11 of IRS-S-36/87 and Section-K of chapter-VII of IRSEM 1988 edition Chapter-XXI of part II of IRSEM Sep.2001 edition.

• Supply, fixing, wiring and testing of Composite relay, Racks complete with relays, fuses, terminals in accordance with the approved design and the approved circuit diagram including all other accessories in the Relay Rooms and apparatus cases.

• Supply, fixing, wiring, termination and testing of Integrated power supply system(IPS) including battery chargers transformers, power panel, batteries etc., and their connection with relay rack,control panel etc. shall be carried out in accordance to RDSO specification no-RDSO/SPN/165/2012 ver.3.0 or latest Amend. and as per manufacturer instructions.

• Supply and fixing of cable runway to support all cables in panel/Relay/power/Battery room.

• The initial charging of batteries shall be carried out as per procedure prescribed by the manufacturer at the time of installation.

• Supply fixing wiring and co mmissioning of crank handle interlocking shall be as per approved circuit diagram both in panel room and apparatus case respectively.

• Supply fixing wiring and commissioning of magneto telephones etc.

RELAY "Q" SERIES (PLUG IN TYPE)

The contractor shall supply the following relays as per details given below:

(i) Relay "Plug in type" 12F/4B :Relay Non AC immunized plug in type style QN1 neutralline, 24 V DC, 12F/4B contact, front and back contacts metal to carbon complete withplug board, retaining clip and connectors, and conforming to Specification Nos. BRS-930A, & IRS-S-34 & IRS-S-23 (as applicable).Interlocking code shall be ABCDE.

(ii) Relay "Plug in type" 8F/8B: Relay Non AC immunized plug in type style QN1 Neutralline 24 V 8F/4B contact front and back contacts metal to carbon complete with plugboard, retaining clip and connectors conforming to Specification Nos. BRS-930A & IRSS-34 & IRS-S-23 (as applicable). Interlocking code shall be ABCDF.

(iii) Thermal Relay : Relay DC miniature plug in, neutral thermal time element tractivearmature, 24V DC, 2F/1B contacts, 120 seconds (fixed), front and back contacts metal tocarbon, hot and cold contacts metal to carbon complete with plug board, retaining clip andconnectors style QJ1 and conforming to Specification Nos. BRS-937A, IRS: S-34 andIRS: S-23 (as applicable). The interlocking code for this unit shall be AFGHK.

(iv) Track Relay 9 Ohms: Relay Non AC immunized plug in type style QTA2 neutral trackrelay 9 ohm 2F/2B contact, Front and back contacts metal to carbon complete with plugboard, retaining clip and connectors conforming to Specification Nos. BRS-938A, IRS: S-34 and IRS-S/23 (as applicable). The interlocking code for this unit shall be FGHKX,

(v) Point Contactor Relay (QBCA-1) 24 V: The contractor shall supply AC immunized,miniature, plug in type, DC biased contactor, Tractive armature 24V DC with 2 HF 4Bcontacts, heavy duty front contacts (HF) metal to carbon and back contacts metal tocarbon, complete with plug board, retaining clip and connectors etc. style QBCA-1 andconforming to specification No. BRS: 943, IRS-S-23 (as applicable).Code BCEJK.

(vi) Relay Plug in type AC LED All Aspect AC Lamp proving Relay: The contractor shallsupply Relay Plug in type AC LED All Aspect AC Lamp proving Relay unit slow releaseneutral line relay, 4F- 4B contacts front and back contacts metal to carbon, shall besuitable for working in series with the 110 V / 15 W AC LED signal complete with plugboard retaining clip and connectors. Style

QECX61, 4F-4B as per Specification No. STS/E/ Relays/AC/lit LED Signal/09-2002. IRS: S- 34, IRS: S- 23 as applicable.

The contractor shall procure the material from RDSO approved firms only followed byRDSO inspection before making over the supply to consignee.

FUSE BASE (CYLINDRICAL TYPE):
The contractor shall supply fuse base made of PBT, and conforming to drawing no. S-23748Alt.4 with latest amendment, if any, suitable to accommodate the Fuse NDT non indicative typemust conform to SPECN/DRG No. IRS: S 78/92 and be of cylindrical type.The NDT fuse base shall be procured from RDSO approved firms only, followed by RDSOinspection before making over the supply to consignee.

NDT FUSE (CYLINDRICAL TYPE):
The contractor shall supply non-deteriorating type low voltage electric fuse, non indicative typeof rated capacity mentioned in the Schedule, conforming to Specification No. IRS: S-78/92round edge 14 mm dia, 51 mm length and of cylindrical type must accommodate to fuse base made of PBT conforming to fuse base drawing no. S 23748 Alt.4 with latest amendment, if any.
The fuse shall be procured from RDSO approved firms with inspection certificate from RDSObefore making supply to consignee.The Ampere rating of fuses shall be as: - 2 Amp. /4 Amp. /10 Amp.

ARA TERMINAL BLOCK (PBT):

(i) 1-WAY:
The contractor shall supply ARA terminal block 1 way made of PBT and conforming to RDSO drawing no. S-23745 Alt.5 and to IRS Specification No. IRS: S-75/2006 Rev,2.0, with links (60 mm) to Drg. No. S-413/M after procuring this from RDSO approved firms only, followed by RDSO inspection before making over the supply to consignee.

(ii) 6- WAY:
The contractor shall supply ARA terminal block 6 way made of PBT 25mm centre as per RDSO drawing No. S-23756 Alt.3 and as per IRS Specification No. IRS: S-75/2006 Rev,2.0 with latest amendment, if any, which shall be procured from RDSO approved firms only, followed by RDSO inspection before making over the supply to consignee.

BUS BAR 50-WAY:
The contractor shall supply brass Bus Bar 50 way. The brass screws and brass washers supporting the wires shall be of adequate size and strength. The bus bar shall be inspected by the consignee before accepting it from the contractor.

EQUIPMENT IN THE RELAY ROOMS.
Supply, erection, testing and commissioning of the equipment shall conform to paragraphs-9, 10&11 of IRS-S-36/87 and Section-K of chapter-VII of IRSEM 1988 edition Chapter-XXI of partII of IRSEM Sep.2001 edition.

• Supply, fixing, wiring and testing of Composite re lay, Racks complete with relays,fuses,terminals in accordance with the approved design and the approved circuit diagramincluding all other accessories in the Relay Rooms and apparatus cases.

• Supply, fixing, wiring, termination and testing of Integrated power supply system(IPS)including battery chargers transformers, power panel, batteries etc., and their connectionwith relay rack ,control panel etc shall be carried out in accordance to RDSOspecification no-RDSO/SPN/165/2004 and as per manufacturer instructions.

• Supply and fixing of cable runway to support all c ables in panel/Relay/power/Batteryroom.

• The initial charging of batteries shall be carried out as per procedure prescribed by themanufacturer at the time of installation.

• Supply fixing wiring and commissioning of crank handle interlocking shall be as perapproved circuit diagram both in panel room and apparatus case respectively.

• Supply fixing wiring and commissioning of magneto telephones etc.

MAGNETO TELEPHONE (Desk Type):

The contractor shall supply Electronic Magneto Telephone Desk type conforming to RDSOSpecification No. IRS: TC 79/2000 Amd-4 or latest, which shall be procured from RDSO, approved firms only,followed by consignee inspection before making over the supply to consignee.

TRACK LEAD JN. BOX (TLJB):
The contractor shall supply cast iron Track Lead Jn. Box with terminals made of PBT as perspecification / Drg. No.SA-20101/M with latest amendment, if any, with GI pipe having 25 mmdia Bore pipe of length 500 mm parallel thread suitable for fixing in TLJB as per IS : 1239. Theterminal block shall be procured from RDSO approved firms. The material shall be inspected bythe consignee before being supplied to the consignee by the contractor.

TRACK FEED ADJUSTABLE RESISTANCE:

(i) TRACK FEED ADJUSTABLE RESISTANCE (15 Ohms): The contractor shall supplytrack feed adjustable resistance made of PBT, Disc type of 15 Ohms value with tapings at 1Ohm, 2 Ohms, 4 Ohms & 8 Ohms conforming to RDSO Drawing No. SA 20165/M(Adv)Alt.1 with latest amendment if any, which shall be procured from RDSO approved firmsonly, followed by RDSO inspection before making over the supply to consignee.

(ii) TRACK FEED ADJUSTABLE RESISTANCE (30 Ohms): The contractor shall supply track feed adjustable resistance made of PBT, Disc type of 30 Ohms value with tapings at 2 Ohm, 4 Ohms, 8 Ohms & 16 Ohms conforming to RDSO Drawing No. SA 20161-66/M(Adv) Alt.1 with latest amendment if any, which shall be procured from RDSO approved firms only, followed by RDSO inspection before making over the supply to consignee.

CELL SECONDARY LOW MAINTENANCE:
The contractor shall supply Secondary Cell lead acid each cell being of 2 volts and of ratedcapacity mentioned in the schedule at 10 hours rate of discharge at 27° C to an end voltage of1.85 volt. Each cell assembled with tubular positive and posted negative plates in a hard rubbercontainer, with inter cell connected float, vent plug, bolts, nuts and connecting strips.Each cell, which shall be dry and uncharged and conforming to Specification No. IS: 1651/91and RDSO specification No.: IRS: S-88/2004 with latest amendments, if any, should beaccompanied with valid type test of RDSO and life test certificate and which should be procuredfrom RDSO approved firms only, followed by

RDSO inspection before making over the supplyto consignee.

The rated capacities are as under:-
(i) 40 AH, (ii) 200 AH, (iii) 80 AH, (iv) 300 AH & (v) 120AH

BATTERY RACK:
The rack should be made of seasoned mango wood plank of proper size as per Sketch quoted and should have sufficient strength.

The rack shall be painted with black paint before supplying to the consignee. The materials shallbe inspected by the consignee before being accepted.

GALVANISED IRON PIPE:
The contractor shall supply GI pipe "ISI" marked, screwed at both ends and socket at one end and other end protected with plastic thread protectors light coated conforming to Specification Nos. IS: 1239 Pt.-I /1990 in with latest amendment if any, of standard make and of Medium grade. Both inside and outside of the pipe should be galvanized properly. The GI pipe shall be supplied to the consignee duly inspected by Consignee.

SUPPLY OF E TYPE LOCK WITH KEY:

The contractor shall supply lock E type with key of ward mentioned in the Scheduleconforming to RDSO Drg. No. SA-3376(M) (IRS) Alt.2 with latest amendment if any and forMiniature E type lock RDSO Drg. No. SA – 3474 (M) (IRS) Alt.2 with latest amendment ifany, which shall be procured from RDSO approved firms only, followed by RITES inspectionbefore supplying it to the consignee.

SUPPLY OF ELECTRIC KEY TRANSMITTER (Rotary type):

The contractor shall supply Electric Key Transmitter (HKT) (Rotary Type conforming toSpecification No. IRS: S-21/2001 and RDSO Drg. No. SA-22601 Adv Alt.4 with latest amendment if any, which shall be procured from RDSO approved firms only, followed by RDSOinspection before making over the supply to consignee.

CONDENSOR AND RESISTANCES:

The contractor shall supply condenser and resistance of rating as mentioned in the schedule ofstandard make only, such as Phillips etc. to the consignee, who will inspect the material and after finding it suitable will accept it.

ELECTRIC POINT MACHINES

Provision of electric point machines shall conform to paragraph 7 of IRS-S-36/87 andsection-K of IRSEM 1988 edition and chapter XIX of IRSEM2001 edition respectively.

Electric Lifting Barrier with hand generator:

The contractor shall supply Electric Lifting Barrier with hand generator as per RDSOspecification No-RDSO/SPN/208/2012(ver.2.0) with latest amendment if any.

SYSTEM REQUIREMENTS

Electric Lifting Barrier shall have two booms, one across the road on either side of the levelcrossing extending across the full width of the road, operated by the independent mechanism.The operation of the Electric lifting Barrier shall take place in the following sequence.

a) Open the detection contacts and simultaneously unlock the boom.
b) Move the boom.
c) Lock the boom in the full horizontal or vertical position and simultaneously close thedetection contacts.

The electric lifting barrier shall have modes of operation as given below:-
For Barriers without hand generator:-

d) With push button switch in case power supply (110VAC or 24V/110VDC) is available.
e) With direct crank handle manually on one boom at a time in case of power supply failure.

The insertion of this crank handle shall disconnect the power supply to the motor and itshall not be possible to reconnect the power supply to the motor until the hand crank iswithdrawn.

For barriers with hand generator

a) With push button switch in case power supply 24V/110V DC) is available.
b) With hand generator located in gate lodge/cabin for manual operation of both liftingbarriers simultaneously.
c) With direct crank handle on one boom at a time in case of both power supply failure andhand generator failure. The insertion of this crank handle shall disconnect the powersupply to the motor and it shall not be possible to connect the power supply to the motoruntil the hand crank is withdrawn.

Electric lifting barrier shall be so designed that it can be stopped, reversed or its movement obstructed at any point during operation without damage. During operation in reverse direction, a delay of at least 2 seconds shall be provided to avoid excessive load on motor.

The operating mechanism shall be designed to prevent movement of the lifting barrier due tovibration or any external force applied to the mechanical connections or boom.

The design of operating mechanism shall be such and the boom so balanced that in case offailure of power supply, the barrier shall remain in the position last assumed.

The operating mechanism shall include a fail-safe locking arrangement to lock the lifting barrierboom in the vertical and horizontal position.

The operating mechanism shall be so designed that if the boom is obstructed during operation, itshall stop and on removal of the obstruction shall assume the position corresponding to thecontrol apparatus, protective devices have operated.

The movement of the lifting barrier shall be so arranged to prevent any undue shock on theoperating mechanism. Suitable snubbing device, capable of operating efficiently in such a waythat boom falls gradually under all weather conditions, shall be provided.

Means shall be provided to adjust the counterbalance of the lifting barrier.

A separate fracture segment shall connect the boom with the mechanism near the pivot. Fracturesegment mounting shall be of such s design that it can be replaced easily and quickly. In case ofa mighty hit, it shall allow for the break of the segment without endangering mechanism itself.Any one section of the boom acts as fracture segment.

TECHNICAL REQUIREMENTS

The rated voltage and normal operating current/ maximum rated current of the motor of liftingbarrier shall be as follows:

a) For barriers without hand generator –
For both types of barriers, time of operation of the lifting barrier shall be less than 12 seconds atrated voltage and maximum 20 seconds at 75% of rated voltage at the motor terminals.For barriers with Hand Generator, the Hand Generator should have rating of 2 times the ratedcurrent of each barrier motor so that both barrier of a gate can be powered by 1 hand generatorsimultaneously.

LIFTING BARRIER BOOM

The boom of the barrier shall be lift in construction and extend across full width of the road. Itsstructure in successive sections of boom shall be such that it does not create any unbalance in thesystem and withstand wind pressure.

The boom of the barrier shall be made of galvanized iron sheet and octagonal in shape withtelescopic structure conforming to RDSO Drg. RDSO/S 11600.The total length of boom shall be in maximum 4 sections (depending on total length). Eachsection shall be of 2.44 m (8 ft) joined by nuts and bolts for easy replacement. The length of theboom of the lifting barrier shall be 4.88/7.32/9.76m (16/24/32 ft) as specified by the purchaser.

The boom shall be painted alternately with 300-mm bands of black and yellow color andadditionally provided with luminous stripes (Reflective tape) as per RDSO Drg. No. RDSO/S11600.The boom shall be operated using operating mechanism (pedestal) mounted on a base and aboom lock post mounted on a base shall be provided for supporting the tip of the boom inhorizontal (closed) position and locking it in this position.When the gate is closed to road traffic, clearance between the road surface and the boom shall be0.8 to 1 meter. This shall be ensured by Railway at the time of installation of Electric liftingbarrier. The road surface level shall be maintained as per Para 904- Annexure 9/1 of IRPWM.At the center of the boom, the lifting barrier shall be provided with a 600 mm dia red disc madefrom minimum 20 SWG GI sheet with a vertical stiffening “V” or “U” bend in the middle havingred reflector buttons/luminous stripes facing the road traffic.

