

## **Corrigendum – 1**

**Date: 20.11.2020**

### **Tender Notice No. K RIDE/Projects/64/2020 Date: - 13.11.2020**

1. In **Section-7B** Technical specification and testing procedure for plastic cable duct/trays to be used for cable laying and revised technical specification for MSDAC is added
2. In **Section-8** work experience certificate for the purpose of quoting in KRIDE tenders is added
3. In **Section-9** (BOQ) due to poor visibility of some items/quantity in package-3, and some part missing in Package –1. Now revised documents are uploaded, the same may be referred for all bidding purposes.
4. All other terms and conditions will remain the same in the above tender notice
5. Please keep referring to the KRIDE website for any further corrigendum

<b>Section 7</b>	<b>Special condition of contract</b>
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## **Part B -Special condition of contract**

Whenever there is a conflict or inconsistency between the provisions of the Special Conditions of Contract–Section 7 PART B and the General Conditions of Contract–Section 6, the provisions stipulated in Special Conditions of Contract–Section 7 PART B shall prevail and supersede those appearing in the General Conditions of Contract–Section 6.

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## **SPECIAL CONDITIONS OF CONTRACT**

### **1. GENERAL**

The Special Conditions of Contract contained herein shall be supplemented to the "General Conditions of Contract 2014 updated with latest correction slips". In the event of any conflict or inconsistency between them, the Special Conditions of contract contained herein shall prevail.

The Contract labour (Regulation and Abolition) Act-1970 (CLRA) as amended up to date will form part of the contract Agreement. Further it is obligatory on the part of every contractor to obtain a valid license from the licensing officer before undertaking/executing the work.

### **2. SCOPE OF WORK**

2.1 The scope of this work broadly includes,

- 2.1.1 'Shifting of cable, location box, signals, S&T equipments to facilitate engineering track work
- 2.1.2 Supervision and Maintenance of the signaling system provided as part of this contract for 12 months after the date of commissioning without any extra payment.
- 2.2 The work shall be carried out according to the technical specifications referred; drawings approved by the KRIDE and shall conform to the provision of Signal Engineering Manual and schedule of dimensions. The contractor shall be solely responsible for the proper execution of the work as per specification.

### **3. COMPLETION PERIOD OF WORK: 18 months**

### **4. MAINTENANCE:**

- 4.1 The contractor shall maintain the executed work in all respect including material & works for any defect & fault for a **period of 12 months** from the date of issue of Provisional Acceptance Certificate entirely free of cost including repairing of cards and equipments without any additional cost of spares and repairs etc. This 12 month period shall be referred as Maintenance Period.
- 4.2 Provisional Acceptance Certificate shall be issued only, when work is completed at site in all respect, station is commissioned for FIRST phase, and items recorded in the Note of Joint Inspection with Open line after commissioning of first phase work are complied.
- 4.3 The services of Maintenance Technician/ Supervisor/ Engineer shall be made available throughout day and night for the period of **12 months** and as and when required by the KRIDE Engineer/ Representative. The contractor shall ensure the Railway personnel are fully acquainted and familiar with the detailed procedure to follow for proper testing and satisfactory maintenance of equipments. Necessary disconnection of working signaling Equipments and systems shall be arranged by the K RIDE Engineer.

### **5. WARRANTY:**

- 5.1 The contractor shall warrant that all materials and equipment to be supplied and installed as per this tender shall be free from defects and faults in design, material, workmanship and manufacture and shall be of the highest grade and consistent with the established and generally accepted standard for materials of the type ordered and in full conformity with the contract specification.

- 5.2 This warranty shall be for a period of 12 Months from the date of completion of the work, i.e. date of issue of the Provisional Acceptance certificate as defined in Para 4.2 above.
- 5.3 During the period of Warranty, the Contractor shall remain responsible to arrange replacement and for setting right at his own cost any equipment supplied by him which is of defective manufacture or defective design or defective material/ component becomes unworkable due to any cause whatsoever. The decision of K RIDE to attend to any damage or defect in work shall be final and binding on the contractor.
- 5.4 If it becomes necessary for the contractor to replace or renew any defective portions of the system under this clause, the provision of this clause shall apply to the expiry of six months from the date of which replacement or renewal or until the end of the warranty period whichever may be later. If any defect is not remedied within reasonable time, the K RIDE may proceed to do the work at contractor's risk and expense, but without prejudice to any other rights, which the K RIDE may have against the contractor in respect of such defects.
- 5.5 All inspections, replacements or renewals carried out by the contractor during the warranty period shall be subject to the same conditions of the contract.
- 5.6 All replacement and repairs and design change that the KRIDE shall call upon the contractor to deliver or perform under this warranty shall be delivered and performed by the contractor within one month, promptly and satisfactorily.
- 5.7 The decision of the **K-RIDE** in regard to contractor's liability and the amount, if any, payable under this warranty shall be final and conclusive.
- 5.8 Due to analysis of failures, if any design deficiency is pointed out by the K RIDE, the contractor shall rectify it at his own cost.

## **6. VARIATION IN QUANTITIES:**

- 6.1 The drawings referred to in the list of plans, if any, are intended only to give a rough and general idea of the location and approximate details of work to be done.No claim what so ever will be admissible in respect of any alteration/ addition/ deletion/ change in the type of works/ change in locations.
- 6.2 The quantities of various items given in the Schedule for the works to be executed are only approximate and are only for the guidance of the tenderer/ contractor.As far as possible,they have been assessed correctly but are likely to vary during the execution of the work.The contractor's attention is drawn to clause 42 of the General Conditions of Contract dealing with variation in quantities.
- 6.3 The Procedure detailed below shall be adopted for dealing with variations in quantities during execution of works contracts:
- 6.3.1 Individual NS items in contracts shall be operated with variation of plus or minus 25% and payment would be made as per the agreement rate. For this, no finance concurrence would be required.
- 6.3.2 In case an increase in quantity of an individual item by more than 25% of the agreement quantity is considered unavoidable, the same shall be got executed by floating afresh tender. If floating afresh tender for operating that item is considered not practicable, quantity of that item may be operated in excess of 125% of the agreement quantity subject to the following conditions:

- (a) Operation of an item by more than 125% of the agreement quantity needs the approval of an officer of the rank not less than GM Grade:
- (i) Quantities operated in excess of 125% but upto 140% of the agreement quantity of the concerned item, shall be paid at 98% of the rate awarded for that item in that particular tender:
- (ii) Quantities operated in excess of 140% but upto 150% of the agreement quantity of the concerned item shall be paid at 96% of the rate awarded for that item in that particular tender:
- (iii) Variation in quantities of individual items beyond 150% will be prohibited and would be permitted only in exceptional unavoidable circumstances with the concurrence of associate finance and shall be paid at 96% of the rate awarded for that item in that particular tender.
- (b) The variation in quantities as per the above formula will apply only to the Individual items of the contract and not on the overall contract value.
- (c) Execution of quantities beyond 150% of the overall agreemental value should not be permitted and, if found necessary, should be only through fresh tenders or by negotiating with existing contractor, with prior personal concurrence of GM (Finance) and approval of Managing Director.

**6.3.3 In cases where decrease is involved during execution of contract:**

- (a) The contract signing authority can decrease the items upto 25% of individual item without finance concurrence.
- (b) For decrease beyond 25% for individual items or 25% of contract agreement value, the approval of an officer not less than rank of GM/may be taken, after obtaining 'No Claim Certificate' from the contractor and with finance concurrence, giving detailed reasons for each such decrease in the quantities.
- (c) It should be certified that the work proposed to be reduced will not be required in the same work.

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

**6.3.5 No such quantity variation limit shall apply for foundation items.**

**6.3.6 As far as SOR items are concerned, the limit of 25% would apply to the value of SOR schedule as a whole and not on individual SOR items. However, in case of NS items, the limit of 25% would apply on the individual item irrespective of the manner of quoting the rate (Single percentage rate or individual item rate).**

**6.3.7 The aspect of vitiation of tender with respect to variation in quantities should be checked and avoided. In case of vitiation of the tender (both for increase as well as decrease of value of contract agreement), sanction of the competent authority as per single tender should be obtained.**

**7. VITIATION CLAUSE:**

KRIDE will exercise control over the aspect of vitiation of tender with respect to variation in quantities and take action as under:

- (a) In the event of vitiation occurring due to increase or decrease in quantities among the first, second and third lowest valid tenderers, the vitiation shall be to Contractors account. The total value of the work done shall be calculated at the rate offered by those tenderers and the amount pay able shall be limited to the lowest aggregate value as worked out.

- (b) Vitiating amount shall be worked out for each and every on-account bill when the value of the work executed reaches 50% of the agreement value and the vitiated amount shall be adjusted at every stage.

## **8. EARNEST MONEY, SECURITY DEPOSIT AND PERFORMANCE GUARANTEE:**

### **8.1 EARNEST MONEY:**

Earnest money payable by the tenderer towards this tender is as under:

### **8.2 SECURITY DEPOSIT**

- 8.2.1** The Earnest Money deposited by the contractor in this tender will be retained by the K-RIDE as part of the Security Deposit for the due and faithful fulfillment of the contract by the Contractor. The balance to make up the Security Deposit, the rates for which are given above, may be deposited by the Contractor in cash or may be recovered by percentage deduction from the Contractor's 'on account' bills. Provided also that in case of defaulting contractor the Railways may retain any amount due for payment to the Contractor on the pending 'on account' bills so that the amounts so retained may not exceed 5% of the total value of the contract.

- 8.2.2** Unless otherwise specified in the special conditions, if any, the Security Deposit/rate of recovery/mode of recovery shall be as under:-

- (a) Security Deposit for each work should be 5% of the Contract value.
- (b) The rate of recovery should be at the rate of 10% of the bill amount till the full Security Deposit is recovered.
- (c) Security Deposits will be recovered from the running bills of the contract and no other mode of collecting SD such as SD in the form of instruments like BG, FD, etc., shall be accepted towards Security Deposit.
- (d) For contracts of value Rs.50 Crores and above, irrevocable Bank Guarantee can also be accepted as a mode of obtaining security deposit.

- 8.2.3** On physical completion of the work, security deposit recovered from the running bills of a contractor can be returned to him if he so desires, on submission of FDR/irrevocable Bank Guarantee for equivalent amount. The validity of FDR/BG shall cover up to the period of finalization of agreements, maintenance period and performance of all contractual obligations envisaged in the contract.

- 8.2.4** No interest will be payable on the Earnest Money or Security Deposit or amounts held by the K-RIDE/ payable to the Contractor under the contract, but Government Security Deposit will be payable with interest accrued thereon.

- 8.2.5** Security Deposit will be returned to the contractor after the expiry of Maintenance Period and after passing the final bill as certified by the Competent Authority. The Competent Authority shall normally be the authority that is competent to sign the contract and not less than a Sr.DGM/ K-RIDE. The certificate, inter alia, should mention that the work has been completed in all respects and that all the contractual obligations have been fulfilled by the contractors and there is no due from the contractor to K-RIDE against the contract concerned. Further for releasing SD, an unconditional and unequivocal no claim certificate shall be furnished by the contractor concerned.

- 8.2.6 If any of the certificates regarding eligibility criteria including the affidavit submitted by the tenderer along with tender document are found to be false/forged or incorrect at any time after the award of the contract, it will lead to termination of the contract along with forfeiture of EMD/ SD and Performance Guarantee besides any other action provided in the contract

### **8.3 PERFORMANCE GUARANTEE (P.G):**

The Procedure of **Performance Guarantee** is outlined below:

- (a) The successful bidder shall submit a Performance Guarantee(PG) within 30 (thirty) days from the date of issue of Letter Of Acceptance (LOA).Extension of time for submission of PG beyond 30(thirty) days and upto 60 days from the date of issue of LOA may be given by the Authority who is competent to sign the contract agreement. However, a penal interest of 15% per annum shall be charged for the delay beyond 30 (thirty)days, i.e. from 31<sup>st</sup> day after the date of issue of LOA. In case the contract fails to submit the requisite PG even after 60days from the date of issue of LOA, the contract shall be terminated duly forfeiting EMD and other dues, if any payable against that contract.The failed contractor shall be debarred from participating in re-tender for that work.
- (b) The successful bidder shall submit 01 [One] Performance Guarantee after issue of Letter of Acceptance (LOA) and before signing off of agreement, One for 10% of the total value of Schedule A, B, C,D H, J& K of the work in the following form:
  - (i) A Irrevocable Bank Guarantee

**Note:** The instruments as listed above will also be acceptable for Guarantees in case of Mobilization Advance.

- (a) The Performance Guarantee shall be submitted by the successful bidder after the Letter of Acceptance (LOA) has been issued, but before signing of the contract agreement. This P.G. shall be initially valid up to the stipulated date of completion plus 60 days beyond that. In case, the time for completion of work gets extended, the contractor shall get the validity of P.G. extended to cover such extended time for completion of work plus 60 days.
- (b) The value of PG to be submitted by the contractor will not change for variation up to 25% (either increase or decrease). In case during the course of execution, value of the contract increases by more than 25% of the original contract value, an additional Performance Guarantee amounting to 5% (five percent) for the excess value over the original contract value shall be deposited by the contractor.”
- (c) The Performance Guarantee (PG) against Schedule A, B, C, D,H,J& K of the contract shall be released after physical completion of the work based on 'Acceptance Certificate' issued by the competent authority stating that the contractor has completed the work in all respects satisfactorily. The Security Deposit shall, however, be released only after expiry of the maintenance period and after passing the final bill based on 'No Claim Certificate' from the contractor.
- (d) Whenever the contract is rescinded, the Security Deposit shall be forfeited and the Performance Guarantee shall be encashed. The balance work shall be got done independently without risk & cost of the failed contractor. The failed contractor shall be debarred from participating the tender for executing the balance work.

- (e) The engineer shall not make a claim under the Performance Guarantee except for amounts to which K RIDE is entitled under the contract (not withstanding and/or without prejudice to any other provisions in the contract agreement) in the event of:
- (f) Failure by the contractor to extend the validity of the Performance Guarantee as described herein above, in which event the Engineer may claim the full amount of the Performance Guarantee.
- (g) Failure by the contractor to pay KRIDE any amount due, either as agreed by the contractor or determined under any of the Clauses/Conditions of the Agreement, within 30 days of the service of notice to this effect by Engineer.
- (h) The Contract being determined or rescinded under provision of the GCC, the Performance Guarantee shall be forfeited in full and shall be absolutely at the disposal of the K RIDE.
- (i) The Performance Bank Guarantee shall be submitted in the Prescribed format as mentioned in Section 4
- (j) If any of the certificates regarding eligibility criteria including the affidavit submitted by the tenderer along with tender document are found to be false/forged or incorrect at any time after the award of the contract, it will lead to termination of the contract along with forfeiture of Bid Security and Performance Guarantee besides any other action provided in the contract.

## **9. INCOME TAX:**

Income tax will be deducted at 2% (two percent) and also surcharge if any at source from each bill unless otherwise authorized by the Income- Tax department.

## **10. GST:**

### **10.1 All the tenderers should ensure that they are GST compliant and their quoted tax structure/rates are as per GST Law.**

**10.2** The rate quoted by the tenderer should take into account the above taxes/Cess and any other taxes, levies, tolls, fees, octroi, payable to State Government or any other department/local bodies/statutory bodies including the surcharge etc. K-RIDE will not pay any such charges levied upon tenderer and tenderer will only be paid at the rate accepted by the Railway administration under the Contract.