The disc shall be marked with “STOP” sign of 50mm width in white luminous paint/stripes(orsimilar signage in language specified by purchaser).LED type boom light having terminal withbuilt- in fuse shall also be provided at the centre of boom.

Boom locking &detection arrangement-
In the boom lock post, either motorized or locking lever &solenoid based locking /unlockingarrangement for boom shall be used with provision of redundant contacts for boom lockproving/closing.

Sturdy limit switch (es) and/or magnet proximity switch (es) shall be used to achieve properfunctioning of the arrangement including operation of lock &barrier opening /closing in propersequence as well as positive boom lock proving arrangement. In case of locking lever andsolenoid based arrangement, provision of redundant magnet proximity switch shall be done.

It shall be ensured that once the boom is locked, positive boom locking proving contact does notbreak when the boom is displaced within the allowable play in the lock ass per design.

In case of failure of the positive boom lock proving, provision shall be made on the control panelfor emergency operation for clearing the related signals by using a separate redundant contact for proving closed position of the boom.

8 Way Isolating type terminal block:-

The contractor shall supply 8 Way Isolating type terminal block as per RDSO Drg. SA – 24811and IRS specification no. IRS: S-79-1992 to the consignee, which shall be procured from RDSO,approved firms only. The material will be inspected by the RDSO before accepting it.

SPECIFICATION OF DIGITAL SINGLE/ DOUBLE SECTION AXLE COUNTER:

Single Section Digital Axle Counter shall be as per RDSO specification No. RDSO/SPN/177/2012, Version – 3.0 or latest and manufacturer specification.

The Axle Counter shall also have the following Characteristics:-
i. System should be 2 out of 2 distributed evaluator type having provision of connectingvital relay at either or both end.
ii. The axle counter shall detect change of both amplitude and phase of the axle detectorreceiver signal.
iii. The Double Rail Contacts should operate at high and different frequency eliminatingany chance of noises and any other harmonic disturbances.
iv. Double Rail Contacts should be mountable with “drilled through rail web” having self –locking bolts and nuts along with teeth and groove adjustment arrangement to ensureone time adjustment with no future maintenance after installation.
v. The Rail Contacts and Track side Electronics should be immune to EMC and EMI andshould be operating satisfactorily in 25 KAC and 1500 DC Electrified traction area forlast 3 – 4 years.
vi. System must have been in use for last 3 years (minimum) and till date should have over200 detection points working satisfactorily with Indian railways.
vii. System should be true Digital Axle Counter i.e. the analog signals from the RailContacts must be processed digitally immediate at the Track side Electronics Unit itself.
viii. The Data transmission between two track side electronics should be Fault Tolerant.
ix. The vital relay can be either „metal to metal „ or „metal to carbon‟ type with wide choiceof operating Voltages viz. 24 V DC, 48 – 60 V DC.
x. System should operate at a very low and nominal power (less than 10 W). Systemshould tolerate high fluctuation of supply and have wide range of operating voltagefrom 10.8 V to 36 V DC, having in built DC – D C converter.
xi. All external terminals must have MOVs, which would make the system absolute reliablein hazard of glitches, noises and lightening.
xii. System should have simple cable requirement. Power supply should be able to be takenpreferably by a quad (paired), Vital relay by another quad. Communication should bethrough

only half a quad cable. Total cable requirement thus should leave one and halfquad free in a 4 quad cable.
xiii. Communication standard between two evaluators should be CCITT V .23, semi –duplex, 1200 bits/ s bandwidth 300……3400Hz. With 0.9 mm Dia. wire (twisted pair orstar quad), transmission distance must be upto 30 Km. The safety of data transmissionshould be ensured by safety coding in telegram. The protocol used should be suitable fortransmission over multiplexed digital transmission system (OFC or Radio) conformingEN50159 – 1.
xiv. The wheel detection should make the system independent of external trolley suppressioncircuit such that the spoke trolley wheels are not detected.
xv. System should have continuous self – diagnostic features depicting various healthstatuses by means of on board LEDs and should not require any computer baseddiagnostic systems.
xvi. The system should be configured economically, such that it can be used in doublesection (viz. IBS) continuous sections with common detection and capable ofmonitoring point zone (3 detection points one section) and can also be part of MultiSection Axle Counter.
xvii. Resetting should be always a "Preparatory Type". After applying reset first train has tosuccessfully cross over the section under caution to finally clear the section. Resetshould be possible on any one Track Side Electronics Unit and by means of reversal ofpolarity of supply voltage to the unit so that reset is always differentiated from a powerinterruption.
xviii. System should sustain temperature – 40 to +80 degree centigrade.
xix. System should be microprocessor based fault tolerant high frequency digital axlecounter with highest safety integrity level SIL4 Standard covered under CENELEChaving well proven installation worldwide including INDIA.

a) INSPECTION:
The contractor shall procure the material from RDSO approved firms only followed byRDSO inspection before making over the supply to consignee.

b) TRAINING:
The contractor shall trained two supervisors and two maintainers for installation,configuration (Hardware & software), interconnection & maintenance of SSDACsoftware and interfacing. The training should include configuration setting, testing, faultisolation, process and testing points.

The contractor shall provide complete training manuals with complete documentation.

INSTALLATION, TESTING AND COMMISSIONING OF SINGLE SECTION DIGITALAXLE COUNTER:

A. General -
1. The activity includes installation, wiring and commissioning of SSDAC.
2. The contractor shall provide well trained experienced staff of OEM (Originalequipment Manufacturer) for the installation of the SSDAC and they will work inconsultation of the Engineer at site. Necessary report regarding installation onprescribed format of RDSO be prepared & submitted by representative of OEM.
3. Installation shall be done as per guideline of manufacturer.
4. Installation of Track device, Reset Box, SSDAC in already provided half case / RelayRoom, will be done by contractor.
5. Termination of cables & wiring will be done by the contractor.
6. PVC helical pipe, HDPE pipe, Elbow, T – Joint, Flexible wires/ cables, copper lugs,Hylem sheet of size 6 mm will be supplied by the contractor.

7. The reset Relay to be kept in sealed box. The termination should be inside the box andsame way inside the reset box at the other end.
8. Push button for resetting on digital cards should be sealed and covered by metal cap.
9. Reset boxes and line verification boxes shall be standard as per RDSO drawing.
10. Indicative type surge protection device in outdoor on all input and output lines offield unit procured from RDSO recommended sources shall be supplied and Installed bycontractor.

B. Out Door Track side Electronics- EAK-
1. Sufficient clearance (350 mm) should be there between sleepers.
2. The rail height should be within vertical limit of worn out (13 mm for 60 Kg rail, 8 mmfor 52 Kg rail, 5 mm for 90 R rail.)
3. Transmitter should be installed on the outside of the rail.
4. Receiver should be installed inside of the rail.
5. Fixing accessories should be insulated from the rail and fitted properly.
6. Deflectors should be fitted at least 250 mm away from rail contacts.
7. Only Quad cable/ PIJF twisted pair telecomm. Cable is to be used between field units.
8. No wires to be paralleled for reducing resistance.
9. Near end cross talk shall be better than 55 dB for quad cable.
10. Far end cross talk shall be better than 55 db for Quad cable.
11. Earth of quad cable shall be less than one ohm.
12. Unused quad pairs should be properly dressed with insulated tape and put under theEAK.

C- OUT DOOR (Location Box):
1. Cables to be terminated in such away that neither the conductor remains exposed nor theconnectors touch the cable insulation.
2. No individual cable to be made spiral before termination.
3. Unused cables pairs shall be cut in such away that none of the conductor's remainsexposed.
4. Unused cables to be properly dressed & terminated.
5. Cable pair used for line verification box to be properly dressed and terminated to theARA terminal in such away that neither the conductors remain exposed nor theconnectors touch the cable insulation.

D- Indoor (Power Supply):
1. Power supply should be suitable for axle counter use.
2. There should not be any other load on the power supply except axle counter.
3. Minimum 10 mm2 multi- strand copper cable or 25 mm2 multi- strand aluminum cableto be used for power supply for taking 24 V DC from central location to EAK units.

E. Indoor (CT Rack):
1-All cables from CT rack relay & Reset panel to be routed neatly.

F. Indoor (Reset Box & Reset relay):
a) Reset box to be mounted properly.
b) Reset Box to be wired in such away that neither the conductors remain exposed nor theconnectors touch the cable insulation.
c) Reset Box to be sealed and no termination should be exposed outside.
d) Reset relay to be kept in sealed box. No termination should be exposed outside.

TECHNICAL SPECIFICATION OF WORKS:

LAYING OF SIGNALLING CABLES:
While laying the underground Signalling cables, the following instructions will be followed rigidly:

a) The trench has to be dug generally straight and parallel to the railway track. For this, arope should be stretched straight and marking should be done by the lime powder. Afterthat only, digging of the trench shall be started. When it is required to dig perpendicularto the track or at an angle to the track it should be generally straight in that alignment.

Location of this cable route for point/track circuits/gate location/signals etc. within thestation section/block section will be given by the engineer-in charge and cable laying hasto be done within these marks, Necessary instructions will be issued by the Engineer-in-charge of the work as and when necessary in this regard. Whenever considered necessarythe contractor will also seek instructions from the engineer-in-charge. The digging oftrench under the track shall be started by the contractor only after the requisite amount ofcables are available and the alignment of the route (for cables) under the track has beenapproved by the engineer-in-charge and advised so to the contractor.

b) The main cable trench should be as per size as mentioned in tender schedule within thestation yard except on platforms, level crossings, track crossings and for tail cables andthe cable trench outside the station yard, where it will be 120 cm deep and 30 cm wide oras per size as mentioned in tender schedule . If the depth of cable trench can not bemaintained due to some technical problems the pro-rata payment shall be made to thecontractor. The issue shall be decided by the site Engineer jointly with contractor.
Cutting smoothing of inside surface of chase in concrete or hard rock having size 80 cmdepth and 45 cm wide. This work includes laying and covering of cable laid in the chasewith (229mmx114mmx70 mm) i.e. 9 bricks per meter second class bricks placed andembedded longitudinally and plastered on the top of the bricks.

c) In the station section or in block section the cable trenching and cable laying shall bedone as per the direction of engineer -in-charge.

(i) Where only signal / power cable is to be laid: -
Where only one type of cable either signal or power cable is to be laid the trench shall be30 Cm wide and the cable is laid as per the instruction mentioned. The bricks used shall be 9 bricks per running meter of the cable trench.

(ii) Where large number of power and signal cable both are to be laid: -
Where power cable is laid along with signal cables the partition is required between thesecables for safe and proper working of signaling circuits, so the trench shall be 35 cm.wide and before laying the cable, bricks are laid in the trench in such a manner to producea partition of height 7.0 cm and 11.4 cm width between signal and power cable. After thebricks are laid for partition the cable laying work is started carefully so that the partitiondoes not break.After the cable laying is done , 'U' Clamp should be fitted at an interval of 5 metersbefore the soft soil of about 5 cm height is filled in the trench to cover the cable and thenthe bricks as shown in the drawing (one side straight and other side breadth wise) is laidin the trench. After ward the cable trench is filled with soft soil and rammed afterproviding cable markers. The earth level after filling the trench should be about 20 cm.above the original ground level over the trench.

d) The work of trenching under the tracks shall be done only under the personal supervisionof engineer-in-charge who will take necessary precautions in regard to safety of trainrunning. The trenching route shall be so decided that it does not interfere with passengersafety. The trench must not be put in open condition for a long time.

e) The contractor shall stack 2nd class bricks, well baked, at site of work in the quantity asmentioned in the schedule or as the case may be. Total number of bricks shall beinspected and passed by the site engineer, it shall be recorded in the material passingregister at site and also a certificate will be issued by him to this effect, to the contractor.

No broken brick shall be passed by the site engineer. After laying the cable, thecontractor shall arrange the safe transport of bricks for use in cable trench and no brokenbricks shall be used for laying.

f) The cable will be issued to contractor. The contractor will be responsible for loading,transporting of cables and its safe unloading at the site of work. Before taking over thecable, Contractor should test the cable and get himself satisfied that there is no defect inthe cable. Any damage to the cable during laying etc. subsequently shall entirely be theresponsibility of the contractor can realize the cost of damaged cables.

The cable in the drum shall be conducted insulation testing before bringing it at site andonly good cables shall be brought at site and test report should be given to Site engineerbefore laying. The laying is to be done by the contractor on the direction of the engineer-in-charge at site. For the safety of cable, the drum should be kept on two ends on jack,with a shaft threaded in the cable drum and the cable should be released by rolling thedrums, so that there is no twist in the cable. This aspect must be ensured by thecontractor. While pulling the cable, it should be supported by adequate number of staff atan interval of minimum 10 meters, so that the cable does not get scratched/ damaged whilepulling. The cable/ cables shall be laid on the soft ground at the bottom of the trench.After laying the cable/cables in the trench these should be first anchoring the cable with:U: clamp at an interval of 5 meters then covered with soft soil for about 50mm.

Thereafter it should be covered with 2nd class bricks breath-wise, 9 bricks per runningmeter approximately as protective covering except where pipes are provided.Thereafter the trench should be filled up with earth and rammed after providing cablemarkers to be supplied by the Railway at an interval of not more than 150 meters and atplaces where cable run changes direction along the cable route as per direction of theengineer-in-charge. The earth level after filling the trench should be about 20 cms abovethe original ground level over the trench.

g) Circular pits of suitable sizes will have to be dug near each location box/ apparatuscase/signal/points machine/track lead in. Box in route as per direction of Engineer-incharge for provision of extra cable coils approximately 4 to 5 meter length for each cableto facilitate termination, at no extra cost. The pits are also to be filled up to the groundlevel after the cable coils are properly placed in the pit.

h) Cable laying should commence only after the trench has been approved by the Engineer-in-charge. The laying of cable/cables should be started by the contractor under properdirection and supervision of engineer-in-charge as indicated in Para (a) to (g) above.
While laying the cable proper care should be taken to ensure that no twists/kinks/damagesof any type are caused in the cable so that its life is not reduced in the long run, for this, while laying the cable, the drum should be mounted on proper jacks.

i) The work of digging of trench, laying of cables and filling of trench etc., once startedshould proceed continuously in full tempo and not left incomplete. After completion ofthe work the railway engineer-in-charge should certify that the cable laying and trenchfilling is over and the work has been carried out to his full satisfaction and as per specifications.

j) While crossing, the track/tracks/level crossing/platforms/taking from overhead line polesto the ground, the cable/cables is / are to be laid through pipes as per the direction of Engineer-in-charge at site. The cable laying at culverts/bridges (except majorbridges)/underground sub-way will be done through by providing G.I. pipes of suitablesize. These pipes should be suitably fixed with clamps/ fixing arrangement. The cablelaid through pipes as mentioned above will be treated as cable laid in normal ground formeasurement purpose. Fixing arrangements for such pipe shall be provided by thecontractor at his cost. Both ends of pipe when laid on bridges/culverts & along throughpoles shall be supported by masonry work/ clamping with M.S. flat using nuts & bolts atcontractor's cost. The surface of platform / level crossing dug for cable trench shall berepaired by the contractor at his cost.

k) Cable shall not be normally taken over the track at the time of cable laying by thecontractor, as this is likely to cause accident to trains and damage to cable. If at any time,the cable has to be taken across the track, it shall be done only in the presence of theEngineer's representative and after the safety precautions have been taken.

l) The testing of cables for the insulation resistance between conductor to conductor andindividual conductor to earth, and continuity test of each core of the cable must be carriedout before and after the laying of the cable in the trench. All parameters measured mustbe recorded in tabular form by the contractor. The sample of the tabular form will besupplied by Engineer-in-charge and signed jointly by the railway engineer-in-charge andthe contractor/contractor's representative at site and submitted to Engineer – in- charge ofthe work.

m) As a result of the measurement of cable testing, if any cable or cables found defective thesame should be withdrawn from the trench and fresh cable of good quality shall be laidby the contractor at no extra labour charges and the contractor shall be responsible fordefective cable. After laying the cables, the empty drums and un-used signaling cablesshall be deposited in the stores of The Consignee. Loading, unloading and transportationof empty drums and un-used signaling cables shall be at the contractor's cost.

n) If, at any stage, it is detected that the contractor has dug the trench and laid the cables at adepth less than specified or less bricks/broken bricks have been used, the contractor shallre-dig the trench to complete depth and provide intact bricks in trench. In this process ifthe cable is damaged, the contractor shall pay the cost of cables and he shall replace thecable without delay. If any twist is detected in the cable laid, the contractors shall beresponsible to replace the cable as if it is damaged.

o) The contractor shall insert all the laid cables in the relay room at station / end locationthrough the ducts already constructed in the buildings. After these cables are terminatedon the terminal boards the ducts shall be filled with sand up to the floor level and whichthen shall be plastered in order that the rooms may have a clean look. Likewise thecontractor shall insert all the laid cables into the apparatus case/In. Box erected for thepurpose. Sand will be supplied by the Contractor.

LAYING OF G.I. PIPE/ DWC/HDPE PIPE:

The signaling/ Telecomm. cables under track crossings below the surface of platform/road, at level crossing gates, on the bridges (except major bridges) & taking from over head line poles to ground shall be laid through G I pipe/HDPE/DWC of adequate dia and length to be cut to size by the contractor. If more than one length of GI/ HDPE/DWC pipes are to be used the ends of these are to be joined together through sockets to be supplied by the Contractor. The complete length of GI/HDPE/DWC pipe carrying the cables on the bridges/culverts/sub-way/through over-head poles shall be supported at the ends by suitable masonry work/ clamping. The entire length on bridge/subway/ culvert shall be fixed by suitable clamps at an interval not exceeding one meter. To prevent theft of GI pipes on bridges etc. it shall be damaged by drilling holes into it of 7.2 mm dia and at an average distance of 30 cm.

In the entire activity, only the GI pipes/HDPE/DWC pipe and sockets shall be supplied by theContractor at the go down of The Consignee, the transportation cost for which shall be borne bythe contractor.

FABRICATION AND FIXING OF BOND WIRE:

This activity includes drilling of two holes on the either ends of the fish- plates in the web of therail. The diameter of the holes will be 7.2 mm. The machinery, plant and power supply shall bethe contractor's responsibility. After manufacturing the bond wires from the G.I. wire 8 SWGsoft the contractor will arrange fixing of the bond wires, in four holes by means of galvanizedchannel pins to be supplied by contractor. The fixing of the bond wire after the drilling of theholes should be done on the same day to avoid rusting of holes. One pair of bond wires shall befixed by means of two bond wire clips as per Drg. No. S-22167 for 90R and 52 Kg rail/ S-22168for 60 Kg rail and as per direction of site Engineer. Bond wire and Bond wire clips shall besupplied by the contractor. The whole activity at one rail joint will be treated as a set of one pair.

FABRICATION AND FIXING OF JUMPER WIRE:

The activity includes drilling of two holes of 7.2 mm dia near insulation joint in the web of therail for installing short jumpers to be terminated at the terminals of track lead junction box; crossjumpering the two rails in the track circuit zone of points by long jumpers by drilling two holesin each rail 7.2 mm dia and inserting two long jumpers in the holes; drilling two holes 7.2 mmdia each in the nose/splice rails and wing rails of crossing of the points, between the holes twocoiled jumper (about one and a half turn in each coil) shall be installed and two short jumperscoiled between switch and stock rail of the points by drilling two holes 7.2 mm dia inswitch/stock rails and so on The short jumpers to be inserted into the track lead junction box and the long jumpers for cross jumpering the two rails as stated above, shall be lead through PVC tubing 12 mm dia and of 01 mm thickness PVC tubing shall not be of re-cycled quality.The wires are to be fixed to the rails by means of galvanized channel pins; GI wires 8 SWG softand channel pins will be supplied by the contractor. The PVC tubing as stated above shall also be supplied by the contractor. The long cross jumper as stated above shall be strapped to the PRC sleeper by MS flat 25mm x 3 mm at two places. The MS flat shall be supplied by theContractor at the stores of the consignee, the transportation cost for which shall be borne by thecontractor, but the bolts and nuts for these straps shall be supplied by the contractor.The whole activity shall be undertaken as per the direction of engineer at site.

The fixing of two short jumpers for track circuit to be installed into the track lead junction box ortwo long cross jumpers as stated above or two jumpers between the switch and stock rail or twojumpers between nose/splice rails and wing rails and so on shall constitute a set of one pair

ofjumper wires.

INSTALLATION OF TRACK LEAD JN. BOX:

This activity includes the installation of track lead Jn. box and insertion of track lead cables intothe TLJB. The contractor shall install Track Lead Jn. box (RDSO Drg. No. SA 20101/M) for track circuits as per the directions of the Engineer at site. The junction Box shall be fixed to MSangle size 50mm x 50mm x 6 mm and of length 675mm by two bolts and nuts already availablein the track lead junction box., The transportation charges from the go down to the site of workwill be borne by the contractor.

The track lead junction box shall be placed vertical and the angle iron buried into the ground, the bottom of the angle iron shall be forked and around the bottom of the angle iron a concretefoundation would be casted of size 300 mm x 300mm x 300 mm. The composition of concreteshall be 1:3:6 viz. 1 part cement, 3 parts coarse sand and 6 parts fine stone chips of size 20mm.The cost of masonry materials MS angle iron size 50mm x 50mm x 6 mm. The cost of masonrymaterials MS angle iron size 50mm x 50mm x 6 mm, its transportation and drilling of two holes,cutting down to size and forking the bottom end of the angle iron shall be borne by thecontractor. The contractor after installing the TLJB shall also insert the TF/TR cable leads intothe track lead Jn. box for termination, as directed by the Engineer-at-site.

CASTING OF COLOUR LIGHT SIGNAL FOUNDATION:

The contractor shall cast the CLS foundation as per Drawing. The ratio for the cement concretemixture shall be 1 part cement: 3 parts coarse sand: 6 parts stone aggregate of size 25mm; thestone chips employed should be free from dirt. The location for the signal foundation shall be asper interlocked Signalling Plan of the station and as per the directives of the Engineer at site.
The casted foundation should be well cured. The casted foundation above the ground level shallbe cement plastered; the thickness of the cement plaster shall not be less than 13mm on all sides.The foundation shall be covered with well rammed earth above the ground level as per thedirection of the Engineer at site.

The contractor shall supply all the materials viz. foundation bolts and nuts, cement, coarse sandand stone aggregate at his own cost.

ERECTION, FITTING AND WIRING OF COLOUR LIGHT SIGNAL POST:

The activity includes the fitting of CLS unit at the top of signal post. However, for Home signals, these shall be fitted on elbow bracket 140mm dia. and on the top direction type route indicator (Jn. indicator) shall be fixed. Where necessary, shunt signal and calling on signal shall be fixed below the CLS unit and foundation of ladder base of concrete size 30 cm x 30 cm x 30 cm. The fittings shall be provided on the CLS posts of 3.6m/ 4.6m/ 5.6 m length and 140mm dia. The signal posts carrying the signal fittings shall be mounted on cast iron, CLS base. The fitting of accessories viz. conventional signal lamp or LED signal with its accessories, hoods, wire mesh guards, side screens i.e. complete fitting of CLS unit and the erection of signal post including wiring of signal unit shall be done with a high standard of workmanship and as per the instructions laid down in the Signal Engineer Manual and Schedule of Standard dimensions, always keeping in mind the safety of running trains. The whole activity shall be executed as per the directives of site Engineer.

The signal shall be provided with ladder. To ensure the rigidity of the ladder, one tie rod between

the ladder and the post for 3.6 m posts and two tie rods for 4.6m and 5.6m posts shall be provided and the base of the ladder shall be concreted of size 30 cm x 30 cm x 30 cm by a concrete mixture of cement, sand and bazari in the ratio 1: 3: 6 respectively. The signal post should be in plumb and perfect alignment and should be provided with lead wool between the CLS pole and the CLS base adequately.

The cable shall be inserted through the post up to the signal unit to a proper length to facilitatetermination of cable, if the cable is not laid the contractor shall provide a GI wire, fromfoundation to the unit in such a manner as to facilitate passing of cable for termination.
For whole activity the Contractor shall supply concreting material, bolts and nuts, cement, sand, bazari and lead wool only. All other materials such as signal posts and CLS, base, elbow bracket CLS unit, direction type route indicator (Jn. route indicator), calling on signals, ladders and tie rods shall be supplied by the Contractor from RDSO approved firms.

CASTING OF POSITION TYPE SHUNT SIGNAL FOUNDATION AND INSTALLATION OF SHUNT SIGNAL:

The contractor shall cast the shunt signal foundation. The ratio for the cement concrete mixtureshall be 1 part cement, 3 parts coarse sand and 6 parts stone aggregate of size 20mm, the stonechips employed should be free from dirt. The location for the signal foundation shall be as perinterlocked signaling plan of the station and as per the direction of the Engineer at site.The casted foundation shall be well cured. The surface above ground on all sides should beplastered by a cement sand mixture of 1:4 and of thickness 13mm all around. All the four sidesof the foundation shall be covered fully with well rammed earth above the ground level as perthe directions of the Engineer at site.
The contractor shall erect independent type shunt signal with complete fitting and CI base on already casted foundation for shunt signal keeping in mind the safety of running trains the signal should be in plumb and perfect alignment.

The cable shall be inserted through the post upto the signal unit to a proper length to facilitatetermination of cable, if the cable is not laid the contractor shall provide a GI wire, fromfoundation to the unit in such a manner as to facilitate passing of cable for termination.

INSTALLATION AND WIRING OF RELAY RACK:

The activity includes: -
(a) The installation of relay rack, fixing of relay bases and relays on relay rack provided inthe relay room at station, at end locations at every station and at gates etc. shall be doneby the contractor as per direction of site engineer. The relays shall be fixed as per relayarrangement (to be supplied by the railway) exactly in alignment. While fixing relaybases proper machined non-corrosive type brass screws and nuts and bolts as requiredshall be supplied and used by the contractor. The contractor as per relay arrangement athis own cost shall do writing of nomenclature on relays and relay bases.

(b) Wiring of relays in the relay racks and their inter-connections to CT racks and respectivepanels in the panel room along with power supply connections such as batteries, fusesetc. including arrangements for proper fixing of wiring shall be done by contractor at hisown cost. Cable termination if any for such interconnection is included in this activity.The wires will be laced by black colored Mayfair tape. The wiring shall be done strictlyin accordance with the wiring diagram of station and as per directions of the siteengineer. Prior to terminating/soldering the wire on to the

connectors (to be inserted inrelay base)/eyelets, letter and number wiring markers (ferrules) shall be inserted into thewire.

(c) Contractor at his own cost will do fabrication and supply of Hylem sheet terminationboard below the relay rack. The contractor shall supply the Hylem sheet of 6 mmthickness and the nuts and bolts for fixing the board. The contractor as per directions ofthe Engineer at site shall fix ARA terminals, condensers, resistors, series indicationtransformers etc. on this board, Suitable sized Hylem sheet board of thickness 6 mm shallalso be provided and fixed in the relay rack for lamp proving relays (ECR's) by thecontractor at his own cost.

(d) Supply and fixing of ladder for wires all along over the relay rack, CT rack and betweenthese to the wall of relay room for placing the Delton cable will be done by contractor athis own cost. The ladder shall be fixed over the relay/CT Rack by nuts and bolt/screws asper the direction of Engineer at site. The work of providing GI pipe/channel etc. fortaking Delton cable/PVC wire etc. from Relay room to panel will be done by Contractor.

The steps of the ladder land rods for supporting wires in the relay rack and CT racks shall be taped by PVC iron grip insulation tape. The supporting rods behind the CT racks shallalso be fabricated, supplied and fixed by the contractor at his own cost.

(e) Condensers, resistors, relay rack, PVC wire, series indication transformers, ARAterminals, relays with bases and connectors shall be supplied by the Railway. All othermaterials such as solder rosin core of 60:40 grade of IYRE make or other make butstrictly similar, lacing materials, copper crimping lugs Dowell's make, ladder, PVC tape,screws, bolts and nuts, Hylum sheet etc. shall be supplied by the contractor at his owncost.

(f) Provision of copper crimping lug Dowell's make of suitable sizes at all the ends of PVCwires terminated at the ARA terminals, fuses and bus bars shall be done by contractor athis own cost.

(g) Continuity test to be conducted and the report to be submitted. The contractor shall beresponsible for the proper commissioning and testing of the relay rack wiring.

(h) After completion of wiring as per wiring diagrams the contractor shall inform theengineer at site, who will conduct tests of the wiring along with the engineer ofcontractor. During the course of joint testing by the engineer, the contractor will deployhis technical staff to remove the deficiencies found, if any. The contractor shall providestaff and all the necessary assistance for conducting these tests and removing thedeficiencies found, if any.

(i) If the number of relays varies from the Scheduled quantity the payment shall be made on pro-rata basis.

CASTING OF FOUNDATION FOR SINGLE CASES/HALF CASES/ 50 WAY JN. BOXES AND THEIR INSTALLATION:

The activity includes casting of foundation for the single case, half case and 50 way JB as perSketch. The ratio of the concrete mixture should be 1 part cement: 3 parts coarse sand: 6 partsstone chips, the plastering shall be done as provided in the sketch. The foundations shall be wellcured before installation of apparatus cases.

Miniature E type locks shall be provided to the location boxes. Doors of single and half casesboxes

shall be provided with two miniature E type locks (one in the front and the other in therear side door), where a 50 way JB shall be provided with one E type lock only, in its front door,these locks shall be of ward No.41 and as per RDSO Drg. No. SA-3474/M. The apparatus casesshall be installed as per the directions of the Engineer at site. For these apparatus cases if anyearthwork is required it will be done by the contractor up to the ground level at his cost. If asituation arises when large amount of earth works (i.e. more than one cubic meter) is required for making the raised platform of soil on which the foundation is to be cast, then in that case theamount of extra earthwork done shall be paid separately. Apparatus cases installed side by sideshall be at the same height for a good look and have proper inter-spacing to facilitate properpainting.The contractor shall supply all the materials including miniature E type locks except singlecases/half cases/50 way Junction Boxes. The apparatus cases will be supplied at the stores of theconsignee, the transportation cost for which shall be borne by the contractor.

INSTALLATION OF J.B. 18 – WAY/ POINT M/C JB:

This activity includes installation of 18 way Jn. Boxes/ Point Machine JB; these shall be installedby the contractor at point's machine and at other locations as per direction of Engineer-at-site.
The pipe pedestal (riser) should be buried for the depth of 18" and fixed with masonry work. The minimum clearance from adjoining track shall be maintained as per the stipulation in theschedule of standard dimensions.

The transportation of Jn. Boxes and other items required for this activity from the stores to thesite of work shall be at the contractor's cost. Except 18 way JB and pipe pedestal (riser) all thefixing and masonry material will be supplied by the contractor at his cost. The masonry workwill be executed by the contractor at his cost. The masonry work will be done by brick work.During installation of JB at point machine the aspect of cranking of motor point must be taken inmind for this proper space for cranking must be provided.