**10.3** Tenderer should quote his/their rates taking into consideration the above complete and no claims whatsoever made by the contractor shall be entertained. This clause is an Excepted Matter as per Para 63 of General Conditions of Contract and in case the Contractor resorts to claims and demands arbitration, the same shall be excluded from arbitration at all stages.

**11. EXECUTIVE INCHARGE OF WORKS** will be indicated at the time of Issue of Letter of Acceptance.

## **12. CONSIGNEE'S RIGHT OF REJECTION:**

**12.1** Notwithstanding any approval which the inspecting officer may have given in respect of the stores or any materials or the work or workmanship involved in the performance of the contract (Whether with or without any test carried out by the contractor or the Inspecting officer or under the direction of the Inspecting officer) and notwithstanding delivery of the stores where so provided to the interim

- 12.2 consignee, it shall be lawful for the consignee, on behalf of the purchaser, to reject the stores or any part, portion of consignment thereof within a reasonable time after actual delivery thereof to him at the place or destination specified in the contract. If such stores or part, portion of consignment thereof is not in all respects in conformity with the terms and conditions of the contract whether on account of any loss, deterioration or damage before dispatch or delivery or during transit or otherwise whatsoever.
- 12.3 When any stores delivered to K-RIDE are rejected, this shall be removed by the contractor within 15 days from the date of rejection. Such rejected stores shall lie at the contractor's risk from the date of rejection. If the stores are not removed by the contractor within this period, the purchaser or his nominee shall have the right to dispose of such stores, as deemed fit, at the contractor's risk and account.
- 12.4 The purchaser shall also be entitled to recover from the contractor, handling and ground rent/demurrage and any other charges for the period the rejected stores are not removed after the aforementioned period.
- 12.5 Stores that have been dispatched by rail and rejected after arrival at destination may be taken back by the contractor either at the station where they were rejected or at the station where they were dispatched. If the contract is placed for delivery F.O.R. station of dispatch, the contractor shall pay the carriage charges on the rejected consignment at Public Tariff Rates from the station of dispatch to station where they were rejected. If the contractor prefers to take back the goods at the station from which they were dispatched, the goods shall, in addition, be booked back to him, freight to pay at Public Tariff Rates and at owner's risk.

### **13. INSPECTION AND MAINTENANCE OF SITE:**

- 13.1 The Contractor before tendering shall inspect the site of work, examine the nature of soil to be excavated, nature of work to be executed, check up the availability of working space and other constraints if any and also acquaint himself of the available access to the site of work and make due provision in the rate for all such contingencies.
- 13.2 The contractor shall make his own arrangement for site clearance, clearance of debris, jungle, bushes etc., without any extra payment. If any heavier materials like sleepers etc., are to be shifted from the site of work, the same should be carried out by the contractor for which separate payment will be made under relevant items of SOR 2011 (SWR), whichever is applicable. Contractor is also responsible to clear all construction debris, labour camps, surplus materials from site of work without any extra payment as and when these are not required for the progress of the work.

### **14. SERVICE ROADS:**

The K RIDE does not undertake to provide any service roads for the movement of the contractor's vehicles. The contractor can however make use of the service roads, where they exist free of charge. However, the railway shall not undertake to maintain them and the contractor shall maintain them at his own cost. In other places, the contractor should make his own arrangements for the movement of the vehicles and no extra rate shall be paid for this. The KRIDE reserves the

Right to make use of the roads formed and maintained by the contractor, as and when necessary, without any payment to the contractor. In the event of the contractor forming the service roads where land is not available or cannot be given by the K RIDE for this purpose, it shall be clearly noted that the contractor shall make his own arrangements for obtaining the required land and KRIDE shall not take any responsibility in this respect and shall not compensate the contractor in any way.

**15. WATER AND ELECTRICITY FOR WORKS:**

- 15.1 The contractor shall make his own arrangements within his quoted rates for necessary water and electricity required for the performance of the contract.

**16. PROGRAMME OF WORK:**

- 16.1 A tentative programme chart and/ or the list of milestones prepared by the K-RIDE for the contract to achieve the K-RIDE's Milestones needs as indicated above will be attached along with Acceptance Letter. The contractor shall accept and return a copy of the programme chart to K-RIDE within fifteen days of issue of LOA and before commencing of Kick off meeting. The contractor may modify the programme to suit his resources, however, without any change in milestones and submit a modified programme to the K-RIDE duly signed by him within fifteen days of issue of LOA and before commencing of kick off meeting. This is however subject to a condition that such shifting or change shall not affect the completion period of the contract in any manner whatsoever. The modified programme of the contractor shall not be conditional and will not affect the terms and conditions of the contract and if made conditional by the contractor, K-RIDE reserves the right to reject the same and to treat such conditions as breach of contract as agreed to in the contractor's offer and in the LOA issued by the K-RIDE. K-RIDE reserves the right to accept or not the modified programme of the contractor. Contractor shall not have any claim whatsoever in this regard. Further programmes, as per the latest progress of work, will be reviewed and prepared on similar basis from time to time.
- 16.2 If the confirmation of acceptance of programme as above is not received within fifteen days of issue of LOA, the contractor is liable to pay towards penalty up to Rs.50,000/- for delay in submission of the programme.
- 16.3 Non-acceptance of K-RIDE Programme or submission of Modified Programme by the contractor which is not acceptable to the K-RIDE, shall also tantamount to breach of contract by the contractor and the K-RIDE shall be entitled to terminate the contract on account of the contractor's default as per General Conditions of Contract, for this lapse alone.
- 16.4 The K-RIDE reserves the right of determining the contract at any stage of review of the progress under Para 16.1 to 16.3 above, if the above agreed programme(s) are not adhered to within the margin of 10% of the provision in the programme in terms of shifting of individual milestones or the quantum of progress at any stage, as envisaged in the General Conditions of Contract and the **Performance Guarantee & Security Deposit** will be forfeited without prejudice to other remedies as contemplated under the Conditions of the Contract.
- 17. INCENTIVE BONUS PAYMENT FOR EARLY COMPLETION OF WORK:** (For cases pertaining to doubling/traffic facility/throughput enhancement work or any other specified work)

- 17.1 Incentive Bonus is payable for early completion of the work in contracts where

specifically provided in the detailed **tender notice uploaded in website**. The incentive bonus payable shall not be more than 1% of the initial contract value or revised contract value whichever is less for everyone full month of early completion ahead of the original completion period or revised completion period whichever is less.

- 17.2 The maximum incentive payable shall not be more than 5% of the original contract value or revised contract value whichever is less.
- 17.3 This incentive scheme shall not apply if any extension is granted beyond the original completion period or any revised completion period whichever is less, irrespective of any reasons whatsoever including FORCE MAJEURE conditions.
- 17.4 Period less than a month will not be reckoned for the incentive bonus calculation.
- 17.5 No relaxation with regard to 'holidays', 'no work days' or 'non availability of line blocks' or non-availability of materials to be supplied either by the contractor, loss of time due to FORCE MAJEURE situations of any nature will be allowed for this purpose. Date of completion shall be reckoned as per the satisfactory date of completion of the work as certified by the General manager (S&T), who shall decide the same based on the inspection notes of the Commissioner of Railway Safety authorizing opening of the section or joint inspection notes between Open Line and Construction departments or based on his own personnel assessment duly recorded.
- 17.6 The decision of the GM shall be final and binding on the contractor. No representation from the contractor in regard to early completion of work shall be entertained from the contractor.

## **18. IMPOSITION OF FINE FOR DELAY OF WORKS:**

- 18.1 In the event of the contractor not adhering to the agreed programme of work and / or not achieving the milestones or quality of work etc., specified, even if no physical or actual damages have occurred to the K-RIDE and even if the currency of the work is not affected, the K-RIDE reserves the rights of, with a view to improve, expedite and the make the contractor realise the effects of delays, levying fine or any value as deemed fit on the contractor by the Engineer – in – charge based on the merit of the case. The amount of fine will be solely decided by the Engineer – in – Charge at his discretion and will be based on his assessment of disturbances, difficulties or losses caused by the delay or poor quality of work, etc., including that of the reputation of the K-RIDE. The contractor shall have no claims what-so-ever in this regard. Subsequent to the imposition of the fine, if contractor makes good, the progress / quality and achieves the milestones to the satisfaction of the K-RIDE, part or full amount of the fine imposed may be waived and the amount so worked out will be released to the contractor at the sole discretion of the Engineer – in – charge duly recording necessary certification to the effect that no damages have occurred. However, in case of actual or anticipated damages occurred or occurring to the K-RIDE, the recovery of agreed / liquidated damages will also be imposed and recovered from contractors dues as per provisions in GCC in addition to the above fine.

## **19. SETTING OUT WORKS:**

The Contractor shall be responsible to keep at site his own modern equipment for the true and proper setting out of the works for correctness of the position, levels, dimensions and alignment of all parts of the work and for provision of all necessary pegs, reference pillars etc., If, at anytime, during the progress of work, any error shall appear or arise in the position of levels, dimensions or alignments at any part of the works, the Contractor, on being required to do so by the Engineer-in-charge, shall at his own expenses rectify such errors to the satisfaction of the Engineer-in-charge.

## **20. ENGAGEMENT OF TECHNICAL STAFF BY THE CONTRACTOR:**

20.1 The contractor shall employ proper managerial and technical personnel during the execution of this work and the personnel deployed shall have adequate experience and thorough knowledge of the works executed including the specifications and proceedings involved. The list of technical staff along with the copy of their bio-data and Degree/ Diploma certificate proposed to be engaged by the contractor shall be submitted to the Engineer-in-charge within 15 days from the date of issue of LOA and the approval of Engineer is to be obtained for engaging them for this specified work. The period of deployment of technical staff covers from 15 days after the date of issue of letter of acceptance till completed works are handed over to the K-RIDE

### **20.2 Scale or Personnel**

20.2.1 One qualified graduate engineer, when cost of work to be executed is Rs. 200 Lakhs and above and One qualified diploma holder engineer when cost of work to be executed is more than Rs.25 Lakhs but less than Rs. 200 Lakhs.

20.2.2 Electrical/ Electronic Diploma holders can also be engaged in lieu of graduate Electrical/ Electronics Engineers at two Diploma holders for each graduate engineer.

20.2.3 Technical Staff stated above should be available at site to supervise the work continuously and to take instructions from Engineer-in-charge. Record of engagement of technical personnel shall be maintained by the contractor at each site, where his Engineers are deployed. This record will be verified by the Sr.DGM/S&T of the project or any other K-RIDE representative.

20.2.4 Even if the value of agreement changes due to variations or even if the currency of contract is changed, the scale of personnel will remain same as per the original agreement value. The decision of the Engineer-in-charge as to the period for which the required technical staff was employed by the Contractor on this account shall be final and binding on the contractor.

20.2.5 Record of engagement of technical personnel shall be maintained by the contractor at each site where his Engineers are deployed. This record will be verified by the Sr.DGM/S&T of the project or any other K-RIDE representative. In case of non-availability on any single occasion at site, it will be treated as absence for a week.

20.2.6 Further in case the contractor fails to employ the Qualified Engineer, as aforesaid in Para above, he shall be liable to pay an amount of Rs. 2,000/- and Rs.1000/- for per day or part thereof for the default period for the provisions Graduate Engineer and Diploma Engineer respectively. The amount will be recovered from the bills.

20.2.7 While passing each “on” account bill, the Sr.Manager (S&T) in-charge will certify the availability of technical staff as above, otherwise the recovery as above shall be made from every bill.

## **21 PRECAUTIONS AT WORK SITE:**

- 21.1 All precautions to ensure safety of workmen must be taken while unloading and loading the materials during execution of work. Traffic rules should be strictly followed and the contractor should indemnify the K-RIDE against any claim due to accidents and unforeseen incidents.
- 21.2 The contractor must ensure the safety of labourers engaged by him while crossing the track during the course of execution of work and the K-RIDE will not be responsible for any injury sustained by the labourer or for any fatal accident. The contractor should bear all the loss and expenditure involved. Wherever necessary he should also provide necessary look out men
- 21.3 The work should be carried out without any interference to the normal working of the Railway track and structures. The contractor will be held responsible for any loss or damage or injury caused during the course of work to the labourer or to the public/private person or to the Railway/ Public/private property and the contractor should bear all the loss and expenditure involved.
- 21.4 Wherever work is to be executed close to any running railway lines or roads or buildings or public passage, the Contractor shall ensure proper protection of public, railway/public property. He shall also ensure all special precautions as provided in this tender.

## **22 License, Permission Etc:**

- 22.1 The contractor shall arrange to obtain permission direct from the State Government or local authorities concerned for using Forest, PWD roads. The rates tendered shall be inclusive of any cess ,tax or any other charges payable to the authorities concerned.
- 22.2 The contractor shall make his own arrangements for obtaining the license for any explosives, as may be necessary, for procurement, transportation, storage and use of the same. All possible assistance will be given by the K-RIDE, should there be any difficulties in obtaining the license etc. However, any failure shall not form the basis for any claim by the contractor against the K-RIDE or for additional payment for the work.
- 22.3 In case of use of explosives for blasting the contractor shall strictly abide by the Indian Explosive Act, the Rules and Regulations framed there under in carrying out the work, shall observe all the provisions of the Indian Mine Act and the metal ferrous mines regulations and rules there under as well as any other Act and Rules, as may be enacted and laid down by the State and Central Government from time to time, for such work.
- 22.4 The contractor will be held responsible for any loss /damage/ injury caused during explosion to the labourers or to the public/ private persons or to K-RIDE/Railway/Public/Private property and the contractor should bear all the loss/expenditure there by involved.
- 22.5 The contractor shall take special precaution while carrying out works at location

where there is likelihood of any underground cables/OFC etc. and the work shall not be carried out without the presence of an authorized K-RIDE representative/staff deputed to supervise the work.

- 22.6 Before taking up any digging work, it is the responsibility of the contractor to get cable layout plan from Engineer-in-charge of the work and arrange to demarcate the same at the site.

**23. CONTRACTOR'S VEHICLES, PLANT & MACHINERY ETC.**

- 23.1 Necessary permit/ interstate permits for the movements of vehicles/ Plant & machinery shall be arranged by the contractor.
- 23.2 Breakdown to transport vehicles, machinery etc., if any, will be on the contractor's account.
- 23.3 Accidents, if any, to his vehicles, Plant and Machinery or to persons would be the responsibility of the contractor and the KRIDE will not be responsible for the damage or compensation there of.

**24. USE OF CONTRACTORS VEHICLES, PLANT & MACHINERY ETC., FOR ACCIDENT RESTORATION WORKS:**

- 24.1 The vehicle and equipment of contractors are liable to be drafted by K-RIDE administration in case of accidents/ natural calamities involving human lives for speedy restoration work.
- 24.2 For payment purpose, this item will be operated as a Non-Schedule (NS) item, duly negotiating rates as per the conditions of contract.
- 24.3 Contractor/Tenderer shall furnish the details of vehicles/equipments available with them to keep a record of the same.

**25. TERMS OF PAYMENT:**

- 25.1 All bills shall be submitted by prime bidder only (to whom contract has been awarded) to the authority mentioned in Preamble.
- 25.2 Subject to any deductions or recovery which the K RIDE may be entitled to make under contract, the Contractor will be entitled to be paid from time to time by way of 'on account payment' for supply of goods and 'progress payment' for works as in the opinion of the Engineer he has executed in terms of Contract.