ELECTRIC POINT MACHINES

Installation of Electric point machines shall be carried out in accordance with the drawings andprovisions in IRSEM part II para 19.28 to 19.38. Before installation of EPM on points, theprovisions on point as laid down in para 12.40 of IRSEM part II shall be fulfilled.

SUPPLY & INSTALLATION OF CABLE TERMINATION BOARD

The activity includes supply of terminal board of Hylem sheet to IS 2036 Grade P-4 of size 6mm thick for single case, half case Jn. box 50 way, station and end locations. These shall befitted with required number of ARA terminals, Balson strips, Wago terminal, fuse blocks and busbars. Similarly for fixing relay bases for installing relays, holes are to be drilled accordingly onthe angle iron frame and MS flat. An arrangement shall also be made, by the contractor to fixthe board in the single case, half case and 50 way Jn. Box by providing a 3 mm M S plate withholes and then secure it with Bolts and nuts from all sides with cases as per direction of engineerat site. ARA terminals, Balson strips, Wago terminal, fuse blocks; bus bars etc. will be suppliedby the Contractor at the go down of (Consignee), the transportation cost for which shall beborne by the contractor. Other materials for fixing will be supplied by the contractor. Nuts andbolts screws etc. required in completing the board and its fixing will be supplied by thecontractor at his cost.

The description of the terminal boards to be supplied by the contractor is as under:-

(a) Hylem sheet size 3025mm x 1200mm fixed by Mushroom GI bolts and nuts at suitableinterval on angle iron frame of section 40mm x 40mm x 5 mm for station / end locationsCT racks. The Hylem sheet must be of 6 mm thickness. The angle iron frame made ofangle iron of section 40mm x 40mm x 5 mm of size 3025mm x 1200mm shall be fabricated and supplied by the contractor. This frame shall be supported with the wall behind, by two angle iron pieces at the bottom and two angle iron pieces at the top. These angle ironpieces of section 40 mm x 40 mm x 5 mm shall be bolted to the angle iron frame at one end and the other end grouted into the wall by a cement concrete mixture of 1 part cement, 3 parts coarse sand and 6 parts stone chips.

(b) Termination board made of hylem sheet 6 mm thickness for apparatus cases will beprepared and supported with a frame of angle iron of size 25mm x 25mm x 3 mm to suitthe size of cases i.e. single case, half case, 50 way Jn. box and as per requirement anddirections of the Engineer in charge. The size of frame and hylem sheet can be adjustedfor providing the space for relays, batteries, battery charger and track feed arrangementetc. if required as per direction of Engineer-in-charge. In such cases payment for terminalboards shall be made on pro-rate basis. The wooden plank/board required for makingshelf for keeping battery, battery charger etc. shall be supplied by the railway the storesof consignee. The shelf etc. required shall be made by contractor at his own cost.

TERMINATION OF UNDER GROUND SIGNALLING CABLES/ WIRES:

The activity includes insertion of cable/ wires into relay room, Apparatus cases, end locationsetc. and termination of laid cables/wires complete as per approved circuit diagram of the stationin relay room, apparatus cases, Jn. boxes, end locations, panel board, lever lock, points machine,boot legs, electrical detectors etc. and as per direction of site Engineer.

The wires are to be laced properly and no wire is to be hung around. Lacing shall be done byMay fair black color PVC tape fitted with PVC rivets.

The Contractor, before terminating the laid cables, shall insert them into Apparatus cases, endlocations etc. after digging the cable out from the location near the Apparatus cases where thesecables have not already been inserted into the Apparatus cases. The termination activity includesoperation of cable i.e. removing outer sheath, cutting and bending of 40 mm of armour of thecable, tying of armour with copper wire (fixing of the cables by means of clamps to thetermination board in systematic layers), then operating the inner sheath, straightening the cores,lacing the conductors by black colored may-fair tapes and hooking the cable from the backthrough the holes and terminating it on terminals by providing proper loops. Matching the cablefrom one end to another as per drawing/termination chart and ensuring that no cable has beenterminated without matching the cores.

This will also be ensured after termination and testing by the contractor and giving the certificate that termination has been done as per the terminating chart/wiring diagram. The testing of cable insulation results in tabular forms is required to be submitted by the contractor with a certificate that there has been no damage during laying process. The released armours, cable sheath shall be transported and handed over to (Consignee) by the contractor at his go down. (The clamp for fixing the cable to the termination board nuts and bolts required will be supplied by the contractor).

In the 50 way JBs the termination of cable by hooking the cable from back of terminals is notpossible technically, so the cable cores shall be terminated from front side by lacing the

cableproperly by Mayfair tape.

Since the cable for termination is taken into the box through the duct provided in the foundation, so for proper alignment and lacing of the cable, wooden plank having ½" thickness and of the size of bottom of the box (either in one or two pieces) shall be provided. The cable should be taken through the holes made in the wooden plank in the alignment of the terminals fixed on the termination board.

Suitable size wooden plank of 25mm thickness shall be provided behind the CT board atstation/end location for taking out the cables through the holes in the wooden plank from ductbehind the termination board. The plank would be fixed to the two horizontal angle iron pieces at the bottom of angle iron frame of CT board, which are meant to support the CT board with the wall behind.

This activity also includes after complete termination/ wiring, writing of terminal number anddescription as per drawing on the face of the terminal board by contractor as per direction of theEngineer in charge.

TERMINATION OF UNDER GROUND POWER CABLES:

The activity includes insertion of cable into Apparatus cases, end locations etc. and terminationof laid power cables as per the direction of engineer at side at the station in Relay room,apparatus cases, Jn. Boxes, and locations etc. and as per direction of technical site engineer. Thecable cores shall be laced properly and no wire is to hang around.

The Contractor, before terminating the laid cables, shall insert them into Apparatus cases, endlocations etc. after digging the cable out from the location near the Apparatus cases where thesecables have not already been inserted into the Apparatus cases. The termination activity includesoperation of cable i.e. removing outer sheath, cutting and bending of 1 ½" of armour of thecable, typing of armour with copper wire (fixing of the cables by means of clamps to thetermination board in systematic layers) then operation the inter sheath, straightening the cores,lacing the conductors and hooking the cable from the buck through the holes and terminating iton terminals with proper size eyelets to be supplied by the contractor at his own cost, matching the cables from one end to other as per termination chart and ensuring that no cable shall beterminated without matching the cable.

This will also be ensured after termination and testing by the contractor and giving certificatethat termination has been done as per the termination chart. The testing of cable insulation results in table form is required to be submitted by the contractor with a certificate that there has been no damage during laying process. The released armours cable sheath shall be transported and handed over to the stores of (Consignee) and the transportation cost for which shall be borne by the contractor.

SUPPLY OF PAINT AND PAINTING OF S&T GEARS:

This activity includes supply of paints and painting of all the S&T gears after completeinstallation and also all the already installed gears, which includes painting inside and outside of the apparatus cases, Jn. boxes, boot legs, track lead Jn. boxes. Token pickup apparatus, all point fittings, point machines, electrical detectors, HPK locks, signal posts and ladders, CLS units, shunt signals, lifting barriers, lever locks, block instruments and panel, relay racks and CT racks etc. (all S&T gears as

laid down in IRSEM).

Outside of location boxes will be painted with aluminum paint whereas inside of the locationboxes will be painted with white (silver) paint and for black painting similarly suitable blackenamel paint shall be supplied and used by the contractor. For painting lifting barriers yellow,black and red (for disc) enamel paint and smoke gray paint for block instruments and panel shall be supplied and painted by the contractor as per direction of site engineer. All type of paint shall be ISI marked and supplied to the stores of consignee and only after the consignee inspection and approval; the paint shall be used for this purpose.

The surface of metal should be cleaned by scraping, chipping or scrubbing with brick-bats. Nochemical of any kind shall be used. Old paint if necessary should be scraped off. When there arepatches of blistering, scaling or cracking, these should be cleaned down to the steel.

Before applying the specific paint on the metal surface, it should be thoroughly cleaned, and then a coat a primer (Red Oxide) should be applied to it by the contractor. Contractor at his own cost shall supply all paints, painting materials etc.

SUPPLY AND INSTALLATION OF WARNING BOARD:

The activity includes supply of warning board and installation of post for the above warningboard. The warning board shall be installed at a station one for up direction and one for Dndirection at a place 1.4 Km from the first stop signal and as per instruction of Engineer at site.The minimum clearance from the track to be maintained as per stipulation in the Schedule ofdimension. The height of the warning board from the rail level is to be maintained andinstallation shall be as per drawing no. SA 8711(Adv)/provided with acrylic reflectors. Thefoundation of post is to be concreted by a concrete mixture (1 part Cement : 3 part coarse sand: 6parts stone chips of 20 mm) for 600 mm, complete warning board and rail/channel shall bepainted by the contractor, the supply of paints and other materials must be as per drawing.

All the materials viz. cement, sand, bazri, paint, bolts and nuts etc. shall be supplied by thecontractor.

INSTALLATION OF POWER OPERATED LIFTING BARRIER GATE WITH BOOMLOCKING ARRANGEMENT:

The contractor shall supply each and every concreting materials viz cement, coarse sand andbazri in the ratio 1:3:6. For barriers with hand generator, control panel & Hand Generator may be integrated into one unit for ease of operation & maintenance. The switches /Buttons of the control panel may be provided on the door of the hand generator unit.

The push button switches should operate respective contactors in panel which in turn shouldoperate the barrier motor/s.

Suitable circuit should be provided to cut off supply to concerned barrier motor when operatedbarrier reaches fully open or closed positions.

Suitable protective devices shall be provided to disconnect the circuit in the case of overloadingof the motor. Push button switches, selector switches having electrical & mechanical life at leastone million operations shall be used.

The Electrical Signaling and interlocking equipment should generally conform to IRSspecification no. S23.The conductor for the internal wiring shall be insulated, stranded and be ofcopper having a cross section area not less than 2.5 Sq mm and not less than three strands.The materials shall be supplied to the concerned Consignee who will accept these afterinspection and then he will issue these to the contractor as per the requirement at gate. Thetransportation cost for these materials and for the materials to be supplied at the stores ofBCCL shall be borne by the contractor.

Testing and commissioning of station:

The contractor shall deploy suitable technical staff for testing and commissioning of panel/E.I. as per the selection table, Signalling Plan and Panel Diagram by simulating conditions for outdoorgears in the relay room to the satisfaction of engineer in charge at site and for safe working ofstation. Any alteration or change required at the time of testing / commissioning in the relay /panel wiring shall also be done by the contractor at his own cost.

The activity also includes final testing for proper functioning of the out door gears e.g. trackcircuits and points, Signals, LC gates etc. as per SEM, energizing and testing of color lightsignals, and final commissioning of entire signaling arrangements for traffic use. The contractorshall first test the equipment and then jointly with Engineer in charge at site. The contractor shall provide test panel for testing at his own cost.

He will also assist at the time of opening of station for smooth working of Panel/E.I. with outdoorequipment connected.

INSTALLATION OF (EKT/HKT) ELECTRICAL KEY TRANSMITTER:-

The contractor shall install the Electrical Key transmitter at the place decided by the Engineer atsite. The following activities include the supply of material required for installation ofEKT/HKT:-
(i) Grouting 4 bolts of size 12mm x 100mm forked at one end to the wall for fixing wooden board.
(ii) Supply and installation of wooden board of size 50mm x 450mm x 25mm thick, duly frame worked to have a good look and it's fixing on wall with the help of already grouted nuts & bolts.
(iii) Cutting of wall for conducting the cable inside the wall from ground up to wooden board and plastering after wards to give the good finish.
(iv) Drilling holes in the wooden board to take out the cable for connection and fixing of HKT/EKT on the board by wooden screws.
(v) Providing underground cable from battery to HKT and from overhead lines to HKT and plastering floor wherever required. If some G.I. Pipe etc. is required for the activity, the same will be supplied by the contractor. Laying of cables has been covered by separate activity in schedule. Cutting armour and removing outer sheath of the cable and the termination of cable core in HKT/EKT at proper place.
(vi) Testing of HKT/EKT after installation for proper working and to the satisfaction of Engineer-in-charge at site.

The Contractor will provide Electrical Key transmitter/HKT only at the stores, the transportation charges from the stores to site of work shall be borne by the contractor at his own cost.

EARTHING OF LOCATION BOXES, C.T. RACKS, RELAY RACKS & EQUIPMENTS:-

The contractor shall provide earthing arrangement for location boxes, cable termination racks,relay

racks, DG sets and all other electrical equipment as per the direction of Engineer-at-site forproper/safe working of signaling installation.

The earth pipe shall be 40mm dia G.I pipe to IS - 1239/Pt I 1979 (Medium) of length 3 m(approx) in which holes of 12 mm dia shall be drilled to ensure percolation of water, one end ofthis pipe is flattened and cut to the shape of spear, with G.I wire soldered to this end internally.
The contractor shall dig by earth auger a pit of size 3 m deep and dia 350 mm. In this pitalternate layers of powdered Charcoal/Coke and salt shall be placed up to the depth of 2000 mmand rest filled with soft soil.

The earth wire which is 8 SWG soft GI wire shall be lead through the G.I. pipe. The earth wireshould be properly secured by nuts and bolts. The GI wire so taken from bottom of the pipe isthen tightened with nut/bolt already welded with earth pipe at the top. The extra length of GIwire of about 1 meter is left for providing connection by PVC wire/PVC Cable to the equipment.

A masonry boundary of size 600mmx600mmx125mm is made by brick work duly plastered togive good look and protection to GI wire and for filling water.

After the earthing is prepared the contractor will connect the concerning equipment with the help of nut & bolt and as per the direction of the Engineer-at-site. As far as possible the earth isprovided near to the watery place and no earth shall be installed near to it by 5 meter.
The contractor shall supply all the material required for this activity at his own cost to the storesof the consignee, who will inspect the material before accepting it. After passing the material bythe consignee, he will take all the material to the site of work the transportation cost for whichshall be borne by the contractor.
After the installation earth resistance should be measured, its value shall always be less than 10ohms, if otherwise; steps shall be taken by the contractor to improve it as per the direction ofEngineer in charge.

TECHNICAL SPECIFICATION OF MAINTENANCE-FREE EARTHING:

(a) Purpose:
Today, the number of installations with electronic equipment is exponentially increasingday by day and there is a need to protect these systems with proper earthing. Thisspecification of maintenance-free earth describes in detail, the components to be used andthe procedure for constructing the pit. The main purpose of using this new technique is toensure that the resistance between the earth electro and the equipment is nearly zero,consistently throughout the year.

(b) Scope:
The earth pit shall be of permanent and maintenance-free (PMF) type. The earth pit shallinclude the components, such as – earth rods, compression couplers, earth enhancementmaterial and connecting wires, earth-bus bar and all accessories. It is meant to be used forearthing for SSI, IPS, Electronic exchange, OFC equipment, Data Logger system, DigitalMicrowave and UHF system.

(c) Earth Resistance:
Acceptable earth resistance value at earth Bus bar shall be less than two ohms forelectrical installations and less than one ohm for telecom installations.

(d) Location for Earth:
Low laying closed to the building or the location box is good for locating earth electrodes. The

location can be closed to any existing water bodies or water points. Earthing rod should not be fixed on high bank or made of soil.

(e) Earth rod:
The earth rod shall have the following characteristics/specification:-
(1) 6 ft. long copper bonded steel rods, especially designed for electrical groundingand shall have a minimum dia of 17 mm.
(2) Shall be corrosive resistance.
(3) Shall be molecularly bonded with copper to high strength steel cores.
(4) Shall have a minimum copper bonding thickness of 250 microns (10 Mil).
(5) Shall have a life minimum 20 years.

(f) Earth Enhancement material:
Earth enhancement material shall be electrically conductive and non-soluble. It shall:
1 Have high conductivity in the electronic ground contact area and it shouldimprove earths absorbing power and humidity retention capability.
2 Have a resistively of less than 4.7 Ohms Mtr.
3 Be non-corrosive in nature having low water solubility (0.2% max.) but high hygroscopic and will not be eliminated by continuous treatments with water.
4 Be stable between – 600 to + 600 C temperatures.
5 Be possible to increase earth conductivity from 3 to 20 times.
6 Interact in homogenous way when applied to the earth,
7 Be suitable for any kind of electrode and all kinds of grounds of different sensitivity through the simple spill of the proper solution to the ground, which surrounds the electrodes.
8 Higher doses may be necessary for optimum result in high resistance soil orrocky area.

(g) Construction of Unit earth:
The earth pit shall be constructed as per the typical installation.
(1) A hole of 4 to 6 inch dia shall be augured to a depth of about 6 to 9 ft.
(2) Two electrodes of 6' each shall be jointed together using a compression coupler.
(3) This electrode of 12' (6 + 6) length shall be inserted into the augured hole.
(4) It will be penetrated into the soil by gently driving on the top of the rod using asledge hammer. Here natural soil is assumed to be available after about 10' so that2' of electrodes shall be inserted into the natural soil.
(5) RDSO approved earth enhancing compound 10 kg. Shall be filled into the augured hole in slurry form and the resistance is measured. This will be further deepened by adding one more earth rod if the resistance is not coming less than around 3 ohms.
(6) Remaining portion of the hole shall be covered by the soil which is taking outduring auguring.

(h) Construction of Ring earth:
The ring earth shall be constructed as per the enclosed typical drawing.Since it is not possible to achieve a low resistance value of less than 1 ohm with one pit,it is required to install a ring earth consisting of 2 to 4 pits depending upon the soilresistively. Following method shall be adopted to construct the ring earth:-

(1) The procedure mentioned above for one pit shall be repeated for installing 2 to 4such earth pits. It will be ensured that the distance between the two earth pitsshall be more than 8 to 10 ft. for effecting utilization of the soil contact area.

(2) The number of pits required shall be decided based on the resistance achieved forthe earth pits

already installed as the properties of the soil plays a major role.

(3) These earth pits shall then be interlinked using an electrolytic grade copperstrip/wire of not less than 40 sq. mm to form a ring using exothermic weldingtechnique. The inter connecting cable/bus bar shall be buried not less than 1below the ground level. This inter connecting bus bar shall also be covered withearth enhancing compound. These connections shall be made using exothermicwelding.

(4) A copper bus bar of 25 mm X 6 mm X 150 mm shall be exothermically welded tomaster earth electrodes for taking the final connection to the equipment room.

(i) Inspection Chamber:
(1) A 300 X 300 X 300 mm (inside dimension) concrete box with smooth cementplaster finish shall be provided on the top of the pit. A steel plate of 4 to 6 mmthickness hinged cover with lockable management, painted black shall beprovided to cover the earth pit.
(2) One padlock of Godrej/Link make with three keys shall be supplied for locking.
(3) The masonry work shall be white washed inside and outside.
(4) Care shall be taken regarding level of the floor surrounding the earth so that theconnector is not too deep in the masonry or projecting out of it.
(5) On back side of the over the date of test and average resistance value shall bewritten with yellow paint.

(J) Earth Bus bar & connection to pit:
(1) The earth electrode and the copper earth bus bar will be connected by cadmiumbronze wire as per RDSO specification No. RDSO/SPN/178/2003,exothermically welded to electrode at one end and the earth bus bar at other end.
(2) The copper earth bus bar will be 300 X 25 X 6 mm size with tin coating and holesfor fixing it to the wall of the equipment room with insulation studs.
(3) All connection to the earth bus bar will be through tinned copper lug of Dowell orsimilar make of suitable size.
(4) All nut and bolts will be stainless steel type.

SUPPLY AND FABRICATION OF CHANGEOVER SWITCH BOARD:
The contractor shall fabricate and install one frame of angle iron of size 1.20 M x 1.0M and ofsection 40mmx40mmx6mm at the four corners of each of the frames, a cross arm of the angleiron of size the angle iron of size 4mmx40mmx6mm (the end being forked) is to be welded, thelegs are to be grouted in the wall at his own cost. Only the hylem sheet shall be supplied by theRailway at the store of the consignee.Besides the contractor shall procure and supply the following material from the well reputedfirms like HAVELL's etc. the catalogue No. of HAVELL is being granted for guidance, howeverthe equivalent material from any well reputed firm shall be accepted. The materials shall beinspected at the premises of the consignee by the officer/official to be notified:-

(a) Change over switch 63 Ampere, Triple Pole, and (CTPO 063): 02 Nos.
(b) DPIC – 63 Ampere 01 No.

The contractor shall fix the switches etc. and wire as per the direction of the Engineer at Siteafter getting there issued from the Store of Consignee. The transportation charges for whichshall be borne by the contractor.

INSTALLATION OF ELECTRIC POINT MACHINE:

The activity includes fitting of ground connections of Electric Points Machine (IRS type)complete as per the standard Lay out- Facing Point (B.G.) Fitted with High thrust Rotary lockingtype Point Machine (with Pin joints) to suit the RDSO Drawing No. S –3262 – Alt (1) (for 52 Kgrails). This activity also includes supply of following Main materials for making groundconnections for each point's machine:-

1 M.S. Washer (Punched) M-20 14 -
2 Bolt, MS HEX HD, M 20 x 200 mm with HEX Nut 4 -
3 Bush "B" 4 S-8912
4 Detector Rod (Far end & Near end) 1 each S-3267-69
5 Insulating Bush 2 S- 8813
6 Lock Rod (Far end & Near end) 1 each S- 3271-73
7 Drive Lug 1 S – 8806
8 Drive Rod 1 S- 8805
9 Insulation Plate (RH & LH) 1 each S – 3265-66
10 Switch Extension Bracket 2 S-3264
11 Insulating Bush 4 S-23199
12 Insulated washer 6 S-8640
13 Insulation plate 1 S-8804
14 Bolt spectacle head 6 SA 312107
15 Sleeve (piece of GI pipe of 1 ½" dia. Having length 4") 1

All the above materials required for fitting of the point machine shall be supplied by thecontractor duly inspected by RITES/Consignee.
The Point machine has to be installed at points on extended sleepers/ Concrete sleepers and hasto be secured on four bolts with it as per the direction of site engineer and as per the Signallingplan of the station. There after the ground connections shall be done as per the RDSO Drg. No.S-3262 Alt-1 by drilling holes to the switch and connecting Switch extension brackets by M.S.bolts and nuts, making pin joint connections to all the rods. A sleeve shall be provided on thedrive rod to give smooth operation of points. Wiring of Electric Point Machine shall be done bycontactor as per direction of Site Engineer. All the connections made shall be tested for theproper functioning of points by crank handle and from panel as per the full satisfaction ofEngineer at site.The material to be supplied by the contractor at the stores of consignee. The transportation of allthe material from the stores of consignee to the site of work shall be done by the contractor at his own cost.

Earth Work:-
Earth work is done as supervision of Site Engineer.

i) BENCHING:
In widening an existing bank, step 30 cm. In high and 60 cm. Wide shall be cut in the existing bank, before any new earth, is placed to form a bond between the New and old earth work.

ii) DRESSING:
After completion of earth work, the slopes shall be neatly dressed to the correct profiles. The earth work is to be excavated and deposited in such widths, depths and height and in such places as may be directed from time to time. It must be clearly understood that the contract rates are intended to cover the full cost of finished work. Banks and cutting are to be correctly dressed to formation with such slopes as may be specified in each case work before being finally paid for is to be certified by the Engineer in charge as having been correctly brought up or carried down to proper level and to have been otherwise completed. In accordance with the specification and with the proper allowance

for settlement as ordered by the Engineer.

Until final measurement have been made, all banks cutting soiling of Bench are to be maintained by the contractor, who will be responsible to make good losses due to subsidence rain cuts or any other cause and restore at his cost the work to be fine profile required prior to taking overof the work by the Engineer.

iii**) Brick work:**
Well burnt bricks are used for flooring overall new earth work providing bricks on edge flooring in cement mortar (1:6) then flush pointed in cement mortar (1:3). Broken Bricks shall not be used except as clears. Brick shall be socked with water except in dry brick used.

TECHNICAL SPECIFICATION FOR CABLE LAYING OVER STEEL GIRDER BRIDGES:
i. Cable may be laid through G.I. pipe / HDPE /DWC pipe on steel girder bridges.
ii. Where the cable has to cross the girder bridges, the cable shall be protected withG.I. pipe / HDPE pipe fitted on the girder bridges with suitable clamps withspacing not more than one meter, without drilling holes in the girders.
iii. When laying cable on long bridges, the question of longitudinal expansion causedby temperature differences should be taken into consideration and suitable cableloops should be provided at the pillars of the bridge.
iv. The laying of the cable on the bridge is to be done with much care and planning.
It is necessary that the cable drum to be laid on the bridge is inspected and testedthoroughly so that damaged cable is not installed.
v. As the laying involves movement of large number of staff over the bridge the lineshould be blocked and flagman posted on other side. On a double line near whichthe cable is being laid should be blocked but care should be taken to see that staffis aware of this and measures taken to prevent staff from staying on to theunblocked line.

12.0 SPECIFICATION FOR DESIGNING ACTIVITY
12.1 The Signalling system design to be furnished by the contractor on the basis of theapproved signaling plan, and selection table and supply of six copies each of documentsmentioned below along with original tracing on a standard 7.5 micron polyester film inAUTO CAD format with CD.
a) Selection Table
b) Panel Diagram.
c) Circuit Diagram along with Wiring Diagram.
d) Relay rack with relay arrangement
e) Contact Analysis.
f) Cable route chart and cable core chart.
g) Cable termination details.
h) Location box details plan.
i) Completion plans.
j) Contact analysis.
k) Fuse analysis of the relay rack.
l) Tag blocks analysis of for the relay rack.
m) CT rack details.
n) Power panel diagram.
o) Relay rack arrangement.
p) Bus bar arrangement.
q) Track bonding plan.

r) Insulation joint plan.
s) Junction box details.
t) Control communication panel.

12.2 DEDUCTION FOR ERRORS IN DESIGN:

a) For any error, omission, incorrect nomenclature or inappropriate inclusion, the contractorshall have to provide the same after rectification on the same day.
b) For 5 or more errors, omissions, incorrect nomenclature, inappropriate inclusion in asheet or the sheet not being signed by his qualified Signal Engineer, the sheet will besummarily rejected.
c) A penalty of Rs. 200/- per rejected sheet shall be deducted and the contractor shall haveto provide the same after rectification by next day and if there is again 5 or more errors,omissions, incorrect nomenclature, inappropriate inclusion in a sheet or the sheet notbeing signed by his qualified Signal Engineer, the sheet will be again summarily rejectedand penalty be charged as stated above.

12.3 PREPARATION OF SELECTION TABLE AND WIRING DIAGRAM ETC.

a) The contractor shall design and prepare Panel diagram (Domino Type), Selection table, complete Circuit Diagram of Route setting type Panel Interlocking System, Relay RackArrangement, Contact Analysis etc. in accordance with RDSO Specification No. IRS: S-36/87 latest, Appendix A and on the basis of the approved Signalling Plan supplied by theRailway.

b) As per latest policy the Selection Table will base upon the route chart and the SignalInterlocking Plan (Signalling plan). The contractor shall prepare the selection tableshowing complete interlocking details as per the Typical Selection Table.
c) The designing of Circuit Diagrams shall be done according to the typical diagram,keeping in view to the extant practice, SEM, General and Subsidiary rules, the guide linesprovided by RDSO and the latest rules prescribed by the Railway. Wiring diagram forprovision of DATA LOGGER shall also be prepared on separate sheets.
d) Each drawing for checking should be supplied on Photo paper in two copies and dulysigned by the contractor and his qualified Signal Engineer not below the rank of aGazetted officer, out of which after checking one copy will be returned to the contractoron the basis of which the contractor shall be required to prepare and submit the DraftDrawing after making necessary correction if any, in duplicate on photo paper for finalapproval.
e) After approval one copy will be returned back to the contractor on the basis of whichcontractor shall finally prepare and supply the drawings as per schedule and specialcondition.
f) The contractor shall prepare a Relay Rack Arrangement chart showing the position andnumber of relays on relay racks and Contact Analysis chart of relays indicating thespare and used contacts also. Contact Analysis chart shall also be supplied on 90/95GSM Tracing paper and photo paper of A3 size bearing the name & signature ofcontractor and his qualified Signal Engineer both not below the rank of a Gazetted officeron each sheet.
g) A Domino Type Panel Diagram shall be prepared and supplied by the contractoraccording to the SIP supplied by the railway of min. size 30x12 Dominos up to 3 lines &30x15 Dominos for 4 line station, each sized 54mmx34mm.
h) For more than 4 line station, size will be as per instructions based on actual site condition.
i) Alteration column should be shown on every sheet and sufficient space should be left for further alteration on each sheet.
j) All drawings shall be prepared with suitable CAD system and after checking authoritieson the photo paper supplied by the contractor, shall be supplied as required by Specialcondition of contracts.

TELECOMMUNICATION WORKS

1.0 Point to point telephone communication

Point to point communication circuits between Pathardih washeryYard,Pathardih North Cabin & Sindri Cabin Shall be installed.

For the provision of point to point communication, Quad/OFC underground telecom cableshall be used between above yard / cabin as decided by Engineer-in-Charge. Signaling underground cables and/or Quad cables shall be used for communication between Location boxes, location boxes to respective relay rooms, LC gate, if any. Communication Cables shall be laid as per approved scheme and plan.

2.0 ROUTE SURVEY FOR 6 QUAD TELECOM CABLE PARA NO. SUBJECT

2.1 Preliminary Cable Route Survey.
2.2 Points to covered in Preliminary Survey.
2.3 Proposed Cable Route Plan.
2.4 Information in Cable Route Plan.
2.5 Detailed Cable Route Plan.
2.6 Main item of work.
2.7 Finalization of Cable Route Plan.
2.8 Finalization of tapping diagram.
2.9 Isolated Telephone Circuits.
2.10 Length of 6 quad telecom cable.
2.11 Size and Length of Derivation cable and Route Charts.
2.12 Preparation of Joint Schedule.
2.13 Materials required for Protective work.
2.14 Communication arrangement in Major Yard & stations.
2.15 Special Problem of the section.
2.16 Materials required.

2.1 PRELIMINARY CABLE ROUTE SURVEY:

The objective of this survey is:

a) Designing and finalizing drawing for the proposed route of the 6 quad cable.
b) Planning location of track crossing, over bridges, culverts etc.
c) Deciding the cable termination location under the system.
d) Planning for extending control communication from cable termination location to varioususer in station area and other locations etc.