**25.3 ON ACCOUNT PAYMENT FOR SUPPLY ITEMS:**

- 25.3.1 "On Account Payment" for supply of equipments, materials will be made on receipt of equipment/ materials, as indicated in Schedule A, B, C, D,H, J,K by K-RIDE. On Account payments made will subsequently be adjusted against payments due on Provisional Acceptance or Final Acceptance.

- 25.3.2 **90% (Ninety Percent)** of the value of each consignment shall be paid on receipt of materials at K-RIDEnominated site duly accepted by the Purchaser's Engineer and on production of the following documents:

- i) Acknowledgement of receipt of materials by Engineer.
- ii) Original Inspection certificates issued by Inspecting Officer.
- iii) Manufacturer's inspection certificate that the materials are in accordance with the specifications of the contract.

- iv) Challan/ Invoice in duplicate.
- v) Bank Guarantee in the approved form (see Section 4).

25.3.3 **10% (Ten percent)** value of the supply items shall be paid after the successful completion of installation, testing & commissioning of whole system covering all materials and services as per schedule of works and issue of "Provisional Acceptance Certificate" by Engineer.

25.3.4 **100% payment** against Supply of Spares, Measuring Instruments, Tool Kits, and if any similar items, which is not part of installation and commissioning, will be made on receipt of materials, acceptance of the same and production of documents listed in Para 25.3.2 above.

#### 25.4 **PROGRESS PAYMENT FOR EXECUTION ITEMS:**

25.4.1 Progress payment shall be made separately for each pure execution item/ sub-item of work given in the schedule A,B, C, D, H, J,K as follows.

25.4.2 **75% (Seventy five percent)** of the progress payment for the items in schedule of work for trenching and protective works and cable laying activities shall be made. The balance **15% (Fifteen percent)** of the progress payment for these items shall be made after terminations and end to end testing from relay room to function end are completed and jointly tested by the Engineer to his satisfaction.

25.4.3 For all other items of work (schedule A, B, C, D, H,J,K), progress payment for **90% (ninety percent)** value of the work/ services will be made after the works are completed to full satisfaction of K RIDE.

25.4.4 **10%** value of the works/ services completed shall be made after the issue of Provisional Acceptance Certificate and submission of all 'As made' documents of the relevant schedules.

#### 25.5 **ON ACCOUNT PAYMENT FOR SUPPLY AND INSTALLATION ITEMS:**

25.5.1 'On Account' payments in respect of items involving supply and installation, 75% of the accepted rate of the schedule item will be paid on complete supply of the equipment listed in the schedule after due inspection, against production of indemnity bond and other formalities as applicable to other supply items in the schedule. The remaining 15% payment will be released only after successful installation of the equipment under the schedule. The balance 10% will be released on submission of all 'As made' documents of the relevant schedule.

#### 25.6 **FINAL PAYMENT:**

On the basis of provisional acceptance certificate issued by the Engineer for all the works in all the sections covered in this contract, the final bill for the balance payment for each item/sub-item of work shall be submitted by the Contractor along with a clear "NO CLAIM CERTIFICATE". The provisional acceptance certificate shall be issued by the Engineer only when he has accepted the work wholly after conducting the acceptance tests on each item of work.

#### 25.7 **FINAL SETTLEMENT:**

On expiry of the warranty period and issue of certificate by Engineer-in-charge

regarding satisfactory completion of work and final acceptance of the entire installations in all respect, **Security Deposit** will be released to the Contractor after adjustment of any dues payable by the contractor.

## **26. CERTIFICATE FOR MODVAT BENEFITS ON BILLS:**

26.1 The Contractor should submit the following certificate along with the bills:

“We certify that no additional duty set off on the Goods issued by us have accrued under the MODVAT Scheme in force on the date of supply after we submitted our quotations and submitted the present bill.”

26.1.1 In the event of MODVAT credit being extended by the Government of India to more items that already covered, the firm should advise the purchaser about the additional benefits accrued through a letter containing the following certificate or any variation thereof as may be considered necessary by individual Railway administration :

“We hereby declare that we can avail additional duty set offs as per latest MODVAT scheme in force now and we hereby give a reduction of \_\_\_\_\_ per unit and agree to revise the prices indicated in the order. The current B.S. of \_\_\_\_\_ is payable on this reduced price. Therefore, we request you to amend the order accordingly.”

## **27. DEDUCTION FROM ON ACCOUNT PAYMENT BILLS**

27.1 All costs, damages or expenses, which K-RIDE may have paid or incurred, which under the provisions of contract are Contractor's obligations, will be deducted by K-RIDE from progress payment bills/invoice of Contractor, as and when it is understood that such an expenses have been incurred or paid for.

27.2 All such claims of K-RIDE shall, however, be duly supported by appropriate and certified vouchers, receipts or explanations as are available to enable the Contractor to identify such claims.

## **PART -(I) TECHNICAL SPECIFICATIONS (GENERAL)**

### **1. GENERAL:**

The Outdoor works include supply and execution of items as well as work in the relay/equipment room and in the field. It will be the responsibility of the Tenderer to commission the complete interlocking with outside gears i.e., points, signals and other field signalling equipment, installation, testing and commissioning of system including transportation of all the equipment to site of installation. Testing and commissioning will be done in association with K-RIDE Engineer and staff.

The work shall be carried out according to the drawings approved by the K-RIDE and shall conform to the provision of Signal Engineering Manual and schedule of dimensions. The contractor shall be solely responsible for the proper execution of the work as per specification. Description of Outdoor work

is given in the respective item of Schedule of work, however, Broad guidelines for various activities in connection with outdoor works are as follows. In case

of any conflict with the description in Schedule of Work and these guidelines, the details in the Schedule of work shall prevail.

**2. CABLELAYING:**

Guidelines on the Cable Laying (Document No. RDSO/SI/G/2010, Version 1.1 or latest) issued by RDSO, which is part of the tender document shall be followed while laying the signaling, power, Telecomm and OFC in the station section and block section

**3. FOUNDATION & ERECTION OF APPARATUSCASES:**

3.1 The work consists of pit excavation, casting foundation with bolts of adequate size having cement concrete of ratio 1:3:6 as per:-

- (i). Drg. No. SG/CN/02/6 (Apparatus case full size)
- (ii). Drg. No. SG/CN/02/7 (Apparatus case Half/ Quarter size)

The location of apparatus case will be indicated by KRIDE/Railways.

3.2 Two 'E' types locks on the doors of full size apparatus case and one 'E' type lock on the front door for half size apparatus cases shall be firmly fixed and tested with 'E' type key . Locking and unlocking shall be smooth with least force. Suitable fixing arrangements for 'E' type lock on the door of apparatus case shall be fabricated by the contractor, if such arrangements does not exist. One hard wood shelf plank 37mm thick, planed and varnished shall be firmly fixed for all types apparatus cases/ battery boxes. Also latching arrangement for the back door shall be provided, if required.

3.3 All the apparatus cases (Full/Half/Quarter) are to be painted with Aluminum paint on the outsides surface and the location numbers are to be painted in 'Bold' letters. Inside of location box shall be painted with white/Aluminum enamel paint.

**3.4 CABLE TERMINATION BOX FOR CABLE THROUGHING, POINTMACHINE:**

3.4.1 Excavating earth and casting concreted foundation as per Drg. No. SG/CN/02/8 and C.T. boxes are to be erected on Rails/L-angles vertically by using suitable size of bolts and nuts. The cables shall be taken through 2 Nos. of G.I. Pipes of size 32mm inner dia and 300mm length fixed at the bottom of the CTB with suitable fixing arrangements. It shall be ensured that there should be no break in the cable core during the process of taking the cables through pipes.

3.4.2 In case of CTB for Point machine, one no. of GI pipe 150mm long shall be fixed at the side of the CTB for drawal of jumper wires from point machines/lever locks with proper fixing arrangements. The CTB should be provided with EWS lock.

3.4.3 CT Box shall be painted with Aluminum paint and rails/L-angles with black paint. The circuit particulars shall be painted neatly on the CT Box cover and the location number have to be painted in „BOLD“ letter.

**3.5 SHIFTING OF APPARATUS CASES/ CT BOXES:**

The work consists of excavation of pit around the existing apparatus cases full/ half size and CT boxes, shifting of the location box along with foundation clear of infringement from the track. The pit shall be excavated with maximum care to avoid any possibility of damage to the existing cables. The location box

shall then be shifted carefully along with the foundation and cable termination, equipment etc., without disturbing the wiring. While shifting apparatus cases of full size, the brick wall covering the cables shall be broken before shifting the

location box. After the location box is shifted, brick masonry walls shall be constructed on the front and back sides of the location box foundation. River/M-sand sand shall be filled up to the floor of the location and the bottom shall be sealed with sealing compound.

3.6 CABLE TERMINATION IN APPARATUS CASES/CTB's:

- 3.6.1 At each apparatus case/CTB, the work consists of fixing all cables, fixing of Phynolic synthetic industrial fiber base fine weave cotton fiber sheet - 6mm thick to IS specification 2036 - 1995 - Type board along with terminal blocks and termination of cables/cores (conductors) using PVC/ Nylon sleeves as per details of termination in approved location diagrams. The contractor shall prepare cable termination and wiring details of apparatus cases and C.T. boxes and obtain the approval of the K-RIDE/ Railway Engineer before execution as per the approved cable plan.
- 3.6.2 The underground signaling cable-main, tail and power shall be properly secured by wooden clamps of 50mm x 50mm teak wood inside apparatus case on 25mm x 100mm base plank. The cables shall be neatly skinned duly mending and taping of cable ends for termination bunched and terminated on the terminal board at the required place in order as per approved apparatus case circuit diagram. All the aluminum power cables of size 10 Sq.mm and above shall be provided with Aluminum lugs using crimping tool of appropriate size.
- 3.6.3 K-Ride/ Railway will indicate approximate total number of cable core, terminations to be made in the apparatus cases/cable termination boxes. The contractor shall fix Phynolic synthetic industrial fiber base fine weave cotton fiber sheet - 6mm thick to IS specification 2036 - 1995 - Type F5 sheet as required by Railway. Terminal blocks with links, fuse blocks with fuse shall be fixed on the terminal board pertaining to each apparatus case and cable termination box using proper size of wood screws. Two suitable holes shall be made on either side of terminal block and fuse block for bringing cable for termination. Termination of main cables, tail cables, power cables, core/cores shall be made at the proper terminal as per approved wiring diagram pertaining to each apparatus case and C.T. Boxes. Before final termination, each cable shall be tested for continuity, insulation etc. and readings recorded and jointly tested and signed.
- 3.6.4 As per site conditions, the termination of new cables may be required on the existing terminal blocks or by fixing new terminal/fuse blocks in old apparatus cases which shall be done as per approved circuit diagram wherever required. The terminal particulars are to be re-painted or corrected on the doors of apparatus cases as instructed by K-RIDE. Suitable clamping arrangements have to be made for the new cables and also the bottom the opening of the apparatus cases shall be closed with masonry brick work and sealed with cable compound.
- 3.6.5 After fixing all the signaling cables inside the apparatus case, the side opening shall be closed with masonry work and plastered. The inner side is filled with Sand and finally the bottom is sealed with sealing compound.
- 3.6.6 All the underground cables shall be provided with punched name plates showing total no. of cores, cross section of each core, Aluminum or copper

conductor and from and to details etc. and also painted inside each apparatus case.

3.7 WIRING OF SIGNALS/ LC GATE CONTROL/ TRACK CIRCUIT/ POINT CONTROL RELAYS IN LOCATIONS:

3.7.1 Relays, transformers, heavy duty contact relays and other gadgets controlling the above functions shall be firmly fixed on suitable relay frames using MS Angles of size 25mmx25mmx6mm and MS Flats of size 25mmx6mm inside respective apparatus cases. The MS relay frame shall be painted before fixing. Hylum sheet of 25mm thick of requisite size shall be fixed inside the apparatus case for fixing Resistance and Electrolytic condensers. In case of shelf type relays, the relays shall be mounted on shelf planks with suitable anti- tilting arrangement. If plug in type relays are used, 16/0.2mm flexible copper wire shall be used for wiring. For shelf type relay and point motor circuit, 3/0.75mm copper wire shall be used. There shall be no joint in the wire. For soldering the wire to relay clips of Plug-in-type relays in relay racks, best quality rosin core solder and temperature controlled soldering irons shall be used. The complete wiring shall be tested jointly and linked to tail cable.

3.7.2 The description of all relays, fixed in each apparatus case shall be painted inside apparatus case doors. PVC/ Nylon sleeves shall be provided on each wire before termination on terminal block. The name of the circuit and wire where connected shall also painted on the sleeves.

3.7.3 Wire should be soldered to relay clips and suitable copper eyelets crimped with crimping tools shall be adopted before the termination. The wiring and termination shall be carried out as per the approved circuit diagram. The relays details shall be painted. PVC/Nylon sleeves shall be provided for each wire before termination and the details of circuit and where the wires connected etc., shall be painted on the sleeves. The complete wiring shall be tested.

3.8 ALTERATIONS TO PAINTING PARTICULARS AT LOCATION BOXES:

Consequent to introduction of new circuits or alterations to existing circuits in apparatus cases/ CTB"s, new nomenclature should be painted on the cable sleeve. And also the new particulars should be painted on the inner side of the doors at apparatus cases/ CTB"s.

3.9 FILLING OF EARTH AROUND LOCATIONS:

The work consists of filling of earth around the foundations of signals and apparatus cases for a width of 0.5m on all sides from 150mm below the foundation top to ground level. The earth shall be consolidated after filling.

4. MAIN SIGNALS:

4.1 CASTING OF COLOUR LIGHT SIGNAL FOUNDATION:

4.1.1 The work includes excavation of pit and casting of color light signal foundations with M.S foundation bolts as per Drg. No. SG/CN/02/9. The position of signals will be indicated by K-RIDE.

4.1.2 The Signal should be casted using Hylum sheet/ Waterproof Plywood/ MS sheet Form work to ensure smooth exterior finish and avoid the additional plastering. Necessary earth work, shall be made around the signal foundation and sufficient earth work shall be made up to the required level in the normal terrain and the cable entries shall be closed as per the instructions of K-Ride/ Railway Representative at Site.