2.2 POINTS TO BE COVERED UNDER THE PRELIMINARYSURVEY FOR CABLEROUTE.

2.2.1 Avoiding underground structures, Signalling cable, power cables and pipe lines etc.
2.2.2 Avoid rodent/ termite infested or infected side of the alignment.
2.2.3 Off set of the cable trench from the central line of the track such as having burrows.
2.2.4 Avoiding proximity to chemical, paper and such other industries which dischargechemically active affluent.
2.2.5 Avoiding areas prone to water logging.
2.2.6 Avoiding large rock cutting/thick jungles and areas different to approach etc.
2.2.7 Avoid the side of the alignment which is likely to be affected due to addition/alteration ofearth work/super structures (such as doubling, shifting of alignment of the existing tracketc.) for this, cable route shall be discussed with construction and doubling organization.
2.2.8 The orientation of the route (left or right side of the track in the sections(c) to bedecided on following:

i) That side of main line which is away from coastal side, other cables such asSignalling and power.
ii) Side which is likely to involve least track crossings and likely to be moreconvenient for crossing the track, bridges, culverts etc.
2.2.9 Figure out and scale crossing of roads, tracks etc.
2.2.10 Scale out proposed arrangement of crossing bridges, culverts etc., out of the manyalternative available.
2.2.11 Assess special problems, if any, of the section such as undulating surface, long cuttingtunnels etc.
2.2.12 Scale out the cable entry/exit arrangement at the cable termination locations. Avoid builtup areas including those area where building etc. are likely to come up in future.
2.2.13 With engineering drawing already in hand, verify pathways/ pedestrian crossing andother lateral clearances.
2.2.14 Scale out the special work required if any and the manner of the cable route in approachof the existing bridges locations.
2.2.15 Identify if any special lengths of cable is required to avoid joints on bridges/culverts etc.
2.2.16 For the straight runs as far as possible a separation equal to height of bank shall be keptfrom the toe of the bank.

2.3 PROPOSED CABLE ROUTE PLAN

The proposed cable route plan will show different locations reference points which arealso called chainages. There are two kind of references points available in section ondate.
Kilometer stones of engineering department provided along with the track.
Telegraph posts along with the track in section.
In addition to above all major Engineering land marks like bridges, culverts, etc. can alsobe used for all reference points on cable route plan.
Any other reference point for the purpose bench marking, the cable route as discussedwith Engineer in charge of work will also be shown on cable route plan.

Based on above survey, the cable route plan shall be prepared: -
2.3.1 6 quad telecom cable route plan (5 Km. charts) with horizontal scale as 1 km = 10 cmThe ASM's office, etc. are to be marked on the chart.
2.3.2 Drawing of the laying of the cable in special terrain viz. Station yards, Approaches ofcable huts, Long bridges, Culverts etc. are to be made 1 Km. chart. (Scale 1 Km= 50cm) to show the details.
2.3.3 The name of location shall be put in the LOC column and the chainages in the CHcolumn. At every 10 cm the Km. post No. shall be written and its exact equal chainagesfor per survey plan entered in the CH column. The equivalent chainage is required forworking out the length of main cable required. The name of station shall be shownagainst the locations of the SM's office.
2.3.4 Based on the survey, the Sr. No. and the length of culverts, bridges and LC gates shallbe marked on the track line of the cable route plan. The survey party shall be suppliedwith prints of 5 Km chart with the above details entered for enabling them to mark theroute and other details after surveying.
2.3.5 All the plans and drawings shall be neatly prepared by using CAD and Plotter etc. Thedrawings shall be in A3 size and suitably filed for ease of handling.

2.4 INFORMATION IN CABLE ROUTE PLAN

The cable route plan shall contain following: -
2.4.1 Whether the cable route is to on north or south side of the Railway track.
2.4.2 Approximate location and lengths where the cable shall be laid in G.I. and HDPE pipesunder the bed on culverts.

2.4.3 Location of track crossing and the number of tracks to be crossed.
2.4.4 Location of road crossings and the number of HDPE pipes to be provided.
2.4.5 Location and length for protection of cable in rocky area and platform cutting etc.
2.4.6 Proximate locations of derivation joints, LC gates or emergency sockets posts will beprovided on 6 quad cable.
2.4.7 The size, length and route of derivation/PIJF cable SM's office to various subscriberpoints.

2.5 DETAILS CABLE ROUTE SURVEY

The purpose of detailed survey is to undertake the closer study of the various existingtelecommunication facilities, to work out the exact requirement of the 6 quad andderivation/PIJF cable and materials required for different items of work, finalize all thedrawings and site plans required for the execution of the work and also to examine thedetails collected during preliminary survey and to affect necessary changes/modifications,if any.

2.6 MAIN ITEMS OF WORK

The following are main items of work, which shall constitute the detailed survey: -
2.6.1 Closely examine the proposed cable route and prepare cable route plans.
2.6.2 Sighting of areas for loading / unloading of cable drums and siding facilities for the EMTs(Engineering materials, trains for the project).
2.6.3 Preparation of route charts for derivation, PIJF cables with the size and length of thecables for each tapping and termination arrangement.
2.6.4 Estimating of requirement of special cable lengths of cables for long girder bridges.
2.6.5 Deciding location of each joint and preparation of a joint schedule.
2.6.6 Determining earth resistively measurement of each cable section along the proposedcable route.
2.6.7 Working out the exact length of derivation, PIJF cable required.
2.6.8 Preparation of material schedule required for different protective works.
2.6.9 Arranging isolated telephone circuits to be provided in the cable.
2.6.10 Investigation on special problems of the section and finding out proposed solutionthereof.
2.6.11 Examination of chemical composition of soil to see whether any special precautions are tobe taken to protect cable from soil corrosion.

2.7 FINALISATION OF CABLE ROUTE PLAN.

The following are the guidelines for finalizing the route and preparation of the cable routeplan:-
2.7.1 Prepare the "5 Km. charts" as explained above showing the relevant chainages anddetails in the "5 Km. charts".
2.7.2 Actual measurement by 30M steel tape or chain along the route is necessary only incase of important locations to be terms as "special terrains" for example, approach torepeaterstation/Cable hut, long bridges, big yards, sharp diversions in the cable route from itsparallel course along the main railways track due to obstruction, cutting etc.
2.7.3 Inspect and decide the portions of route falling in category of "special terrains" i.e. whereactual longitudinal measurement is necessary.
2.7.4 The remaining portions of the route i.e. other than the portion decided as "special terrain"are to be terms as "straight runs". Actual chaining along the route is not necessary forsuch 'straight runs' and these can be marked on the '5 Km. charts'.
2.7.5 For the 'straight runs' on the cable route an allowance of 3.5 % of the drum length shallbe made for the contours, joining etc. and each drum length shall be considered to covera route of 0.965 x cable drum length.
The cable route shall be started from a repeater cable hut station. Actual measurementalong the route shall be done by means of a 30M steel tape for a few drum lengths up toa convenient point

along the main line where from the distance along the route may bereckoned from the Plan. A termination allowance of 5M cable inside the repeaterstation/cable hut building shall be made, in addition to a length of about 10M being keptin a pit just put side the building.
2.7.6 It shall be ensured that both “special terrains” shall consist of full drum lengths, so thatthe position of joints (other than ‘T’ joints) is fixed without difficulty in both cases.
2.7.7 Actual measurements of the separation distance from the center line of the referenceshall be made where necessary. In case of special terrains, the separation distance atsome points on the route may also have to be reckoned from some other permanentstructures depending upon the site conditions.
2.7.8 The separation distance of the cable route from the nearest track on the “straight runs “shall be 10M. The deviating from this standard separation of 10M shall be kept to theminimum and as soon as any obstruction has been negotiated, the route shall againfollow this standard separation distance. It is desirable from the point of view ofcalculating the induced voltage that the uniformity of the separation is maintained for themaximum possible length of the main cable route.
2.7.9 Separation distance shall be marked on the “straight runs” portion of the cable route plan(5 Km. chart) at intervals of not more than 250 M. In addition, the separation distance atpoints of change in the cable route such as diversions, track crossings, approaches tobridges, culverts, etc. shall invariably be marked on the cable route plan in such a wayas the intended cable route is clearly defined for “special terrain” the separation distanceshall be marked at as close intervals as is considered necessary depending on the siteconditions.
2.7.10 The route shall be decided by walking along the track. On long stretches “straight runs” apush trolley moving slowly may be used. The trolley shall be on the track closes to theproposed route.
2.7.11 Actual measurement shall be made for the protective works required for the cablepassing over the culverts, under tracks, over long girder bridges, level crossings, rockyareas, under the bed of culverts.
2.7.12 Once the cables are laid the actual length of cable as per the printed marking on thecable is required to be indicated at every kilometer of cable route, at diversions, crossings, approaches of bridges and joints for quad cables.

2.8 FINALISATION OF TAPPING DIAGRAM

2.8.1 The survey team shall visit each location such as cabin, SM,s offices, Loco sheds,cabins, gate lodges, etc. and verify the details collected during the preliminary survey ofall the existing telecommunication facilities, and additional telecommunication facilities tobe provided.
2.8.2 The position of each tapping shall thus be finalized and a final tapping diagramprepared.

2.9 ISOLATED TELEPHONE CIRCUITS

It is necessary that all the telephone circuits such as isolated quarry sites, gate lodges,etc. are taken note of and provision made for transferring the overhead alignment intocables wherever considered necessary.

2.10 LENGTH OF 6 QUAD CABLE

The cable length is worked out on following basis to arrive at the locations of the straightjoints:-
a) Route length as per actual measurement plus contour allowances of 2.5%.
b) Extra length for track crossing including 2.5M loop on each side etc.
c) Extra length on approach/crossing of the bridges and culverts as per measurementin the detailed survey.
d) 10M of cable to be kept on either side of major steel bridges and 5M on minorbridges.
e) At every joint a loop of 10M on either side.
f) In cable hut a loop of 10M in the cable pit.

2.11 SIZE & LENGTHS OF DERIVATIONS/PIJF CABLE AND ROUTE CHARTS

The derivation/PIJF are required to laid from ASM's office to cabins, enquiry & otheroperational points, depots, supervisor's residence etc. for extending control tapings. Theplan and requirement of different sizes PIJF/derivation cables shall be suitably workedout. As for as possible derivation/PIJF cables shall be laid in the trenches for maintelecom cables and branched off at suitable locations.

2.12 PREPARATION OF JOINT SCHEDULES

The details of type and number of joints in main 6 quad cable is required to be workedout based upon the, obligatory locations, LC gates etc. The typical drum lengths of 6quad telephone cable is 1 Km. and therefore, it shall generally be possible to combinestraight through joints.

2.12.1 No isolation transformer is considered necessary for LC gate & other location telephonesup to a distance 7.5 Km. on 6 quad telephone cables.

2.12.2 The jointing schedule shall be made as straight-line diagram indicating the locations ofvarious joints with reference to chainages. The length of 6 quad cable from leading cablehut /ASM's office shall be specifically indicating taking into account the factory printedmarkings on the cables.

2.12.3 The requirement of termination boxes for cables at various locations shall be worked out.

2.13 MATERIALS REQUIRED FOR PROTECTIVE WORKS

2.13.1 The cables are meant for direct burial underground and no special protection is requiredin plain and normal territory. For building, masonry platforms, culverts,crossing of tacks, level crossings and roads etc. special protection works are specified inthe following drawings: -

i) For girder bridges, G.I. pipe / HDPE pipe medium grade with ISI mark as perdrawing.
ii) For cable entries to cabins, ASM's office etc. through GI pipes Drg.
iii) For cable terminations in ASM's office
iv) For cable jointing pit the cable trench
v) For laying cables over arch bridges brick channeling Drg.

2.13.2 Actual measurement shall be made for the length for which special protection isnecessary and the requirement of materials for the protective works shall be worked out.The requirement of materials based on the actual protective works shall be shown in the
cable route plan at the appropriate place.

2.14 COMMUNICATION ARRANGEMENT IN MAJOR YARDS & STATIONS

In big yard and major stations involving large cabins/Depot/Tapping points, it may not bepracticable to lay independent derivation cables for various locations. Therefore one main cable shall be laid to transverse in a zigzag way through the yard involving frequent tapping points. Lead sheath derivation, 6 quad or higher size PIJF cable may be laid for this purpose. The circuits shall preferably be tapped through V.F. transformers.

2.15 SPECIAL PROBLEMS OF THE SECTION:

2.15.1 Certain Sections may present special problems such as presence of chemically activesoils, marshy areas deep cuttings in the rocky areas, requirement of speciallyconstructed platforms for distribution of cable drums along a high embankment etc.

2.15.2 Approaches to large bridges may also present special problems due to highembankment as well as deep ravines.

2.15.3 The survey party shall inspect and report to Engineer in- charge such problems at theoutset so that suitable solutions can be worked out.

3.0 TECHNICAL SPECIFICATION AND INSTRUCTIONS FOR TRENCHING AND LAYINGOF UNDERGROUND TELECOMMUNICATION CABLE AND PROTECTIVE WORKS

Para No. Subject
3.1 Scope
3.1.1 Supply of tapping and route plan
3.2 Instructions for excavating & back filling of trenches.
3.3 Track crossing
3.4 Road crossing
3.5 Cable over steel Girder Bridges
3.6 Culverts and Arch Bridges
3.7 Cables in Marshy Areas
3.8 Laying of Main/ Derivation Cable in Masonry building & cabins.
3.9 Laying of Cable in Special Cases.
3.10 Handling of Cable in Special Cases.
3.11 Rewinding and Redruming of cables.
3.12 Cable laying.
3.13 Cable Reserve
3.14 Cable marker
3.15 Laying of Derivation cable
3.16 Tools required for trenching Cable Laying and Filling.

3.1 SCOPE:
This chapter deals with the specifications under which the various work for trenching &laying of underground telecommunication cables coming under the purview of thecontract are to be executed by the contractor.

3.1.1 SUPPLY OF TAPPING & ROUTE PLAN
Cable route plan, Tapping plan and jointing schedule for jointing of cable will beprepared and supplied by the contractor in consultation with the engineer before thecommencement of the work. This shall give a fairly accurate idea of the number &locations of the various tapings required on various circuits and the quantities and typeof various equipment to be fixed, wired and commissioned. These shall be got approvedfrom the Engineer.

3.2 INSTRUCTION FOR EXCAVATION & BACK FILLING OF TRENCHES
3.2.1 The representative of Engineer in charge of the work will mark the route of the cable inwhite chalk or lime as per the tapping and route plan and the instructions given to him bythe Engineer, notwithstanding the cable route shown in the tapping and route plan tomeet the requirement of local conditions at site, if any and as required shall be taken bythe contractor to be final. The contractor shall be present at the time of marking and heshall furnish to the engineer's representative required quantities of lime, rope labour etc.for carrying out this work. The marking will be given on the track side of the trench at adistance approx. one meter away from the center line of the trench. In the difficultterrains such as water-logged areas, the position of the cable route will be specified byoff sets from the center line of the nearest track.

3.2.2 Trenches for telecommunication cable shall normally be done as per Drg. Digging to adepth of one meter or as specified in schedule of work. The width of the trench shall be300 mm. In places where underground pipes, electric mains etc. come in the way,trenches deeper than one meter shall

be dug as necessary and HDPE pipes shall beplaced to protect the telecom cables.

3.2.3 Metal led, macadamized, concrete and stone paved roads shall also be cut to a depth ofat least one meter. The cable shall be laid through HDPE pipe as per Drg.No.SIG/GEN/031-98. The road surface shall be restored to original.

3.2.4 The bottom of the trench where the cable is to be laid shall be thoroughly prepared andshall be free from any stones. The bottom of the trench shall be horizontal and shall inno case be undulating. When the cable bed changes from solid to soft surface or fromthe bridge to soft soil, tamped fill at the transition point shall be provided so that cable isnot pressed against the edge of a hard surface.

3.2.5 In the entire cable route brick covering is required to be provided as per the approved'Tapping route plan' or as per the instruction by Engineer the contractor shall arrangesupply and distribution of well burnt bricks of standard size at site along the excavatedtrenches and after uniformly covering the cable laid in the trenches by Stone-free sievedsoil up to 50 mm height above the cable, he shall arrange to place the bricks flat andposition them breadth wise so that on an average, 8 bricks shall be laid in a meterlength.

NOTE:
1. In order to be certain that the full requirement of bricks has been arranged bythe contractor for placing on the top of the cable to be laid on any day he shall arrange tospread the bricks side by side on the top of the trenches before the depth of the trenchesare inspected by the Railway representative.

2. If DWC/HPDE is used as protective material for cable in BOQ in place of bricks no bricksare required to placed over DWC/ HPDE Pipe.