4.2 ERECTION AND WIRING OF SIGNALS:

- 4.2.1 Signal pole shall be securely fixed to surface base and erected on signal foundation and plumbed. The gap between the signal pole and surface base shall be filled with suitable putty to avoid tilting. Soon after installation, the pole shall be painted with two coats of Aluminum paint/  
Yellow & Black strips of Enamel paint for second distant signal after a coat of primer. Signal unit shall be provided with two coats of black enamel paint.
- 4.2.2 Multi-unit color light signals up to 4 aspects shall be properly mounted on the top of signal pole where there is no route indicator. If required, LED type signal aspect shall be fixed for signals. If there is route indicator a large off set bracket shall be fixed firmly with 2 nos. of 'U' bolts 3/4" thick on the signal pole for mounting multi-unit color light signals. One 22mm through hole shall be drilled on signal pole just below the off-set bracket and a 20mm through bolt shall be the provided to prevent offset bracket from sliding down.
- 4.2.3 Signal ladders with platform complete fittings, cast iron shoe and adequate number of support to suit signal pole 3.6/4.6m, shall be firmly fixed clear of infringement with suitable bolts and nuts and painted in black. The ladder shoes shall be concreted. This work also includes fixing of marker boards, enameled number plates with suitable clamps at the required place. Speed board if any, shall be fixed on the pole with proper clamp clear of infringement as required by K-RIDE.
- 4.2.4 Signal tail cable shall be taken through the signal pole without damaging insulation and armor, skinned and terminated on signal units. If the signal units are mounted on large offset brackets a vertical slotted hole of 50mmx50mm in size shall be made on signal pole for taking signal tail cable. Suitable protection shall be provided on the slotted hole to avoid damage to insulation of cable.
- 4.2.5 This work includes fixing of LED Unit along with Current Regulator. Wiring to be done according to approved circuit diagram. The unwanted aspects shall be blanked using MS sheets of 3mm thick.
- 4.2.6 All the multi-unit color light signals shall be wired with 3/0.75mm copper wire and terminated. For each aspect 2 separate wires shall be used from the terminals and the wiring shall be tested jointly.
- 4.3 **BLANKING ARRANGEMENTS FOR SIGNALS:**  
In case of signals with a horizontal clearance between 2.21m and 2.36m (in B.G) from the nearest track centre, blanking arrangement shall be provided. If a Ladder of signal erected at a distance with in 2360 mm from C/L of adjacent track then it should be blanked off (strap around by a sheet around ladder) to a height of 300mm between 2060mm and 2360mm above rail level using MS plate not less than 8mm thick. The end portions of the plates should be folded and made smooth so that it will not harm the person climbing the ladder. This plate shall be painted with black.
- 4.4 All signals shall be properly earthed in RE area.
- 4.5 Necessary wooden cross shall be fixed on the newly erected signals before being brought into use.
- 4.6 **ROUTE INDICATORS:**
- 4.6.1 All types of Route Indicators shall be mounted on the top of signal pole firmly. The tail cables for route indicators shall be taken through signal pole without any damage to the insulation and armor, skinned and terminated on route indicators. Route indicators shall be wired with Wire PVC 3/0.75mm copper as

per the approved circuit diagram. Hoods shall be fixed properly and examined during day time and if required extension of hoods shall be made to have proper visibility. The route indicators shall be painted as required by Railways.

4.6.2 Universal AC/DC LED Numeric Route indicator

4.6.2.1 Universal AC/DC LED Numeric Route indicator should be capable of displaying 1 to 19 route with right & left arms with optical sensing and complete housing for use with LED ECR.

4.6.2.2 The unit should mount at the top of signal post safely and securely. Necessary fixing arrangements shall be supplied by Contractor.

4.6.2.3 The circuit should be so designed that it draws the required current to ensure the pickup of ECR whenever the digit is lit.

4.6.2.4 RDSO approved Route LED"s should be used for left and right arms. It should work on 110V +/- 20% AC.

4.6.2.5 Color of LED"s of white color of reputed make should be used for Numeric Route indicator seven segment display. Fusing of an LED should neither blank the whole segment nor deteriorate the visibility of indication. Uniform intensity over entire operating range Components used in numeric route indicator unit should be industrial grade.

4.7 CALLING - ON SIGNALS/'A' MARKER LIGHTS:

Calling on signals/'A" marker shall be fitted on the signal posts at required height using off-set bracket. Suitable hole shall be drilled on the signal poles to bring the cable/jumper wires. The cable/jumper wires shall be taken to calling on signal/ „A" marker through suitable steel hose pipes and wired by using 3/0.75mm copper wire. The calling on signals shall be provided with 'C' marker and „A" for „A" marker. Number plates to be fixed and painted as per the standard practice in this Railways.

4.8 REPLACING THE TAIL CABLES IN SIGNALS:

Wherever necessary the existing tail cables shall be released from the existing signals and new tail cables shall be drawn to the aspects and terminated. The termination particulars shall be painted.

4.9 SHIFTING OF SIGNALS:

Wherever required the existing Colour Light Signals shall be shifted to clear any infringement from the tracks as instructed by K-Ride/ Railway representative at site. The earth surrounding the foundation shall be excavated and the cable coils shall be loosened very carefully without causing any damage to the cables. The Signal shall be moved along with the foundation slowly to the new position and earthwork shall be done around the foundation. The loosened cables shall be buried at 1m depth.

4.10 REPLACEMENT OF SIGNAL UNITS:

The existing CLS units shall be removed from the signal post duly disconnecting the cables and new signal units (required as per signalling plan) shall be mounted on the existing signal pole. The tail cable is to be terminated and the signal aspect shall be wired by providing LED unit with Current regulator. If there are any blank aspect, the same shall be covered with round MS plate.

4.11 SCREENING ARRANGEMENTS:

For the Colour Light signals in RE area which are coming in the infringing zone, screening arrangement as per standard RE drawing shall be provided

as required by Railways. The screen made of MS wire-mesh will be fixed on MS angles of size 25x25x6mm with suitable fixing clamps, bolts and nuts and finally painted with black.

5. SHUNT SIGNALS:

5.1 POSITION LIGHT GROUND TYPE SHUNT SIGNAL:

5.1.1 The work involves excavation of pits and casting of shunt signal foundations as per Drg. No. SG/CN/02/10. The position of shunt signals will be indicated by the K-RIDE. Foundation for shunt signals shall be casted with cement concrete in the ratio 1:3:6 using stone jelly of size 20/25mm. The foundations are to be plastered on all sides. Necessary earthwork shall be made for each position light shunt signals as required by the K-RIDE.

5.1.2 The position light shunt signal shall be properly mounted and plumbed.

5.1.3 The cables are to be taken through the unit, skinned and terminated. The post type/Ground type shunt signals shall be wired and terminated and the wiring shall be tested jointly.

5.1.4 This work includes fixing of number plates and direction Arrow plates. The post shall be painted with Aluminum while the signal unit and surface base with black enamel paint.

5.1.5 The CLS units, Route Indicators, Calling-on signals, position light shunt signals post type and ground type shall be provided with EWS locks.

5.2 POST TYPE SHUNT SIGNAL:

Small off-set bracket shall be firmly fixed with 'U' bolts of suitable size on signal pole for mounting Post type shunt signals. One 22mm through hole shall be drilled on signal pole just below the off-set bracket and a 20mm through bolt shall be provided to prevent offset bracket from sliding down. A vertical slotted hole of 50x50mm in size shall be made on signal pole for taking the signal tail cable. Suitable protection shall be provided on the slotted hole to avoid damage to insulation of cable. The cables are to be taken through the unit, skinned and terminated. The post type/Ground type shunt signals shall be wired and terminated and the wiring shall be tested jointly. This work includes fixing of number plates and direction Arrow plates. The post and signal unit shall be painted with Aluminium and enamel black respectively. One EWS lock shall be provided for the signal.

6. TRACK CIRCUITS:

6.1 INSTALLATION:

6.1.1 The work includes drilling of holes, bonding of rail joints with 8 SWG GI soft solid wire. 7.2mm holes are to be drilled close to Fish Plates on the web of rail and the bond wires are to be fixed by driving channel bond pin tightly. Two bond wires are to be provided for each joint in parallel. One bond wire clip is to be provided for each joint to keep the bond wire intact. In point track circuit, parallel jumpers/ bond wires/cables shall be provided as required by the K-RIDE/Railways with proper supporting arrangements.

6.1.2 Four TLD boxes, two each at track feed end relay end shall be fixed clear of infringement and the respective track circuit tail cables 2 x 2.5 sq.mm PVC copper conductor from the apparatus case shall be terminated in these boxes.

6.1.3 In Point zones, additional TLD boxes shall be provided for series jumpers as per the bonding plan and instruction of K-Ride representative at site. The connection from the TLD boxes to the rail should be through 8 SWG GI soft

solid wire which should be taken through PVC sleeve or signalling cable if required and fixed to the rail both at feed and relay ends. The GI Wire should be clipped on to the sleepers to prevent shorting with rails.

- 6.1.4 Wherever Glued joints are not provided, Rail Joint insulation RDSO type shall be provided with long bolts and nuts at places marked by K-RIDE/Railways. In case of point zone track circuit, necessary insulation shall be provided for switch extension pieces/„D“ brackets, throw bar lugs, gauge tie plates, crossing plates, stretcher bars, etc., as per site conditions and fixed by the contractor in the presence of K-Ride representative. Insulating material shall be provided by contractor. Contractor shall use proper MS washers, bolts and nuts for insulating them. All the insulation shall be tested jointly. Wherever the Roding crosses track circuit zone, it shall be provided with rod joint insulation and tested.
- 6.1.5 Polarity bonding in each point track circuits shall be provided using 8 SWG soft wire, insulated and clipped on to sleeper. Parallel bonding shall be done wherever required. In RE area transverse bonding should be provided at both feed and relay ends by connecting 2GI 8SWG wire across the block joint as per the bonding plan.
- 6.1.6 Track circuit work includes fixing of track feed and track relay equipment in the apparatus cases as indicated by the Railway. The shelf type track relay shall be provided with suitable anti-tilting arrangement. Track relay details shall be painted on the inner side of the apparatus case door.
- 6.1.7 Suitable flexible copper wire shall be used for wiring the track relay, track feed equipment, batteries, chokes, etc. and finally terminated at the terminal block. For each track circuit, secondary cell 80 AH shall be charged and installed in the apparatus case. The no. of cells and chokes to be used for each track circuit will be as instructed by the Engineer in charge. The secondary cells shall be charged by the contractor through reputed agencies. The charging of secondary cells shall be done as indicated in following paras below.
- 6.1.8 All the TLD boxes shall be painted and Track Circuit numbers along with feed end or relay end particulars shall be neatly painted as required by K-RIDE/Railways.

## **6.2 ALTERATIONS TO TRACK CIRCUIT:**

- 6.2.1 Alterations to the existing track circuits involves by shifting the Feed end equipment/ Relay end equipment/block joints and installing them at a different locations and re-wiring them.
- 6.2.2 After completing the installation/alteration of track circuit, it shall be energized, tested, adjusted and readings recorded in track test record.

## **6.3 POINT MACHINES:**

### **6.4 INSTALLATION OF POINT MACHINES**

- 7.1.1 Electrically operated point machines shall be fitted in level to all facing points as per standard drawing on long sleepers on extended gauge-tie plate, clear of infringement.
- 7.1.2 The point machine shall be installed after cleaning the machine (both inside and outside) and greasing/oiling of all the moving parts. The point machines shall be hand operated, detection and motor controlling contact adjusted before taking to site. All unwanted openings shall be covered with MS Sheets.

- 7.1.3 The point machines shall be fixed with proper size of bolts and nuts and

flat/spring washers with correct size of holes on special sleepers to avoid lateral play.

7.1.4 All point connecting rods shall be connected to point machines as per standard layout/drawings without any strain and with minimum offset. All connecting rods shall be in level and correct size of pins shall be used to avoid longitudinal play. Any changes in the connecting Roding during installation which necessitates welding and off sets shall be carried out by the contractor at site. The welding shall be by smithy process. Lengthy roddings shall be supported suitably.

7.1.5 Suitable eyelet shall be used for termination of power cables using Crimping tool. The jumper wires from the point machines to the CT boxes shall be taken through flexible conduit PVC pipes and securely fixed with suitable clips. The wiring inside the point machine for motor and detector circuit shall be tested for insulation and earth and the connections tightened. 7/1.4mm 3/0.75mm PVC copper wire shall be used for wiring point machines. PVC/Nylon sleeves shall be used for identification of cable cores/jumper wires and marked with paint. Necessary grooves/wards shall be cut on the point machine at the place of insertion of crank handle, for crank handle interlocking purpose.

#### 6.5 ADJUSTMENT AND TESTING OF POINT MACHINES:

7.2.1 The point machines shall be worked by hand crank and the housing of switch rail with the stock rail shall be checked. All the electrical wiring shall be carried out neatly.

7.2.2 The point machines shall be worked both ways with proper feed. It should work without undue friction and working current shall be recorded.

7.2.3 The point stretcher bar and lock connections should be adjusted in such a way that with a 5mm thick obstruction piece placed between the switch and stock rail at 150mm from the toe of switch,

(a) The point does not get locked.

(b) The point detection circuit is not completed

(c) The friction clutch disengages.

(d) The tripping current does not exceed 200% of normal working current.

7.2.4 The point machine shall be provided with EWS locks/pipe locks.

7.2.5 Necessary notches shall be cut on the pinion of point machine to suit crank handle configuration in the case of 5E only.

#### 7. CABLE TERMINATION RACK:

7.1 Cable termination racks shall be erected in the relay room at the required location as per the approved Relay room floor plan and shown by the K-RIDE with suitable foundation bolts and cement concreted. The cable termination racks shall be painted soon after installation but before cable termination work is taken up. Suitable cable ducts wherever required shall be provided to bring all outside cables to the termination rack.

7.2 All the cables are to be neatly skinned, fixed on the cable bracket and terminate in order. Bending of cables to less than 120 degree shall be avoided. The cable armors and the rack should be earthed. Internal wiring and

termination particulars are to be written with paint. 6 way/1 way terminal blocks are to be fixed on Hylum sheet and held rigidly by mechanical screws.

**7.3 TERMINATION OF CABLES:**

8.3.1 The PBT terminal and fuse blocks shall be fixed firmly on the cable termination racks and serially numbered with paint for easy identification. Tags shall be provided for each terminals and painted, giving description of the circuit. Suitable rubber grommet shall be provided on the holes of termination racks. Copper tape of width 20mm x 1.5mm shall be used for providing bus bars. Suitable holes shall be drilled in copper tape for this purpose.

8.3.2 All the cables shall be identified by a punched label, tied on to each cable. Printed cable termination index and pasted on Perplex sheet of thickness 10mm as per instructions of site in- charge shall be fixed in the relay room showing the terminal numbers circuit-wise. In case sufficient space is not available for fixing the board in one piece, it may be provided in parts retaining the overall size as per instructions of site in-charge. 'As made' terminal particulars shall be prepared in tracing Film duly signed and handed over to the K-Ride at the time of commissioning.

**9 RELAY ROOM:**

**9.1 ERECTION OF RELAY RACK :**

9.1.1 Podanur type Relay racks shall be mounted on T.W base frame of size 50x150mm as required by K-RIDE/Railways in the relay room with suitable foundation bolts and cement concrete.

9.1.2 Siemens's relay rack, (to accommodate 56 Nos. of „Q“ series relays) shall be anchored using „J“ type foundation bolts and nuts (12mmx100mm) with washers. In places where „J“ type bolts cannot be used, special headed bullet type foundations shall be used. An insulator shall be provided for each foundation bolts and also to the ladders for carrying the cables. A MS wall angle of size 35x35x5mm shall be provided- one end grouted to wall and the other end fixed to the relay rack as tie.

9.1.3 The relay rack shall be painted including Relay nomenclature as per relay disposition chart soon after the installation and before plugging of relays.

**9.2 WIRING OF RELAYS(NEW/ ADDITIONAL/ ALTERATION):**

9.2.1 Based on the circuit diagram, contact analysis chart shall be prepared by the contractor. The required number of 50 way terminal boards, plug boards and plug in type relays shall be fixed on

the new/ existing rack in the nominated places as instructed by K-Ride representative. The configuration of plug boards should be checked with the contact analysis chart. The nomenclature both on the rear and the front side of the plug board and on front side of the relays in the relay frame shall be painted.

- 9.2.2 Suitable arrangements shall be made in the relay rack for fixing condenser and resistance unit, required for slow to pick up or slow to release feature. Letter painting shall be made against each unit to identify the circuit for which it is used. Suitable wire supporting Tray made of PVC shall be provided for each row in relay rack to accommodate the complete bunch, wherever the new wiring is carried out.
- 9.2.3 The wiring shall be carried out as per approved circuit diagram. The wiring shall be done on connectors and terminated on terminal clips by soldering process neatly, using high grade solder and Temperature controlled soldering iron. PVC flexible wire 650V grade 16/0.20mm copper conductor shall be used. Potential free contacts of various relays required to be monitored by the Data logger should also be wired on the tag block of the data logger using distinct colour wire. In case of alteration to existing wiring, the wires and relays not required shall be removed. After completing the alteration work, the new wires have to be bunched neatly and brought to original condition. The relay rack wiring shall be tested initially by the contractor and then jointly with K-Ride Representative. Any addition/alteration to wiring in the course of testing shall be carried out free of cost by the contractor. Different colours of wire shall be used for identify the power supply circuit wiring. In case of alteration, a different colour of wire from the existing one shall be used for easy identification.
- 9.2.4 Before plugging, the relays shall be checked visually and defective ones noticed shall be replaced duly reporting the same to the K-RIDE/Railways.
- 9.2.5 The printed Relay Index and pasted on Perpex sheet of thickness 10mm as per instructions of site in-charge shall be fixed in the relay room in the relay room giving the details of the relays and their position in the relay rack. In case of alteration/ additional relay wiring, the relay particulars shall be incorporated in the existing relay index board available in the relay room. If sufficient space is not available for fixing the board in one piece, it may be provided in parts retaining the overall size as per instructions of site incharge.
- 9.2.6 Rubber mat having sufficient width should be placed in front and rear of all the relay rack and FTOT. The mat should not be less than 6mm thick and it should withstand 650V AC.
- 9.3 FUSE BLOWN OUT INDICATION: (Applicable for Relay Interlocking)
- 9.3.1 Fuse Blown out indication shall be provided using Hylum sheet 5mm thick and 50mm width and fixing of 5mm LEDs and resistance in case independent Fuse Alarm system is not provided. The Hylum sheet shall be fixed by the side of the corresponding Fuse Blocks. Separate switch shall be provided for each circuits. This arrangement shall be made near FTOT inside the relay room.
- 10 INTERCONNECTIONS: (Applicable for Relay Interlocking)**  
Interconnection arrangements between the cable termination rack, relay rack, control panel, power and battery room shall be carried out as follows:-
- 10.1 Interconnection between relay rack and FTOT, and to control panel shall be carried out with cable having plain, annealed copper, multi core/single core conductor of 1/1.5 sq.mm PVC insulated, un-armoured, unsheathed 1100v grade cable.
- 10.2 Relay rack to relay rack wiring shall be done with 16/0.2mm PVC copper conductor by soldering process.
- 10.3 The inter-connection between the relay rack and power room, power room and FTOT, Block

Instruments and FTOT shall be carried out with underground, armoured, sheathed, power/ signalling cables of adequate length. The termination shall be carried out using suitable size of copper eyelets/sockets. Inter-connection between power rack and battery room, shall be carried out by using suitable underground cables.

- 10.4 All the interconnecting wires shall be supported by means of Aluminium ladder. Ladder of suitable capacity shall be manufactured using Aluminium angles of size 50mmx50mmx6mm and Aluminium flats of size 25mmx6mm. The inter spacing between two rods of the ladder shall not be more than 125mm. The corners of the ladders as well as the inner path of the ladders shall be of curved shape and shall not damage the insulation of the inter-connection wire. The bends also shall not be steep. The bottom of the ladders shall be provided with Hylum sheet of 3mm thickness. The ladder shall be fixed firmly with proper Aluminium flats.
- 10.5 The inter connection arrangement includes laying of signalling cables in ducts, wherever necessary as indicated by K-RIDE/Railways. Wherever cables are taken through cable ducts inside relay room/ battery room etc., the ducts shall be filled with River/ M-Sand sand up to the floor level and covered with RCC slabs covered with suitable tiles.
- 10.6 All connections/ terminations shall be tested by the contractor and after satisfying himself jointly with K-Ride Representative. Any alterations required shall be carried out by the contractor free of cost.
- 10.7 Cable details, functions allotted to each core and terminal numbers shall be prepared in standard size tracing film and handed over to K-RIDE.

**11 POWER SUPPLY ARRANGEMENT:**

**11.1 INSTALLATION IN POWER ROOM:**

Transformers, battery chargers, transformer rectifiers, voltage stabilizers, inverter, etc., as detailed in the schedule shall be installed and wired as per approved power diagram in power room.

- 11.2 The contractor shall manufacture a power supply panel using 1200x1200mm Hylum sheet not less than 10mm thick for mounting meters, switches/fuses, etc. as required by K-RIDE/Railways. It shall be installed on a frame made of MS angles of size 25x25x6mm, MS flat of size 50x6mm and grouted to the wall after leaving sufficient space from the wall for testing and replacement. The cable shall be fixed on TW base plank of size 25x150mm using TW cable clamps of size 50x50mm and terminated on PBT Terminal blocks.
- 11.3 The power supply arrangements wiring shall be carried out using 7/1.4 mm PVC Copper wire as per the approved circuit diagram.
- 11.4 Ammeter and Stabilizer by-pass arrangements shall be provided on the panel to prevent ammeter being always in the circuit. After wiring, the power rack shall be tested jointly. The power rack shall be energised to its rated capacity and kept in that condition for not less than a week before commencement and any defect notice shall be rectified by the contractor. The Guarantee Certificates and Technical Pamphlets for the power supply equipments shall be handed over to K-Ride. Any addition/alteration to power supply arrangement shall be carried out during Testing and Commissioning.
- 11.5 The power rack and power supply equipment shall be painted suitably and uniformly before installation as required by K-Ride/Railways. Schematic diagram of power supply arrangement and distribution details shall be printed and pasted on 10mm thick perplex sheet as per instructions of site in-charge and fixed in the power room. As made power diagram shall be submitted in tracing film duly indicating the power supply details and position of the equipment's.

- 11.6 The power panel and power rack should be suitably earthed.
- 11.7 **INTEGRATED POWER SUPPLY ARRANGEMENT**  
This work involves supply, erection of Integrated Power Supply (IPS) units conforming to RDSO Specification No. RDSO/SPN/165/2004 with latest amendment as required by Railways and wired.
- 11.8 **PROVISION OF POWER EQUIPMENTS AT LOCATIONS/ LC GATE:**  
The power equipments like Transformer Rectifier, Isolation Transformer, transformers, etc. as mentioned in the schedule should be procured by the contractor and the same shall be installed at the apparatus cases/ LC gates as indicated by K-RIDE/Railways. The equipments should be wired with 3/0.75mm copper wire. On 400V/230V side, the terminals should be protected suitably to avoid any shock. The particulars of equipments and the description of the circuit should be painted inside the Apparatus case as well as on inner doors. Sufficient HW planks (25mm thick) shall be provided for fixing equipments inside the apparatus case. In case of LC gates, one changeover switch shall be fixed on a Hylum board and mounted on the wall inside the gate lodge using MS angles and suitably painted. As per the circuit, the required capacity of HRC Fuse should be provided and wired.
- 12 INSTALLATION OF SECONDARY CELLS AT BATTERY ROOM/ LOCATION:**
- 12.1 This work includes initial charging and installation of the track circuit or any other purpose cells as specified in the schedule. Secondary cells shall be initially charged by reputed firms only and shall undergo not less than 3 cycles of charges and discharges as detailed by K-Ride representative.
- 12.2 IPS batteries shall be charged as per the conditions of the Stores Purchase order.
- 12.3 Battery links (copper/lead) with copper lugs crimped and suitable bolts and nuts shall be used for connecting cells. The charged Cells shall be fixed leaving sufficient working space for taking specific gravity reading and distilled water topping. Cells are to be connected with suitable copper lead links sufficient to carry the full load. Immediately after connection, petroleum jelly shall be applied on battery terminals.
- 12.4 In the Battery room/ Cable Hut wiring of the batteries shall be carried out using PVC 7/1.40mm copper wire with colour codes through PVC Pipes properly clamped and terminated on the Hylum sheet in the battery room.
- 12.5 The details of batteries like capacity, circuit, date of installation, etc., shall be Computer printed and displayed on a Perplex sheet of 10mm thickness and mounted on the wall with suitable screws.
- 12.6 The specific gravity and voltage reading shall be recorded for each cell in a separate register along with the Guarantee Certificate of the supplier and handed over to the K-Ride duly signed.
- 12.7 One Hydro Meter on suitable Stand shall be kept in the battery room.
- 12.8 In case of installation of secondary cells at location boxes, anticorrosive black paint to be coated inside the apparatus case. Additional ventilation arrangements shall be made. The date of installation, capacity serial No. and circuit particulars shall be painted on each cell and inner side of the door.
- 12.9 All connections/ termination shall be tested by t h e contractor and after satisfying himself then to be tested jointly with K-Ride Representative. Any alterations required shall be carried out by the contractor during testing and commissioning of installation.

**13 BLOCK INSTRUMENTS:**

- 13.1 Double line block instruments and Daido single line block instrument FM type shall be mounted on a block counter. All the outer sides and top of the counter shall be made of teak wood and varnished in natural wood colour as indicated by K-RIDE/Railways.
- 13.2 Podanur type single line push button token less instrument shall be fixed on the ground as indicated by K-RIDE/Railways.
- 13.3 Necessary Terminal Blocks and Fuse Blocks shall be fixed inside the Block Counter for termination of jumper wires and cables. Cable shall be fixed properly inside block counter and terminated. The Block relays shall be placed inside the Counter and shelf type relays shall be fixed firmly using anti-tilting arrangements. The relays shall be wired and properly identified.
- 13.4 The control and block lines shall be terminated on distinct colour Wago terminals inside the Quad cable termination box and brought through PVC pipe or HDPE duct to block counter and terminated inside the block counter.
- 13.5 The inter connection between the instrument and line battery (provided in the battery room) shall be done with underground cables.
- 13.6 In RE area block filters and block bell equipments should be installed and wired. The work involves installation of Block Filters and Block Bell equipments on a stand made with MS angles 50mmx50mmx6mm grouted to wall with T.W top plank of 25mm thick, termination of jumper wires in T.W Terminal box of size 300mmx450mmx100mm, wiring including interconnection between Terminal Box.
- 13.7 The block counter shall be provided with a suitable lock with 2 keys.

**14 INSTALLATION OF WAY STATION EQUIPMENTS:**

- 14.1 The way station equipment such as selector, selector bell box shall be fixed at appropriate places and wired as directed by K-Ride Engineer. The control telephone and battery shall be installed in suitable place and battery boxes manufactured out of T.W. The wiring between the test panel/termination box and telephone cum battery box shall be carried out with PVC copper wire 3/0.75mm. The wiring from the equipment and telephone shall be carried out by using PIJF telecommunication cable.

**15 INSTALLATION OF DISTILLED WATER/ DEIONISOR PLANT:**

- 15.1 The work involves Supply and installation of De-ionizer plant, which shall be installed at Distilled Water Plant Room on suitable stand.
- 15.2 For water supply, a fiber tank similar to „SINTEX“ make – 200 liters capacity shall be installed on cut rails, grouted to wall at suitable place indicated by K-Ride Representative.
- 15.3 The water supply connection from water tap towards fiber tank and Distilled Water tank shall be made using good quality of GI pipes, bends, taps and valves of 25mm dia wherever required.
- 15.4 The water pipe lines shall be clamped at required places using proper size of clamps. One separate power socket with fuse indication shall be provided and wired for distilled water plant.
- 15.5 The Distilled water plant shall be tested for its satisfactory working jointly with K-RIDE/Railways.

**16 INTERLOCKING OF LEVEL CROSSING GATES WITH LIFTING BARRIERS:**

- 16.1 Excavation of pit, concrete foundation as per Drg.No.SG/CN/ 11 and erection of ground lever frame using suitable bolts and nuts. Casting of A type foundations for mounting the cranks is included in the scope of this work. All the foundations will be plastered on the top.
- 16.2 Making rod connection from the Ground lever frame to the boom locking mechanism through cranks, adjusting and testing the boom locking from ground lever frame. The rod run shall be at rail level and gap of not less than 40mm shall be maintained while crossing the track. All the joints of rod connecting cranks and levers shall be smithy welded. The rod run between the track shall be insulated while crossing the track circuited portion The Lengthy roddings shall be run on roller stands fixed on trestle located not more than 2.2 Meters between adjacent supports.
- 16.3 The gate interlocking arrangement shall be carried out as per the standard practice of S.W. Rly and as per the instructions of the K-Ride representative at site.
- 16.4 The lifting Barrier will be painted with two coats of enamel paint of approved quality as given below:  
(A) Stands: Black  
(B) Boom with fringes: Black and Yellow- Retro-Reflective stripe 300 mm wide alternatively  
(C) Stop Disc on the boom: Red- Retro-Reflective
- 16.5 Florescent paper strips should be pasted on both the lifting barrier boom.
- 16.6 **INSTALLATION OF ELECTRONIC GATE WARNING EQUIPMENT:**  
The work includes fixing of Gate warning equipment on suitable fixtures as per Railway standard for LC gates - 2 Nos. one on each side of the track, fixing of amplifier in apparatus case and hooter at Road warning signal post, wiring as per approved circuit diagram and painting.
- 16.7 In RE area wire rope and Roding shall be insulated with proper insulating material and all metallic parts shall be connected to earth. Insulation required for wire rope and Roding insulation shall be supplied by the contractor.

**17 INSTALLATION OF STAND BY DIESEL GENERATOR:**

- 17.1 The Standby diesel generator plant with control panel shall be installed on the concrete platform as per standard practice adopted by the Railways using anti-vibration packing to minimize the vibration. Required number of anti-vibration mounting (cushy foot) shall be provided by the contractor.
- 17.2 The control panel of the Diesel Generating set should be properly mounted. The wiring of generator and the control panel shall be carried out using PVC 7/1.40mm copper wire, through PVC Pipes, PVC bends and terminated. An Hour meter shall be provided as required by K-RIDE/Railways.
- 17.3 The Auto Change-Over CLS Control Panel as per the Item Description in the tender schedule need to supplied and installed as instructed by K-Ride representative at site in Panel Room.
- 17.4 The Standby generating plant and control panel shall be earthed.

- 17.5 Secondary cell of required capacity shall be installed and connected for self- starting facility.
- 17.6 After installation, for initial commissioning, the procedure given in the firm's manual should be strictly followed. Each diesel generating set should be tested on full load continuously as per the rating of the generator, defects noticed if any, shall be rectified by the contractor as per the warranty conditions. In case of expired warranty period, the defect rectification shall be arranged by the contractor.

**18 ELECTRIC KEY TRANSMITTER AT LC Gate/ STATION HOUSE:**

- 18.1 Electric key transmitter with/ without crank handle fixed to the key shall be installed firmly on suitable angle supports and Hylum sheet boards in the place indicated by K-RIDE/Railways, with economizer push switch and wired. The cables shall be terminated on a terminal box made using 25mm thick T.W. planks and locking facilities. Required number of terminal blocks shall be fixed inside the terminal box for termination of cables and jumper wires. The wiring shall not be exposed. The cables shall be taken to the terminal box using Powder coated MS Box of suitable size. Interlock the EKT key with Crank handle by Nickel coated Dog chain/ welded. The EKT should be painted and the circuit particulars and ward nos. are to be painted in bold letters.