3.2.6 The back filling of trenches shall be done by tamping and consolidation the excavatedsoil in layers of 15-20 cm at time. All the soil that is excavated shall be put back to thetrench and care shall be taken inconsolidation to ensure that the back filling does notsuffer any sinkage in monsoon. The left out earth if any within station limit has to bethrown out from Railway premises by the contractor at his own cost.

3.2.7 Wherever the Engineer's representative considers it necessary to adopt shoring, thecontractor will be required to adopt shoring for which the contractor shall have sufficientquantities of shoring material on hand. Where the direction of trench has to change, itshall be done in a gentle curve of not less than one-meter radius and not at sharpangles.

3.2.8 Places where back filling is not done properly are likely to get water logged with the firstrains after completion of the work, the contractor and engineer's representative willinspect the entire section soon after the first monsoon and the contractor will arrange toset right such areas.

3.3 TRACK CROSSING
All cables crossings across railway tracks shall be done in DWC/G.I. pipes, taking thecable through these pipes. The contractor shall track by excavating trenchless track uptorequired depth where ever necessary to cross the track. Two G.I. wire of 10 SWG sizeshall be threaded through DWC/G.I. pipe, one to pull the cable one for future use.

3.4 ROAD CROSSING
3.4.1 When crossing road ways it is necessary to lay the cables in such a manner as to avoidthe

necessity of handling the cable sharply and minimize the excavation of road surfaceas far as possible. Where cable is laid in surfaced trucking the trucking alignment shallbe curved down to the pipes and proper bricks or concrete joint shall be made betweentrunking and pipe.

3.4.2 The crossing of main roads often involves difficulties especially if traffic is heavy,precautions to avoid accidents to workmen, pedestrians and vehicles shall be taken. Onminor roads, which can be temporarily closed to traffic, it is possible to open up andcross the entire width of the road. Pipes shall be installed quickly in the cutting, which isthen filled in there by reducing to a minimum time for which the road is closed.

3.4.3 Track crossing and crossing at busy roads shall be done through trenchless methodaccording to schedule of work.

3.5 CABLES OVER STEEL GIRDER BRIDGES

3.5.1 Where the cable has to cross the girder bridges, the cable shall be protected with G.I.pipe/ HDPE pipe fitted on the girder bridges with suitable clamps without drilling holes inthe girders.

3.5.2 When laying cable on long bridges, the question of longitudinal expansion caused bytemperature differences shall be taken into consideration and suitable cable loops shallbe provided at the pillars of the bridges.

3.5.3 The laying of the cable on the bridge is to be done with much care and planning. It isnecessary that the cable drum to be laid on the bridge is inspected and testedthoroughly so that damaged cable is not installed.

3.5.4 As the laying involves movement of large number of staff over the bridge the line shallbe blocked and flagman posted on either side on a double line near which the cable isbeing laid shall be blocked but care shall be taken to see that staff are aware of this andmeasures taken to prevent staff from staying on to the unblocked line.

3.6 CULVERTS & ARCH BRIDGES

3.6.1 Wherever possible the cable shall be laid under the bed of the culvert through HDPEpipes. Similar arrangement shall be provided for taking the cable in water logged areasand drains.

3.6.2 In case of wet culverts or unfriendly terrains where it is not possible to lay cable underthe bed of culverts the cables may be laid over the culvert in GI pipes/ HDPE pipes.

3.6.3 The protection of cable on Arch bridges and approach to culverts & bridges shall be asper Drg N0. RITES/TELE/GEN/024-98 & RITES/SIG/GEN/027-98.

3.7 CABLES IN MARSHY AREAS

3.7.1 In marshy area where it is not possible to divert the cable route the cable shall besuitably laid and protected as per decision of Engineer depending on site condition, likelaying cable in RCC pipe/ HDPE pipe supported on masonry pillars/ iron channels etc.

3.8 LAYING OF MAIN/ DERIVATION CABLE IN MASONARY BUILDINGS & CABINS

3.8.1 Derivation cable/PIJF will have to be led inside any masonry building such as cable hut,ASM's room at a depth of 0.75 M by cutting the masonry structure of the wall. After thecable has been laid inside the masonry wall the floor inside shall be duly repaired andplastered.

3.8.2 When a derivation cable has to be taken and terminated on the 1st floor cabin it shall befirst laid inside the ground floor of the cabin by cutting the masonry structure of the wallof the cabin and

then it will be taken through a HDPE pipe fixed vertically on the inside ofthe cabin wall by suitable clamps to be embodied on the wall as directed by engineer-in-charge.

3.9 LAYING OF CABLE IN SPECIAL CASES

3.9.1 NEAR POWER CABLE

When the contractor comes across any other cable already laid, he shall first report thefact to the engineer & cable shall be identified by the Engineer as a power cable (Lt orHT) the trench shall be dug as far away from the route of the power cable as practicable.

3.9.2 CROSSING OF TLECOMMUNICATION CABLE WITH ANOTHER CABLE.

Crossing of the telecommunication cable with another cable shall be avoided whereverpossible. Where however, this is not possible, the telecommunication cable shall be laidin cement or asbestos cement pipes. The length of pipe to be provided on either side ofthe crossing shall be at least one meter.

3.9.3 LAYING OF OTHER THAN TELECOM CABLE IN THE SAME TRENCH

No other cable shall be laid in the trench for the telecommunication cable. Where,however, exceptional circumstance exit, the telecommunication cable may be laid alongwith another cable in the same trench provided a specific permission of each such caseis obtained in writing from Engineer. When telecommunication cable and L.T powercable/ Signalling cable have to be laid in the same trench they shall be shall beseparated by placing a layer of brick between them vertically (approx. 16 bricks/ meter)or laid in HDPE pipe.

3.9.4 LAYING OF CABLE THROUGH PIPES.

i) The cable shall be laid through G.I./ HDPE pipes at the locations marked on thetapping and route plan and as advised by the Engineer or his representative.

ii) Laying the cable through pipes galvanized steel wires of a cross section not lessthan 10 SWG shall be used as a lead wire. Two such lengths of wires shall belaid through the pipes, so that after the cable is threaded through the pipe, onelead wire is permanently left in the pipe with a suitable overlay at two ends, toeagle the cable to be pulled out at a later stage if required to do so.

iii) On arch bridges and culverts bridges the cables will be threaded through GI/HDPE pipes etc. while threading the cable through these pipes the contractorshall do the trenching to the required depth wherever necessary for which noextra charge will be paid.

3.9.5 LAYING NEAR ONLY SURFACE

If during the excavation of trenches for laying cables the contractor or his representativenotice the presence or oil or oily substance or any other chemical which is likely to causethe deterioration of the cable protective material he shall bring the matter to the notice ofthe engineer or his representative and on the latter's decision he shall choose analternative cable route or he shall protect the cable in such places in such a manner asadvised in writing by the engineer or his representative. No additional charges arepayable.

3.9.6 SPECIAL SOIL CONDITION

Cable shall not be run through abnormally high acidic or alkaline soil or throughsewages. If this is unavoidable special measures shall be taken against corrosion asadvised by the engineer in charge.

3.9.7 PROTECTION AGAINST DAMAGE DUE TO SHARP EDGES

When cable is laid in trucking care shall be taken to see that no ballast or stones havebeen dropped inside the trunking, shall be cleared of all ballast and stones before thecover is secured. When the

ends of covers are joined together with cement plaster apiece of paper or wood shall be placed under the joint to prevent the cement plaster fromfalling on the cables.

3.10 HANDLING OF CABLE DRUMS & LAYING OFF CABLES

3.10.1 The drums shall be unloaded by the side of the Railway Track from either a crane or anyother suitable means very carefully so as not to cause any damage to the cable. Thedrums at site shall be protected until they are laid.

3.10.2 On each drum there are two ends, A&B. The 'B' end of one cable length shall meet 'A'end of the next cable at a joint. The 'A' end shall be normally on the top unless indicatedotherwise on a drum.

3.10.3 The drums shall always be kept upright i.e. axle in parallels position to the base.The drums shall not be set by jerks but shall be handled slowly and with care. The wallsof the drums shall not be damaged while moving the drums if required for unrolling.

3.10.4 The drums shall normally be unrolled at the same place and the cable carried byworkmen near the trench. The drums shall not be dragged in any case, but where drumsof cable have to be moved would always be rolled in the direction of the arrow, otherwisethe coils tend to unwind and the cable may get battered. In case no direction arrow ismarked on the drum remove several battens and determine the direction in which thecable is coiled. The arrow shall then be painted on the drum pointing in the oppositedirection in which the upper cable end is coiled so that future handling of the cable drumis facilitated and then replace the battens carefully.

3.10.5 The drum shall be properly mounted on jacks (or on a cable wheel) making sure that thespindle is strong enough to carry the weight without bending and that it is layinghorizontally in the bearings so as to prevent the drum creeping to one side or the otherwhile it is rotating. Before attempting to pull off the cable, remove the end protection boxattached to the flange of the drum and cut the security ropes so as to leave the cableand free to move.

3.10.6 If a portion of the cable only is taken out from the cable drum, the battens shall beimmediately replaced to prevent damages to the balance of the cable. This is important.

3.10.7 With armored cables having Hessian serving it is possible under extreme conditionsforthe bitumen to soften and cause adjacent turns of the cable on the drum to stick to eachother. In such cases, particular care must be taken to pull the cable of these drums veryslowly and to free the cables carefully from the adjacent turns on the drums. Snatchingof the cable to cause it to break away may result in kinks and damage, small size cablerequire care in this respect.

3.10.8 The use of steel bars between the bolt heads to 'jump' or turn the drum around isdangerous to staff and likely to damage the drums. A better method is to use two steelplates with grease between them by standing the drum on these greased plates; it canbe easily turned round to the desired position.

3.10.9 All care shall be taken in handling cable drums with a view to ensure safety not of thecables but also of the working party handling them. The man shall not be allowed tobrake the cable drum by standing in front but only from side.

3.11 REWINDING AND REDRUMING OF CABLES.

i) If for any reason it is found necessary to rewind a cable on a drum, cable drum, cable drum with a proper barrel diameter not less than of the original drum shall be chosen.

ii) The drums shall be mounted on cable jacks during rewinding operations usingproper size of spindles passed through the flange holes, which will not buckleunder the lead.The cable shall not be bent opposite to the set it is having already.

iii) In the redruming operation the full and empty drums shall be so turned that thecable passes from the bottom of the original set as little as possible.

iv) Replace all the laggings on the cable drum.

3.12 CABLE LAYING

3.12.1 It is advisable to employ the same people at the same place or job while cable is beinglaid.

3.12.2 Before commencement of the laying inspection of the trench and inspection of protectionworks shall be carried out so as to ensure their conformity with the specification. Thetrench bottom shall be clean, smooth and free of small stone. When the soil containsstone or pieces of rock and therefore cannot be raddled, sieved earth about 10 cm thickshall be used both for the bedding on which the cable is laid and for covering the cables.

3.12.3 The cable drum shall be brought as close to the cable trench as possible. It shall be liftedwith the aid of cable jacks firmly mounted on a support of stone or wood. The spindleshall be minimum of 55mm diameter and lower edge of drum shall be 5 to 10 cm abovethe ground.

3.12.4 Where necessary the cable drum may be placed at such a point so that 2/3 of the cableis laid directly and the balance in other direction. Care shall be taken in such a case tosee that there is no kinks or loops in the cable.

3.12.5 The wooden battens on the drums shall be carefully removed shortly prior to laying andbefore the drum is mounted on the jack. The nails on the lagging shall be carefullyremoved.

3.12.6 While rolling a cable drum for laying the drum shall be supported on an axle runningthrough its center the height of the axle being such that the end frames are free to rotateand do not touch the ground at any point. The cable shall be carefully uncoiled by gentlypulling the cable assisted as necessary by carefully turning the drums quick pulling of thecable or turning the drums shall be avoided at all cost. Each cable drum shall be brokenwhile laying is in progress to prevent sharp bending or buckling, particularly when thecable coils are sticking together.

3.12.7 The following personnel shall be employed near the drum.

1 Man : for handling the brakes.

1 Man : for permanent observation of the uncoiling of cable.

2 Man : for uncoiling close to the drums.

3.12.8 The method of mounting the brakes is shown in Drg. No.RITES/LKO/PO/TEL/21.

3.12.9 When drums are turned for change of direction, wooden blocks shall be carefully putunder the drum bolts, which stand out from the drum discs.

3.12.10 It is customary for the mate to stand in a commanding position where he canview the entire route and shout evenly timed calls to his men to pull. If there is propersynchronization between the mate's calls and the pulling by the men, the cable will leavethe drum without difficulty. It is important that the cable shall be pulled with steady andeven pulls and not be unnecessarily jerked or strained. On no account shall a cable beallowed to twist or kink, as this is likely to spring the Armour and fracture the paperinsulation and outer serving of the cable. When pulling cable around bends, one or twomen shall be stationed to give the cable the correct bend when it passes.

3.12.11 When the cable drums are exposed to great heat before laying, them dangerexists that the individual coils and layers stick together in spit of the half overlay.Special attention shall be paid to see that no buckling of the cable occurs while pullingthe cable. A man shall stand near the drum and loosen the cable carefully by hand andshout a warning whenever the cable cannot be loosened. Separation must be affectedas close to the drum as possible as otherwise kinks may result. The rate of pulling shallalso be slow to prevent possible damage to cable that is being carried when the payingout stops. The drum shall be kept in shade where possible.

3.12.12 While laying the cable employ adequate number of men such that the cable canbe conveniently carried by them in both hands without stretched arms. The distancebetween any two persons carrying the cable shall be from 2 to 10 metres dependingupon weight of cable such that the maximum sag of the cable between any two personsis not more than 0.5 meters.

3.12.13 The cable shall be gently drawn by pulling the cable, which may be assisted as required by smoothly, and slowly turning the winch. The cable shall not be twisted on any account.

3.12.14 Before laying is commenced the cable shall be uncoiled first in a straight linesupported by men and then carried to the trenched and laid gently & carefully. Cableshall be laid as per engineer-

in-charge directives.
3.12.15 While the laying work is in progress one man must continuously observe thecable and feel along its length in order to determine whether any indentations holes orother damaged parts are apparent. Such damaged parts have to be protectedimmediately by the cable jointer provided with the laying party.
3.12.16 When two or three turn of cable are left on the drum the pulling shall be stoppedand the inner end of the cable removed from the slot in the drum. Pulling shall then becontinued. If this is not done the cable end is likely to be stretched and damaged.
3.12.17 The ends of the telecommunication cable shall have an overlap of 1 M at the endof each drum for jointing purpose.
3.12.18 The conditions of the cable shall be visually inspected throughout its length andin case any damage or defect is noticed, the trench shall not be filled up until theengineer's representative in notified to examine and authorize filling of the trench.

3.12.19 MINIMUM BENDING RADIUS:
Cable shall always be bent (or straightened) slowly; They shall never be bent to smallradius while handling. The minimum safe vending radius for telecommunication cablesshall be 30 times the diameter of the cable but wherever possible larger radius shall beused.

3.13 CABLE RESERVE:
a) At the following locations, it will necessary to provide reserve cable for future possibleuse.
1) Where a change to cable line is expected, the reserve to be allowed dependson circumstances.
2) In freshly banked SOIL to allow for slipping of the bank an allowance of 30cm. shall be provided for every 10M of trench (3%). The cable shall be laid ina sinuous form.
3) Near roadways, buildings and culverts reserve of 5 M shall be allowed atdrum end.
4) On each side of girder bridges a reserve of 10M shall be left.
5) Where remodeling works on culverts, bridges and track doubling work aregoing on, it may be necessary to kept loops of cable as an extra reservepending finalization of its future route.
6) At the cable hut a loop of 10M in the cable pit.
7) At every joint a loop of 10 M on either side.