**18.2 INSTALLATION OF EMERGENCY KEY PROVING CONTACT:**

EKT shall be kept in a glass fronted wooden box and wired. The box shall have the locking and sealing facility using 6 levers NAVTAL LOCK with duplicate keys.

The contacts shall be made when the key is 'IN' and contacts shall break when the key is disturbed or taken 'OUT' using a limit switch.

NOTE: In case of Crank Handle Interlocking using Key-Lock Checking Relays, Provision for KLCR/Crank Handle Box, Termination of Cables on Wago Terminals and Installation to be carried out as per the Item Description in the Tender Schedule and Drawing enclosed here.

**19 INTERLOCKING OF SIDING POINTS/ TRAP POINTS:**

- 19.1 For siding points with succession key lock arrangements and trap points, hand plunger lock fitted with "E" type locks shall be provided on gauge tie plates with suitable bolts and nuts. This work includes fixing of switch extension pieces and split stretcher bars. Notches on split stretcher bars shall be cut at site.
- 19.2 It shall be ensured that, it is not possible to lock the points with an obstruction of 5mm test piece placed between switch and stock rail at 150mm from the toe of the switch.
- 19.3 'E' type lock shall be fitted to the hand plunger locks with proper bolts and nuts. After ensuring the free as well as the full movement of the plunger, marking shall be done and notches cut on the plunger.
- 19.4 Proper lubrication shall be done for the smooth operation of points, HP locks and 'E' type locks.

**20 FIXING OF ELECTRICAL DETECTOR:**

- 20.1 The electrical detector shall be fixed on the extended gauge tie plate firmly. The switch extension piece shall be fixed on the switches and the point is to be connected with electrical detector by using ground connections. If any smithy work is involved, the same shall be carried out on the ground connection rods.

20.2 A CT box shall be fixed near the electrical detector and the cable is terminated inside the CT box. The electrical detector shall be wired with 3/0.75mm copper and the jumper wire shall be taken through hose pipe between electrical detector and CT box.

20.3 The electrical detector shall be painted with Aluminum paint and the point ground connections, CT box with black paint. The working of electrical detector shall be tested in presence of K-Ride/ Railway representative to conform to obstruction test.

## **21 TELEPHONES:**

### **21.1 DESK TYPE PHONES AT STATION HOUSE/APPARATUS CASES/LCs:**

Desk Type magneto telephone shall be supplied and fixed at station house/ apparatus case/ LCs/ apparatus cases near top points/siding points and securely fixed on shelf planks. It shall be ensured that no other gadgets are kept in that apparatus case and separate door lock arrangement made to protect the Telephone battery.

Nickel-Cadmium power pack 4V - 2.2AH, with battery charger 110V AC/4V DC shall be supplied and provided for telephone.

### **21.2 INSTALLATION OF ANNUNCIATOR**

Fixing of Annunciator in the Station Master room on a suitable HW stand fixed to the table/ wall by MS angles, wiring the same using wire PVC 16/0.2mm copper and painting. The hard wood plank shall be pasted with coloured Decolium sheets on all sides. The work also includes supply and wiring of magneto telephone - 1 No. and Ni-cad power pack 4V DC – 2.2AH with battery charger 110V AC/4V DC and painting of various circuit particulars on the Annunciator as instructed by K-Ride representative.

## **22 PROVISION OF TEAK WOOD KEY BOX & TOOL BOX:**

22.1 This work involves manufacture, supply and installation of Glass fronted Teakwood Key box of size 300mmx600mmx75mm with built in lock arrangement. Plastic tags duly engraved giving the particulars of various keys are to be provided along with the keys.

22.2 A teak wood tool box of size 1000mm x750mm x100mm (inner dimensions) made of 25mm thick teak wood, perplex sheet fronted 6mm( Color-less) shall be manufactured and fixed on the wall at a convenient location as instructed by K-Ride representative at site. The box should have provision of padlock for locking arrangements.

## **23 ERECTION OF BOARDS WITH LEGENDS/ GOODS WARNING BOARDS:**

23.1 Retro reflective Boards with Calling on Legends/ Goods Warning boards shall be fitted on to the Rails/L-Angles, erected with suitable foundation at location as indicated by K-Ride representative and as per approved signaling plan, clear of infringements.

23.2 Necessary legends such as "DRAW CLOSE IF SIGNAL IS AT ON" shall be computer printed on retro reflective sheet as per standard practice of this Railways and as per Signal Engineering Manual.

23.3 Rail posts and other fittings shall be painted as prescribed in Signal Engineering Manual and as directed by K-RIDE/Railways Engineer.

## **24 EARTHING:**

24.1 All apparatus cases, battery boxes, CT boxes, armors of cables, battery chargers, transformers, power panels, Control panel, Block Instruments/Control test panel/Cable Termination Rack/Relay Racks, etc., shall be earthed. If number of apparatus cases are grouped at a place, one earth shall be provided up to 2 Full Locations and 1 Half Location. Over and above this, additional earth to be provided at the other end and both the earth need to be connected to all the locations in ring path. Otherwise, separate earth is to be provided for each apparatus case. The earth resistance shall not be more than 10 Ohms.

24.2 GI PIPE EARTHING SYSTEM shall be provided as per the drawing of GI Pipe Earthing system available at K-RIDE and as directed by Railways Engineer.

24.3 COPPER PLATE EARTHING SYSTEM shall be provided as per the drawing of Copper Plate Earthing system available at K-Ride and as directed by K-RIDE/Railways Engineer.

**25 PROVISION OF LOCKS:**

Universal locks (EWS Locks)/ GI locks/Navtal Locks shall be provided for CLS units, Route Indicators, point machines, apparatus cases, battery boxes and C.T. boxes, wherever necessary. Two Navtal locks (Godrej make) 75mm with 2 keys shall be provided for Relay Rooms at all stations.

**26 PAINTING:**

26.1 Block instruments, Block counters, control panel, EKT"s and all signaling gears installed shall be painted in accordance with the standard practice of South Western Railway and as per Signal Engineering Manual.

26.2 While painting, initially one coat of primer and afterwards 2 coats of enamel/aluminium paint shall be applied.

26.3 The details of paints to be used on the signaling gears are shown below.

S. No.	Signalling Gadgets	Colour to be painted (outside)
I	Signal(Colour Light Signal) & Shunt Signal: (i) Surface base (ii) Post (iii)Aspect unit complete	Black Aluminium(except for Distant Signal in Double Distant Territory) Black Note: Post of Distant Signal in Double Distant Territory to be painted in black & yellow stripes at 300 mm interval.
II	All types of apparatus cases and cable termination box	Aluminium
III	Track Lead Disconnection Box	Black
IV	SM"s Control Frame Instrument	Green Enamel
V	Point machines	Black
VI	Electrical Detectors	Black
VII	Electrical Lever locks & Circuit Controller	Black
VIII	Key Transmitters	Red or Black
IX	(i)Double line SGE Block Instrument (ii)Single Line Token Instrument (iii)Single Line Tokenless Instrument	Green Enamel Grey Enamel Green Enamel
X	(i)Interlocking frame supports, quadrants, lever below quadrants, locking trough, catch handle connection & Indication plates (ii) Down rods between Lever tail and crank (iii) All types of cranks, compensators, Facing point Locks, lock bars & Detectors. (iv) Roddings& Rod Rollers	Black  Black Black  Red Oxide Paint

XI	(i)PointLever (ii)Lock Lever (iii)LC Gate Control Lever (iv)Spare Lever (v)Signal Lever	Black Blue Chocolate White Red
XII	Rails	Black

**27 NON-INTERLOCKED SIGNALLING ARRANGEMENT:**

- 27.1 Non-Interlocked Signalling Arrangement as explained below shall be made by the Contractor at his own Cost during all the phases of Commissioning of Stations as per the directions of K-Ride representative. No extra payment will be made on this account.
- 27.2 Erection and wiring of temporary relay rack, SM's slide instrument, wiring alteration in the FTOT, apparatus cases, signals, Control panel etc. as per the instructions of K-Ride representative at site for operating signals and points during non-interlocked working.. The work also includes provision of Magneto Telephone communication between Top points/ location goomties and SM's Room.
- 27.3 The SM"s control instrument shall be wired as required by K-RIDE/Railways and as per the circuit diagram prepared in connection with NI. working. Necessary wooden crosses shall be fixed for the signalsout of use as indicated by K-RIDE/Railways. Special warning boards/stop/speed boards may be fixed temporarily as per the NI plan.

**28 INSTALLATION OF DATA LOGGER:**

The installation and commissioning of Data Logger includes wiring between Data logger equipment and relay rack/ power equipment room. The potential free contacts of DC-DC Converters of EI, TJs, IPS Modules, Block Instruments and ELD to be monitored shall also be wired to the data logger.

**29 RELEASING OF S & T GEARS:**

- 29.1 An inventory of all the S&T gears to be released in the yard should be taken up jointly with K-RIDE/Railways representative duly indicating as serviceable or unserviceable before NI working commences. The same should be submitted and approved by the Engineering in-charge.
- 29.2 The S&T gears as mentioned in the schedule should be released carefully without damage and stacked at a place indicated by the K-Ride representative.
- 29.3 All the concrete foundation of the released gears like signals, location boxes, „A" type bases, etc. should be broken completely. The resultant pit shall be refilled with earth, rammed and re-surfaced. In case of releasing, the stands grouted on the walls/ floor should be restored to original condition and neatly plastered.
- 29.4 All the unserviceable released materials shall be guarded by the contractor till they are returned back to stores/ depot as directed by K-Ride representatives.

**30 TRANSPORTATION OF SERVICEABLE MATERIALS:**

The released serviceable materials shall be transported from the work spot to the Stores Depot. Loading and Unloading of materials shall be done by the contractor. The released material shall be stacked neatly by the contractor in the Railway Stores.

**31 PROCUREMENT OF CEMENT:**

- 31.1 Cement for use in the works shall be procured by the contractor from the main producers/their authorized dealers/ authorized stock yards which shall conform to BIS Specifications.

- 31.2 Cement bags packing should bear the following information in legible marking:
- Manufacturer's name
  - Registered Trade Mark of manufacturer, if any
  - Type of cement
  - Weight of each bag in kgs. or No. of bags/ton.
  - Date of manufacturer, generally marked as week of the year/year of manufacturer, e.g., 30/93 which means of 30th week of 1993.
- 31.3 To ensure quality control, test certificates from the manufacturer should be produced by the contractors, which should confirm to the relevant specifications [latest may be incorporated].
- 31.4 K-RIDE/Railways may also take samples during the course of the work and get the cement tested to ascertain their conformity to specifications.
- 31.5 When such sampling is done, it shall be as per IS Specifications.
- 31.6 Test on the cement as per IS:4301 shall be carried out in the field level. Some of the tests Which may be carried out are:
- Compressive strength
  - Initial and final setting time
  - Consistency
  - Soundness

### **32 WIRES TO BE USED IN S&T INSTALLATION:**

The size of various wires/ cables to be used for the wiring of signalling and telecommunication gadget is indicated below:

SN	Size of wire	Circuits/ Equipments
1	16/0.2 mm Copper	Relay rack wiring Panel wiring Plug-in type relay wiring at location
2	7/1.4mm Copper	Power equipments
3	3/0.75mm Copper	Power equipments in locations Relays other than plug-in type Block instrument Rotary key transmitter All Signals Electrical detector SM"s control instrument Point machine Loop wire at locations

### **33 TESTING & COMMISSIONING INCLUDING AS MADE:**

- 33.1 The entire installation shall be tested by the contractor as per the approved plan and design according to the provisions in Signal Engineering Manual (SEM), OEM guidelines and established practice of the railways and after satisfying himself, the K-RIDE / Railway shall jointly test along with the contractor. Any alteration during testing shall be

- 33.2 carried out at free of cost as required by K-RIDE/Railways before commissioning. Each installation shall be tested in the presence of the supervisory officials deputed by the K-RIDE/Railways as soon as the particular installation/ equipment is installed and unless the working of the equipment is actually ensured, it will not mean that the work has been completed to the satisfaction of the K-RIDE / Railway. This work involves testing and commissioning of the entire installation. Two copies of the approved plans and designs incorporating all construction details and stamped as "TESTING COPY" shall be submitted to K-RIDE before taking up the joint testing with Railways.
- 33.3 In order to ensure that equipments are properly installed and commissioned by adhering to pre- commissioning check list and procedure as defined by OEM in its installation manual, it is necessary that Electronic Signaling systems i.e. EI, SSDAC, IPS, Datalogger are installed, tested and commissioned by RDSO approved manufacturer and a certificate shall be issued to K-RIDE/Railways.
- 33.4 "AS MADE" DETAILS:  
After joint testing of the installation with the K-RIDE/Railways engineers and incorporating all alterations suggested in the approved plan and design, the contractor shall update all the records, plans and design. Required copies of final 'As Made' details as hereunder shall have to be supplied duly incorporating all particulars for the station before commissioning of the entire installation. All „Asmade" shall be prepared by the contractor in AutoCAD 2000 or latest and submitted in compact discs in duplicate. All 'As Made' documents/ plans shall be made by the contractor on Polyester Films to RAILWAY STANDARD only as laid down in the Special Condition of Contract and shall be handed over to the Railways, duly signed.
- i. „As made' Circuit Diagram
  - ii. „As made' Cable Core Plan
  - iii. „As made' Cable Route Plan
  - iv. „As made' Track Bonding Plans
  - v. „As made' Power Supply Layout Diagram
  - vi. „As made' Contact Analysis Chart
  - vii. „As made' Relay Disposition Chart
  - viii. „As made' Termination Particulars of Locations & FTOT.

Contractor shall hand over along with the negatives, required copies of plans and designs in the neatly bound booklet marked as 'FINAL As Made'. Two sets of these documents shall be kept in thick plastic cover (2 sheets back to back in one plastic cover) duly filled in plastic folder and handed over to Railways.

The contractor is required to supply the following bound registers in 100 pages printed on good quality papers. (75 GSM)

- i. Cable Meggering Register,
- ii. Relay Register,
- iii. Relay Room Key Register,
- iv. Route Cancellation Register
- v. Earth Resistance Register.
- vi. Track Circuit Register
- vii. Points Machine Parameter Register
- viii. IPS Parameter Register
- ix. Battery Register,
- x. Axle Counter/MSDAC/ BPAC Parameter Register and any other Registers/Bounded Books as indicated by the K-Ride Representative.

**34 PROCEDURE FOR INITIAL CHARGING OF SECONDARY CELLS:**

- 34.1 All the cells in the battery set shall be same type and capacity.
- 34.2 Electrolyte shall be prepared by mixing battery grade Sulphuric Acid and distilled water in the ratio 1:5 in a glass/ Porcelain container by adding Acid to water and not vice-versa
- 34.3 The new cells shall be cleaned with distilled water and filled with this electrolyte up to 12-15mm above the plates
- 34.4 Allow the plates of cells to soak in the electrolyte for 12 hours
- 34.5 Charge shall be applied at the rate of 4% of AH value of the cells to the correct terminals of the battery set duly interconnected.
- 34.6 Specific Gravity and voltage of each cell shall be measured and recorded once in 8 hours.
- 34.7 Charging shall be stopped when specific gravity becomes 1210 +/- 5
- 34.8 If the specific gravity does not attain this value, little quantity of electrolyte shall be taken out and with electrolyte of higher value (1400 – obtained by adding acid and added water in the ratio 7:11) and charging shall be started afresh.
- 34.9 On charge, the cells shall be discharged with lamp load up to the limit when the specific gravity becomes 1190 and voltage 1.85 volts.
- 34.10 Charge and discharge cycle shall be repeated once again.
- 34.11 Final charge shall be given before wiring the cells to use.

**35 PROCUREMENT OF STORES:**

- 35.1 For the execution of the works, the contractor shall procure items of materials inclusive of miscellaneous and consumable items of Stores.
- 35.2 The specification for each material to be procured and used by the tenderer shall be as indicated against each item of material. All the materials and equipment's to be supplied and used for execution of work shall be to IRS specification wherever available, or to IS, if IRS is not available. In case of materials for which neither IRS nor IS specification is
- 35.3 available, detailed specifications with drawing have to be supplied by the contractor for approval of the K-RIDE/ Railways.
- 35.4 Materials not covered in RDSO's approved list of items and to be supplied by the contractor shall be of the best quality and from manufacturers of reputed establishments. The contractor shall produce Quality test, Warranty certificates from the manufacturers and the pamphlets in four copies to the K-RIDE Materials covered under RDSO's approved list of items should be procured from those firms approved by RDSO only.
- 35.5 The contractor, will however have to procure all the tools and plants required for executing the labour portion of the work and before the actual commencement of the work, the contractor will satisfy the K-RIDE engineer that he has procured all the necessary tools and plant required of good quality. The contractor shall engage his own labour and supervisor for the execution for work covered in the contract.

**36 USE OF TECHNICAL TERMS AND CONDITIONS, DRAWINGS AND SPECIFICATIONS:** Definition of technical terms and symbols used in circuits shall be as per Indian Standard Specifications and where such specifications are not available, they should be of British Standard Specification.

**37 SPARES:**

The Tenderer shall supply the essential spares as per the quantities indicated in respective Schedule of works.

**38 DISCREPANCIES IN DRAWINGS AND OTHER DOCUMENTS:**

The tenderer shall carry out at his expense any alteration of the work due to any discrepancies, errors or omissions in the drawings or other particulars submitted by him.

Any approval given by the K-RIDE/Railway for this purpose shall in no way absolve the contractor from any or all responsibilities for the correct function of the equipment. In this regard, the sole responsibility rests with the contractor in all respect. Any fittings or accessories which may not be specifically mentioned in the specification of tender documents or the letter of acceptance of the tender or the agreement executed thereof but which are usual or necessary as per normal Signal Engineering practice are to be provided by the contractor without extra charge so that the plant is complete in all respects.

**39**     **ISSUE OF MATERIALS:**

- 39.1     Extra care should be taken in the transportation of sophisticated Electrical and Electronic equipments like relays, power equipments, etc. to prevent from damage during transit. Further, these equipments should be stored in a covered place to protect from heat, dust, water, etc. These equipments should be installed and brought in use before the expiry of the shelf life
- 39.2     The materials that shall be handed over to the Contractor at any time for execution of the work shall depend upon the particular item of work in the Schedule to be done at a particular time and also the progress of work. The contractor shall furnish an indemnity bond for a sum equal to the cost of materials proposed to be taken by him. The quantity of materials that shall be given by the K-Ride at a time shall not exceed the value of the indemnity bond that is furnished by the contractor.
- 39.3     Material at Site statement shall be prepared and submitted as per the provisions contained in GCC by the K-Ride Engineer. The contractor must promptly submit the monthly return of the issued stores to K-Ride Engineer in the first week of every month without fail.
- 39.4     If at any time, any material which the contractor would normally have to arrange for himself for executing the works, is supplied by the K-RIDE/Railways, either at the contractor"s request or suo-moto in order to prevent possible delay in the execution of the work due to contractor"s inability to make adequate arrangements for the supply thereof or otherwise such materials will be made available to the contractor in the Railways Stores. All handling thereof will be the contractor"s responsibility. Recovery of the cost of such supply materials will be made from the contractor"s bills as per extant rules of the K-RIDE

**40**     **RETURN OF SURPLUS/ RELEASED MATERIALS:**

- 40.1     The contractor has to return any cut pieces of cables, wires, etc., that may be left out and surplus materials from the drums and other packing materials that might have been handed over to him. No extra payment will be made for this and the unit price quoted against the various items should include this work also. The surplus materials have to be handed over to the Stores of the Engineer- in-Charge of the work
- 40.2     The contractor shall take proper written acknowledgement from the Engineers Representative For all the materials returned by him.
- 40.3     All tools that are required by the contractor for the purpose of transportation of the materials, digging, concreting and erection, wiring and painting works shall be brought by the contractor himself. This shall include spare parts, fuel and consumable and miscellaneous stores .The rates quoted by the contractor shall be deemed to be inclusive of all charges for such items and inclusive of labour required to ensure efficient and methodical execution of work.

**41 RECEIPT OF MATERIALS FROM CONTRACTOR:**

- 41.1 As soon as the materials are accepted by the K-Ride from the contractor, DMTR entries are to be made immediately. While taking materials from the contractor, delivery challan issued by the firm, who has sold the materials to the contractor/trader and inspection certificate shall be insisted upon.
- 41.2 Fabricated items which are to be supplied by the contractor are to be checked thoroughly with the drawings regarding quality of the materials, gauge dimensions, etc. as per the schedule. Wherever any material is received from field/contractor, the detailed nomenclature shall be entered in the DMTR. In case of equipment, the details of manufacturer's name, year of manufacture, RDSO Test Certificate No., Serial No., Contractor's name and Agreement No. and place of installation shall be mentioned both in the DMTR and the ledgers.
- 41.3 Materials are normally to be delivered at designated Stores by the contractor. If they are delivered at site due to logistics/exigencies, the supervisor/officer receiving such materials (after verification of due inspection) shall arrange for necessary entries in the Site Inspection Register and ensure the entry in designated Stores' DMTR within a week.

**42 INSPECTION OF WORKS:**

- 42.1 The Engineer or his representative shall inspect and test the various portions of the work at all stages and shall have full power to reject all or any portion of the work that he may consider to be defective or inferior in quality of materials workmanship or design in comparison to what is called for in the specification. In the event of rejection of any work already executed and not in accordance with specification as in this tender and/or as determined by the Engineer or which the Contractor has been apprised, the contractor shall carry out alterations/ replacements to such works to the satisfaction of the Engineer for which no additional expenses will be borne by the K-Ride.
- 42.2 The contractor shall submit detailed test procedure for each equipment, sub-system and system as a whole to the K-Ride. The K-Ride shall discuss with the contractor and modify the test procedure as may be required to ensure that the requirement of tender specifications are complied. The finalized test procedure shall, only, act as a broad guideline and K-Ride shall be free to carry out any other tests that may be considered essential. The test procedure shall give details of all equipment, test and measuring instruments required to perform the tests which shall be provided by the contractor free of cost.

**43 ATTENDING TO DEFECTS:**

The contractor shall rectify defects that may arise in the work executed during Maintenance period after completion of work, such defects being due to bad workmanship on the part of the contractor or otherwise. Should any dispute arise so as to correctness of the defect pointed out, the Engineer's decision in this regard is final and binding.

**44 INSPECTION OF MATERIALS:**

- 44.1 Materials to be supplied by Contractor shall be of best quality and shall conform to the relevant specifications, Designs and Drawings. The materials shall be procured by the Contractor/s from manufacturers of repute or their authorized dealers as approved by the Engineer-in-Charge.
- 44.2 The contractor should procure signaling/telecom items which appear in the RDSO approved list of suppliers. The contractor shall take prior approval of the K-RIDE/Railways before placing orders on the firms.

- 44.3 The items which are included in the list of RDSO approved suppliers (Electrical Signaling items) shall be inspected by RDSO and Mechanical Signaling items shall be inspected by RITES except petty items which shall be inspected by representative of the Engineer-in-Charge. The RCC products, GI Pipes, FRP type TLD Boxes, Apparatus Case, HDPE Pipe, DWC pipes, split DWC pipes, Polyolefin Cable channel and Earth Electrodes, shall be inspected by RITES. In case the value of Electrical signaling items is less than Rs. One Lakh, the inspection shall be carried out by RITES. In exceptional cases, the consignee inspection shall be carried out by an Officer nominated for the purpose. Even in these cases, the materials shall be procured from RDSO approved sources.
- 44.4 The following items will continue to be inspected by RDSO irrespective of its value:
- (a) All Types of Signalling Relays
  - (b) Block Instruments
  - (c) All type of Axle Counter Equipments
  - (d) All Power Supply Equipments
  - (e) Electric Key Transmitter
  - (f) Terminal Blocks (PBT type)
  - (g) Electric Point and Lock Detector
  - (h) Electronic Interlocking system.
  - (h) Data Loggers
  - (i) LED Signals
  - (j) PVC Wire Copper for signalling
  - (k) Maintenance Free Earth.
  - (l) All underground cables
- 44.5 All materials that are not covered under specification, designs and drawings of RDSO, Railway Board, etc., will be procured by the Contractor from the manufacturers of repute/their authorized dealers, after the approval of the Contract Signing Authority
- 44.6 Materials to be supplied by the contractor shall be put up for inspection of Engineer or his representative for checking its quality/ suitability before they are finally used/ installed by the Contractor and necessary inspection certificate to be obtained. The Contractor shall therefore arrange to get the material inspected in advance, preferably in bulk and not in piece-meal. The Contractor shall give the K-Ride 10 (Ten) days" notice, when the materials are ready for inspection.
- 44.7 The inspection charges levied by RDSO/ RITES will be on K-RIDE account.
- 44.8 All materials to be supplied by contractor should be offered by him/them for RDSO"s/RITES inspection, well in time, so as not to delay the progress of work at any stage at any of the stations in any way on this account.
- 44.9 If required, the Contractor shall provide at point of production, apparatus and labour for making required tests under the supervision of the K-Ride. Tests may be made either at point of production, on samples submitted or at the destination.

**45 FACILITIES FOR TEST & EXAMINATION:**

The contractor shall provide, without any extra charges, all materials, equipments, tools and labour of every kind which the RDSO/RITES or their nominee may consider necessary for any tests and examinations which they or their nominee shall require to be made on the contractor's premises and shall pay all cost attendant there upon. The contractor shall also provide and deliver free of charge at such places as the RDSO/RITES or their nominee may nominate such materials as they or their nominee may require for the independent testing organization. The cost of any such tests will be defrayed by the K-RIDE unless it is stated in the specification that it is to be paid by the

Contractor.

**46 CERTIFICATE OF INSPECTION AND APPROVAL:**

- 46.1 No stores will be considered ready for delivery until RDSO/RITES/K-RIDE/Railway inspecting officer nominated by them have certified in writing that the material has been inspected and approved by them for dispatch.
- 46.2 Facilities must be provided by the contractor to the K-RIDE or their nominee for inspection of the stores, equipments and structures at all stages of their assembly, manufacture and fabrication.

**47 INSURANCE:**

- 47.1 The contractor shall take out and keep in force a policy or policies of insurance against all liabilities of the Contractor or the K-RIDE at common law or under any statute in respect of accidents to persons who shall be employed by the Contractor in or about the site or the Contractor's Office for the purpose of carrying out the contract works on the site. The contractor shall take about and keep in force a policy or policies of Insurance against all recognized risks to their office accommodation and storage for which he is liable. Such insurance shall in all respects be subject to the approval of the K-RIDE.
- 47.2 The Contractor shall take out and keep in force a policy or policies or insurance for all materials handed over to him irrespective of whether used up in the portion of work already done or kept for use for the balance portion of the work until such works are handed over to the Railway.
- 47.3 For this purpose, the works are deemed to have been handed over when final acceptance certificate is issued by the Engineer after the completion of the entire acceptance test to be conducted on the works. The contractor shall not be liable for losses/damages to the materials either used up in the portion of work done or the materials kept for use at site, in consequence of mutiny or other similar causes over which the contractor has no control and which cannot be insured. Such losses or damages shall be the liability of the De.
- 47.4 The Contractor should, however, insure the stores brought to site, against risks in consequence of war and invasion, as required under the Emergency Risk (Good) Insurance Act in force.
- 47.5 The Contractor shall take out all insurance covers in connection with this contract with the General Insurance Corporation of India.

**48 AVOIDING INFRINGEMENT OF INDIAN RAILWAY ACT:**

- 48.1 The works must be carried out most carefully without any infringement of the Indian Railway Act or the General and subsidiary rules in force on the Railway, in such a way that they do not hinder Railway operation nor affect the proper functioning of or damage any Railway equipment, structure or rolling stock except as agreed to by the Railway, provided that all damage and disfiguration caused by the contractor to any Railway or Public properly must be made good by the contractor at his own expenses failing which cost of such repairs shall be recovered from the contractor.
- 48.2 No work on the points, track circuits, equipments involving working signaling gears, internal wiring, cable termination, etc., should be done unless and until contractor's technical supervisors are present at site.

**49 CONTRACTOR'S DRAWINGS:**

- 49.1 Any work done by the contractor prior to the approval of the contractor's drawings will be done at the risk of the contractor unless previously authorized in writing by the K-RIDE.

- 49.2 The tenderer shall be responsible for the correctness of the drawings furnished by him. The contractor shall carryout any alterations of the works due to any discrepancies, errors or omissions in the drawings or other particulars, submitted
- by him. Any approval given by the K-RIDE/Railways for this purpose shall in no way absolve the tenderer from full responsibility for the execution of the contract in all respects.
- 49.3 After the contract is awarded, the contractor shall furnish to the K-RIDE required, prints of contractor"s drawings that form an essential part thereof. No change shall be made in any approved drawings without the written consent of the K-Ride/Railways.
- 49.4 After completion of the execution of the contracts, the contractor shall submit to the K-Ride/Railway all corrected tracing film/cloth tracings of drawings furnished by him and prescribed sets of copies of final drawings.
- 49.5 Notwithstanding the fact the K-Ride/Railway might have approved or the contractor"s design, drawings and specifications the contractor is responsible for the correctness of the entire scheme as a whole and its satisfactory performance to the specifications as laid down by the Railway. The K-Ride/Railway"s responsibility is only for the correctness of the signaling plans.
- 49.6 In the event of any breach of the aforesaid conditions, the contractor shall in addition to throwing himself open to action for contravention of terms of the agreement and or for original breach of trust, be liable to account to Government for all moneys, advances or profits resulting or which in the usual course would have resulted by reason of such breach.

#### PART- (II)

##### TECHNICAL REQUIREMENTS OF ELECTRONIC INTERLOCKING

1. Electronic Interlocking (EI) system including sub systems to be offered should be as per RDSO Specification No. RDSO/SPN/192/2019 or latest for all the stations mentioned in the Scope of Work of SCC with Hot standby feature as per RDSO TAN No: STS/E/TAN/3004 or latest and have RDSO approval on the date of closing of tender.
2. Approved Signal Interlocking Plan of the proposed stations shall be issued as per the Milestone Activities and TDC specified in SCC and during the Kick off/ review meetings. However, Draft/ Tentative plans of the yards may be seen in the office of GM/K-RIDE on any working day.
3. Before Commissioning of Electronic Interlocking, Technical System Application approval as specified in RDSO TAN No: STS/E/TAN/3012 Ver. 2 or latest shall be obtained from the Competent Authority RDSO/PCSTE by the Railways. Contractor shall ensure the preparation and submission of the required documents at least two months in advance of the first phase commissioning schedule.