3.14 CABLE MARKER
3.13.1 The cable markers shall normally be provide at the distance of every 100 M on the cableroute and also at places or corner wherever the route of the cable changes. The jointindicators shall be provided at all types joints. The cable maker and joint markersprovided shall be as per drawing of stone/ concrete reinforced marker drawing withstandard trench as per site conditions.

3.15 LAYING OF DERIVATION CABLE
The derivation cable is required to be laid from cable hut to the subscriber premises(Cabin Depots, Residence, LC gates etc.) and from main cable trench toemergency post for extending control and other tapings. The plan & requirement of PIJF/derivation cables shall be suitably worked out and got approved from the Engineer wellin advance.

As far as possible derivation/ PIJF cables shall be laid in the trenches/ protective worksalready done for 6 quad cable. From the diversion point, cables shall have to be laid onindependent trenches. For taking out different tapings on route, the cable may be tapped at different locations. However, it must be ensured that every tapping is taken on independent conductors right from cable hut to the subscriber for case of isolation in case of malfunctioning.
All the required protective works shall be implemented for protecting these cables.

3.16 TOOLS REQUIRED FOR TRENCHING CABLE LAYING AND FILLING

In addition to the tools mentioned below all tools & plants required to speed up the cablelaying through mechanized methods will be utilized by the contractor.

S. No. Tools Name

1. Cable jack
2. Cable grip
3. Reopening device
4. Free hood hook
5. Shackle free head hook
6. Grouling hook
7. Pulling bolt
8. Tension meter
9. Pulley
10. Anti twist device (swivel)
11. Roller
12. Flexible cable
13. Pulling Rope
14. Brush
15. Mandrel
16. Chain
17. Measuring cord for strain gauge
18. Slip winch
19. Wire rope
20. Portable VHF set
21. Measuring tape
22. Fawrah
23. Iron plate
24. Loader backhoe for drilling
25. Warning tape
26. Caterpillar Tractor
27. Fork lifter
28. Vehicle Van type
29. Tacho meter
30. Road measurer.

4.0 JOINTING OF 6 QUAD TELECOM CABLE AND ACCEPTANCE TEST

The contractor can follow instructions issued by approved supplier of Thermo shrink jointing kit, provided such instructions are issued formally by the supplier and it is certified that joint will be free of defect.

4.1 Jointing & termination of PIJF quad & derivation cables.

4.1.1 Thermo shrink joints of appropriate size for straight through or branch off joints as per RDSO specification shall be provided.

4.1.2 All the derivation/ PIJF cables shall be terminated on CT box of suitable size dulymounted on cable huts and other locations as advised by the site engineer.

4.1.3 The details of cable of different types of jointing of cable are as per Drawing.

4.2 ACCEPTANCE TEST FOR 6 QUAD AND PIJF CABLES

The characteristic impedance of unloaded 6 quad cables (IRS/ TC/ 30) is 470 (± 10%)ohm at 800 Hz. when loaded with inductance of 88 mh, the characteristic impedance is1120 (± 10%) ohm.

Joint tests are to be carried out by engineer's representative and contractor'srepresentative for accepting the cables from the contractor.

4.3 TESTING OF VF TRANSFORMER:

4.3.1 Following tests may be conducted on VF transformers before using in the joint:-

a) Continuity and DC resistance of windings:- Use an AVO meter to check continuity,measure DC resistance of primary/ secondary windings with LCR bridge. Thereadings obtained shall be comparable.

b) Insulation resistance: Connect one lead of a 500 V megger to one winding connectthe other lead on Megger first to another winding and take reading. Next connect it toall other windings connected together and the case and again take the readinginsulation resistance shall not be less than 10,000 Mega Ohms.

c) Transmission Loss: Adjust output level of transmission measuring set to O/db andconnect it across the primary of transformer connect a db meter on the secondaryside. Db meter reading shall not be more than 1 db.

4.3.2 LOOP RESISTANCE AND CONTINUITY TEST

Instruments to be used: Multimeter

a) The multimeter will provide ready means for continuity test and also it will be capableof testing D.C and A.C Voltage D.C resistance and also low frequency levels for testand maintenance purpose. The input sensitivity shall be at least 100K Ohms per voltD.C and 10K Ohm per Volt of A.C.

(b) The maximum average loop resistance of a pair measured with direct current at 20deg C shall be 58 Ohm per Km. for the PE quad of 0.9 mm diameter Cuconductors. The normal loop resistance of a pair shall be 55.2 Ohm per Km. at 20Deg C. This test shall be carried out only on untapped pairs of cable.

4.3.3 INSULATION TEST

a) Instruments to be used-Mega ohm Meter/ Megger. The insulation resistancemeasured between a conductor of a quad and all conductors of all other quadsconnected together to the sheath and earth shall not be less than 625 mega ohmsper Km. When measured at 100 volts DC after energising for one minute at atemperature of not less than 160 C.

b) For measuring insulation all conductors may be bunched together and tied properlywith a bare and insulation to the sheath/ screen measured. The insulation resistanceper Km. can be obtained as - No. of wires tested x deflection (Megs (c) x Length (Km.Meg ohms per Km.)

4.3.4 FREQUENCY ATTENUATION & TRANSMISSION MEASUREMENT.

Instrument to be used - Transmission Measuring sets (IRS TC 43.87 or latest). Twotransmission measurement sets are required for these measurements. One set is kept atone end of the cable and the other at the other end of the cable. Before sending the setto other end the zero errors of all meters are checked.

Zero db tone is sent from one end and the level received at the other end and ismeasured. Whenever the frequency is changed the zero level shall be adjusted again Zero level of the tone shall also be adjusted first before taking any reading.

The reading are taken at the following frequencies 300 Hz, 400 Hz, 600 Hz, 800 Hz.1000 Hz, 1400 Hz, 1600 Hz, 2000 Hz, 2400 Hz, and 3000 Hz and recorded and it shallbe as per specification of quad cable laid.

4.3.5 CROSS TALK MEASREMENT

Instrument to be used a cross talk measuring set (IRS EC-45) and oscillator 1 KHz/ 800Hz. Zero dB. Tone of 800 Hz is given on one pair and cross talks is measured on theother pair in the same quad. Also the cross talk has to be measured in adjacent quads,cross talks is measured at 'Near-End' and also 'Far-End' The far-End cross talksattenuation between any two air spaced paper insulated VF pairs at a frequency of 800Hz shall not be less than 65 dB. The near-End Cross-Talks shall not be less than 61 dB.

4.3.6 NOISE LEVEL MEASUREMENT-PSOPHOMETRIC

Instrument to be used-Psophometer (RDSO SPEN. NO. STE/ RE/ C/ SPN/ M1)-1975 (orlatest) SIEMENS Germany Model No. V 2233 (1994) are presently used for measurement of noise. The detail procedure for measurements is supplied by manufacturer. The far end of test pair is terminated at the resistance equivalent to characteristic impedance of the cable (600 or 1120 Ohms). At near end Psophometer is connected. The readings of weighted and unweighted noise can be directly read on the meter. The permissible limit of Psophometer voltage is 2 mv.

4.3.7 MEASUREMENT OF CIRCUIT ELEMENTS

Instruments to be used - impedance Bridge (L 3/4 C 3/4 R Bridge) (Specn. No.STT/RE/SPN(M1)-1973 or latest).

This measures electrical data of components like coils, capacitors and transformers aswell as of Subassemblies, amplifier, filters etc. The measurement of resistive andreactive components of impedance and admittance can also be measured with thisbridge. These parameters are generally factory tested and need not be measured at site.
The impedance bridge can also be used for assessing the distance of cable fault/ lowinsulation quad with reference to healthy quads.

5.0 INSTALLATION, TESTING AND COMMISSIONING OF EQUIPMENTS IN SM'SOFFICE, CABINS AND OTHER LOCATIONS:

Para No. Subject
5.1 Way station control equipment
5.2 6 quad cable repeater equipment etc.
5.3 Installation of test room equipment
5.4 Protection against surge and lightening

5.1 WAY STATION CONTROL EQUIPMENT

Those locations where the repeater amplifier equalizer rack is not provided and the waystations are separately installed these equipments shall be suitably fitted on slotted orMS angle frame work. The MS angle frame shall be suitably grouted on the floor/walls atthe subscriber location shown in the tapping diagram and as per markings given byEngineer's representative. The MS angle frames shall be painted with a primer coat ofRed Oxide and finally with gray enamel paints to ISI specification (2 coats). Themounting arrangements for fixing way station equipment shall be as per decision ofEngineer. In cabins the telephone shall be kept. A wooden stand shall be mounted on wall at suitable height (1200mm) as per at all other locations for placing the control telephone.

The wiring shall be done on PVC Casing & capping / PVC conduit of suitable sizedepending upon the requirement, along the walls from C.T. Boxes to the equipments.Wires from the equipments to the table for telephone and other equipments shall also betaken accordingly. For crossing of floor the wiring shall be taken inside the GI pipeminimum 25 mm dia, buried inside the floor and bent at

both the ends. All the wiringshall be terminated on the telephone termination strip/Rosette suitably fixed in a woodenbox, for facilitating connection to telephone and block instruments etc.

5.2 6 QUAD CABLE REPEATER EQUIPMENTS ETC:

6 Quad PET cable repeaters shall be installed on 30 cm masonry platform rigidly or onthe wall as per the instructions supplied by the manufacturer. The wiring from repeaterequipment to the C T box shall be neatly fixed and pass through PVC conduit pipe withfacility of its isolation. The AC power required for the repeater shall be taken fromnearest Power board and a socket shall be fixed nearby the repeater equipment. Thewiring for DTMF control, telephone shall be done up to SM's table neatly, concealing theconduct pipe underground (if required).

5.3 INSTALLATION OF TEST ROOM EQUIPMENT

5.3.1 Test room equipment with prewired rack, suitable for 4/6 quad/OF cable with wallmounting arrangement consisting of-

1) Cable termination panel having Krone connectors' sufficient nos. to terminate4 quad and Telephone connection-1Nos.
2) Link Panel with sufficient U Links-2 Nos.
3) Amplifier Equalizer system sufficient for 4 quads.
4) Isolation Transformer sufficient for 4 quad.
5) Power Supply Unit (230AC-12V DC)-2 Nos.
6) Battery Management System-1 Nos.
7) 12V.40 AH low Maintenance batteries-2 Nos.
8) DTMF control equipment with remote monitoring facility.

All above is to be installed in test room as per manufacturers' instruction and directivesto make it operative.

5.4 PROTECTION AGAINST SURGE AND LIGHTENING:

5.4.1 All the equipment shall be protected against the insurgence of surge voltage andlightening etc. by providing Gas discharge tubes before they are connected toMain/derivation cables.
5.4.2 GD tubes (rare gas type) with normal flashing voltage of 250-300 volts along with fusesof 3 amps. 250 volts shall be used as per TEC or IRS specifications.
5.4.3 In cable Hut these shall be provided on Krone or mounted independently as perManufacturer's instructions.
5.4.4 The GD with fuses shall also be provided on LC gate, emergency, spare quads andderivation circuits. The block circuits shall be protected through block filter unit.
5.4.5 All the GD tubes shall be suitably connected to proper earth. The earthing arrangementshall be provided as per Drg No. RITES/SIG/GEN 13 to latest amendment.

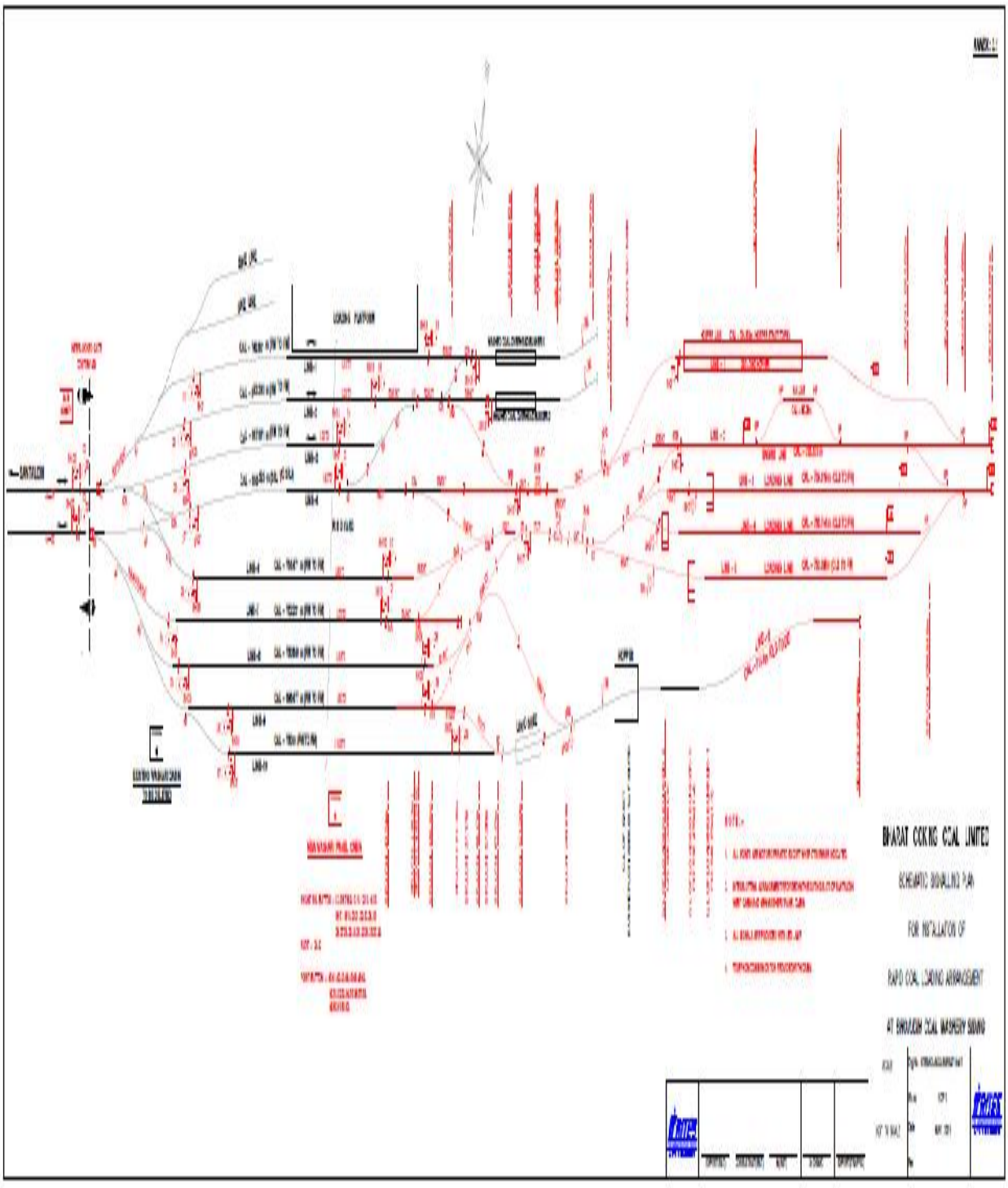
NOTE:

1. Technical specification for any equipment/materials is not covered above shall beprocured and supplied as per RDSO specifications from approved vender of RDSO. The items for which RDSO specification do not exist shall be procured from RDSO approvedvender/ vender approved by Engineer-in-Charge.

2. Technical specification for execution of any work is not covered above, in such cases execution shall be done as per existing practices of concern railway or as per the instruction of Engineer-in-Charge.

Section - 6

DRAWINGS


BHARAT COKING COAL LIMITED
SCHEMATIC DIAGRAM
FOR INSTALLATION OF
RAPID COAL LOADING ARRANGEMENT
AT BHOJUDIH COAL WASHERY SIDING