## 4. Information required as per RDSO specification is as under:

Sl. No.	Description of Information	Details of Information
a)	Approved Interlocking Plan, Selection Table and Panel diagram of the station	1. Approved Interlocking Plan and Selection Table shall be provided by K-Ride/Railways as per the Milestone of Activities and TDC specified in Special Conditions of Contract and during the Kick off/ review meetings. 2. VDU Panel diagram shall be designed by the Contractor as per the Approved Interlocking Plan and submitted for approval by the K-Ride/Railways.
b)	Whether CCIP (Domino type) or VDU terminal or both required	Dual VDU
c)	System O/P required to drive field gears. Relay interface or object Controllers	Relay Interface
d)	110V AC or DC usage for signal lamp lighting	110V AC with ECRs
e)	Size of VDU monitor screen	Maintenance VDU – 42” LED Operator VDU – 55” LED

## 5. Other features of the proposed signaling system shall be as under:

- 5.1 EI system to be installed at all stations is working in Centralized Architecture. However, scheme may be changed during the course of execution.
- 5.2 In the Distributed architecture, the distribution of Object Controllers shall be made Line/ Zone- wise so as to result in minimum repercussion to traffic in case of failure of any Object Control Module or the power supply or its OFC connectivity to Electronic interlocking. The end goomties shall be provided by K-Ride/Railways in addition to Central EI room for housing the distributed version of EI.
- 5.3 The typical EI Distributed architecture with power supply and redundant communication topology as specified in the RDSO TAN No. STS/E/TAN/3008 or latest shall be followed.
- 5.4 For better reliability, all vital sub systems like Processor unit, Object controllers shall have separate 110-24 Volt DC- DC converters. DC-DC converters provided for EI shall be segregated for 'A' & 'B' systems along with segregation of cabling and termination for power supply up to DC- DC converters, for all the converters and in N+1 configuration. The typical EI power supply schemes issued by RDSO vide TAN No. STS/E/TAN/3008 or latest shall be followed.
- 5.5 The EI system should be designed to suit QN1 and QNA1 24V DC relays.
- 5.6 The scope for Provision of EI system includes designing of EI Software (Application Logic, Interface Circuits etc.) including Operator and Maintenance VDU software as per

- 5.7 approved signaling plan & Table of control provided by K-Ride/Railways. The K-Ride/Railways will check and make necessary corrections and hand it over to the contractor for final preparation of circuit diagram and submission for approval before installation.
- 5.8 Design charges for phase works as per Phase signaling plan will be paid as per schedule of work, in case the work is commissioned in multiple phases.
- 5.9 Operation and Maintenance terminal of the EI system shall be as per RDSO TAN No. STS/E/TAN/3007 Ver.1 or latest
- 5.10 Industrial grade fan less PCs shall be used for EI installation for VDU/Maintenance/Diagnostic terminals like MOXA Series V2406, Kontron MPCX 28R, MEN BC50M or similar as specified in the RDSO specification and Technical Advisory Notes with compact flash drive suitable for use in Non-AC & normal environment.
- 5.11 Installation, testing and commissioning of Datalogger system/ RTUs at End goomties as well as Central EI room suitably interfaced to EI system with networking up to Divisional S&T control room to facilitate monitoring of digital and analog inputs.
- 5.12 Track repeater relays /slot relays /Gate controls relays/ siding control relays/repeater relays shall be of approved type and shall work on 24V DC.
- 5.13 The point operation is working on 110 V DC with independent detection.
6. The signaling system should meet the requirements of 25 KV Railway Electrified section.
7. After testing and commissioning of the entire installation, "As Made" Design & Documents and Installation details shall have to be supplied as per specification, duly incorporating all particulars for the station. All "As Made" Design and Documents" shall be prepared by the contractor in Autocad 2000 or latest and submitted in Soft Copy (pen drives) and Hard Copy (R.P. Film) in duplicate. Blue prints of the same shall be supplied in desired number as per the schedule.
8. ESSENTIAL SPARES :
  - 8.1 All lowest level field replacement module/ assembly/ device units, which shall include all circuit packs/ boards, Cards, modules, terminals, fuses, power supply ancillary equipment, interconnecting couplers/ connectors/cable of each type.
  - 8.2 The scale of Essential spares shall be 10% and 15% of the quantities of Normal Cards and Vital Cards used in the working system respectively subject to a minimum of one.
9. Specification for Tool Kit related to EI

The indicative list of measuring instruments and tools is as follows, which is not exhaustive. Tenderer should include the contents of the Tool Kit along with their offer including any other tool specifically required for handling the equipments supplied in this contract.

  1. Crimping tool set
  2. Crimp insert set
  3. Extract tool set
  4. Insertion tool set
  5. Location tool set
  6. Screw driver adjustable
  7. Spanner double ended 33mm
  8. Spanner double ended 3/8x1/2"
  9. Spanner double ended 5/8 x 3/4"

10. Spanner double ended 7/8x1"
11. Adjustable screw spanner 12"
12. Insulated cutting plier
13. Insulated nose plier
14. Hammer 1 ½" LBS ball pane
15. Hacksaw frame
16. Electronic soldering iron 230V/60W
17. Digital multimeter (Fluke)
18. AC clamp meter of Suitable range to cover the measurements of all kind of Used Voltages and currents (Fluke or equivalent)
19. Cabinet to store tools

10. Scope of Work under Items related to Electronic Interlocking System Complete is as below.

10.1. Supply Portion of Electronic Interlocking System Complete

Manufacture and Supply of Microprocessor based Electronic Interlocking (EI) system complete as per RDSO Specification No. RDSO/SPN/192/2019 or latest with latest amendments, as per Special Conditions of Contract and Technical Specification enclosed, including all fixtures, interconnection cables and jumper wires, mounting arrangement and accessories to make the EI System functional at stations mentioned in the Scope of Work of SCC. This EI system shall be of Hot Standby with Distributed Architecture. This system should have either relay interface or object controllers to drive field gears. If object controllers are used, it shall be installed at relay room of station. The system shall be designed with Dual Operator VDU of size 55" with industrial grade Embedded Fan-less PC as per RDSO TAN No. STS/E/TAN/3007 Version 1.0 or latest. The Signal lamps are to be lit with 110V AC in case of direct-fed signals.

The supply includes:

- (a). DC-DC converters shall be supplied separately for A & B Systems along with segregation of cabling and termination & shall be in N+1 configuration as per RDSO TAN No. STS/E/TAN/3012 dated 10.08.2016 ver.2.0 or latest.
- (b). Data logger with 32 Analog inputs and 512 External Digital inputs along with Protocol converter for Interfacing the EI system and Fault diagnostic software shall be as per RDSO Specification No. IRS-S-99/2006 or latest and as detailed in Technical requirements for Datalogger in next section. Data logging facilities shall conform to 5.1.5 of RDSO Specification No. RDSO/SPN/192/2005 or
- (c). latest. The tenderer shall take the responsibility to supply Data loggers which are not only interfaced with EI system but also interface seamlessly with the existing Data logger network
- (d). 2 Nos. of 55" size Operator VDUs and 1 No. of 42" Maintenance VDU with Industrial grade Embedded Fanless PC as per RDSO TAN No. STS/E/TAN/3007 Ver. 1.0 or latest with adequate storage memory to work in Hot-standby mode. The VDUs shall have minimum 4K resolution for 55" monitor and Full HD resolution for 42" monitor with commercial grade suitable for 24/7 operation.
- (e). Only OFC based communication equipment should be provided for communication between EI equipment and Operator VDU. OFC/UTP cable switches, protocol converters etc. and any special cards and cables /wires required for OFC based communication system should be supplied for under this schedule item. Only Armoured OFC cable as per railway specification shall be used (supply not included).

NOTE:

- (1). Vital I/O Bits are calculated as per the EI Functional Table enclosed below.
- (2). Hardware Configuration mentioned below is inclusive of additional 15% of I/O Bits either in the form of Unused bits in installed cards or unused I/O slots, any other Vital I/O, Non- vital I/O and Read Back Inputs as required to make EI system functional with Dual VDU system as per OEM requirements.
- (3). In case of Siemens Westarce Make, the Quote Should be inclusive of QN1, 50V DC Interface relays, if required.
- (4). Any other materials other than the above mentioned materials, required for making the Electronic Interlocking functional to be supplied as part of this schedule item.

- 10.2. Installation, Testing and Commissioning of Electronic Interlocking System Complete Design, Installation, Wiring, Testing and Commissioning of EI Equipments as per RDSO Specification No. RDSO/SPN/192/2019 or latest, including installation of Relay racks and Fixing & wiring of all types of interface relays, termination of interface wires on the CT rack (FTOT) and printing sleeve particulars. The input and output cables/wires (RDSO approved) used for interface wiring of EI shall be made of twisted pair.

This work also includes:

- (a). Supply of 2 sets of hard copies of Design documents (Application Logic and Interface Circuits) for approval and supply of 2 sets of final approved copy.
- (b). Supply and Installation of EI Racks, Relay Racks, Fixtures, Mounting arrangements, Interconnecting cables and Jumper wires etc. Relay racks, which are being supplied as a part of this item shall have 15% spare capacity for future use.
- (c). Supply and Installation of Powder Coated SM Key Cum Counter Box made of MS Sheet of approved type as per approved drawing of Counter Box.
- (d). Supply and Installation of Panel Operator Console in SM Room New Modular/Pyrotech or similar or superior company (as approved by K-Ride engineer in charge) with control desk for 2 monitors of min 55" size, 2 operators, 2 Nos. of UFSBI/SSBPAC Block panel and on SM Key Cum Counter Box. & one module to be provided for storage in SLAT system - should include space for housing Two nos of Embedded PCs, 2 nos FDMS and their Power supply arrangement for with proper ventilation - Two chairs (Godrej PCH7002DX or superior as approved by officer in charge) to be provided adequate spares as approved by engineer in charge so as to cater for entire codal life of work space with arrangements to fix 2 No. VDUs of 55", SM Key Cum Counter Box, 2 Nos. of UFSBI/SSBPAC Block panel & Axle Counter Reset Boxes, etc. The material of the working surface should be minimum 12 mm thick ASS+ 25mm MDF Board. 2. Structure: Made of heavy duty Extruded Vertical and Horizontal Aluminium profiles of HE9WP grade. The Extrusions shall be duly powder coated with 40+ microns over all surfaces. All sheet metal parts must be finished with a durable, black, electrostatic powder coating. OEM must be FSC certified. The structure shall be rigid enough to withstand BIFMA X5.5: 2014 (Latest Edition) test. 3. Slat Wall Shall be made of approximately 2mm thick Extruded Aluminium (HE9WP aluminium alloy). 4. Shutters & Side Legs: - Front, back shutters shall be of 18 mm Laminated MDF Board with premium finish. Side leg shall be of 25mm of the same finish. Hinges shall have ten year's warranty against manufacturing defects. Proposed console shall

meet the VOC emission parameters as per BIFMA X7.1 standard. Proposed

- (e). console must be Green guard Gold certified. 5. Cable Trays and Wiring: - The desks must be designed with vertical and horizontal cable trays to allow for continuous cable management between the cabinets. Wire shall be routed into the cabinet through gland plate. Proposed console should be RoHS Certified from UL/Intertek  
All the materials required for the fabrication and fixing of console shall be supplied by contractor including Lead, Lift and Man-power. Work need to be carried out as per the tentative drawing available at the office of GM/Sr.DGM/K-Ride and the instruction of site engineer. This item also includes supply of Godrej C13 or better make/model Computer Table (1 No.) for installation of Maintenance VDU of 42" and Godrej Office Executive Chair or better make (2 No.s).
- (f). Synchronization of EI clock and Data logger clock through CMU.
- (g). Provision of Communication between Operator VDU, Maintenance VDU and CIU/Main EI Equipment.
- (h). Installation, wiring, testing and commissioning of Data logger including wiring the Externalrelay contacts. (All the internal variables of EI should be monitored by the data logger.)
- (i). Supply and provision of Earthing& bonding, Surge Protection and System integrationAs per RDSO specification No.RDSO/SPN/197/2008orlatest, RDSOTANNo.STS/E/TAN/3012 dated 10.08.2016 ver.2.0, RDSO TAN No.STS/E/TAN/3006 Version1.0 dated 02.11.2012 and/or latest and guidelines issued by RDSO/Railway board for achieving earth value less than One Ohm, using minimum of Six Maintenance Free Earth Pits.
- (j). Supply, Installation and commissioning of Class 'A' protection with Lightning Event Counter as per RDSO spec No. RDSO/SPN/197/2008 and as per details given in Technical specification in following sections, with three years warranty.
- (k). Supply and provision of necessary Class B, C and D protection as per RDSO guidelines.. Provision of DC-DC converters in N+1 configuration separately for A & B Systems along with segregation of cabling and termination.
- (l). The tenderer shall submit the OEM certificate for the installation as per RDSO prescribed format before commissioning of EI. (OEM certificate is mandatory for making payment.)

**NOTE:**

- (1). During the stage of execution, if there is any alteration in the approved TOC, up to 20% Positive Variation in Number of Routes, need to be catered within the scope of this item. No additional cost will be given by K-Ride.
- (2). Fuses, LED indicators for fuses, indoor cable, wire coils, etc. required to wire the various relays and all other miscellaneous materials required for the work shall be supplied by the contractor. Any other materials other than EI modules/card, relays and DC-DC converters required for the commissioning of EI shall be supplied by the contractor.

**10.3. Submission of "As Made" documents for EI:**

The contractor has to supply six sets of documents as mentioned below along with system details, site installation details/drawings, maintenance manual, and Operation procedure in a bounded book as per practice of SW Railway. 'As made' shall be prepared by the Contractor in AUTOCAD 2000 or latest in A3 size. All indoor work details shall be prepared by contractor and submitted to K-Ride/Railways before testing the circuits. On execution of the work, one copy of the 'As made' check print along with

soft copy of the drawings shall be submitted for checking. The final negatives shall be made in tracing sheet and submitted to K-Ride/Railways for approval. On approval, the contractor shall submit along with the negatives, six sets of documents duly making neatly bounded booklets. Out of 6 sets, 2 sets of drawings and other plans shall be kept in transparent plastic cover (2 sheets back to back in one plastic cover) and handed over to Railways.

The As-made shall include the following:

- (a). Wiring diagrams (Interface circuits)
- (b). Application program listing (Application logic in ladder form)
- (c). (c). Relay/Cable termination particulars
- (d). Input/Output assignment details
- (e). Relay layout and contact analysis chart
- (f). Equipment disposition layout
- (g). Details of power supply arrangement
- (h). Actual boolean equations (note pad/word file), VDU Software for the station, VDU application data for the station, various compilers of the data etc. as per RDSO TAN No. STS/L/SSI/General dt.10.3.2017
- (i). Any other drawing as required by the Railway as per the practice
- (j). All other documentation as per clause No.10 of RDSO specification RDSO/SPN/192/2019 or latest with latest amendment shall be supplied.

**B. Scope of Work under Items related to Alteration to Existing Electronic Interlocking System at YPR-Bye pass, MNHK & HSRA**

**10.4. Installation, Alteration, Testing and Commissioning of Existing Electronic Interlocking System**

- 1) Design, Installation, Alteration, Wiring, Testing and commissioning of existing EI Equipments as per RDSO Specification No. RDSO/SPN/192/2019 or latest, including installation of Relay racks and Fixing & wiring of all types of interface relays, termination of interface wires on the CT rack (FTOT) and printing sleeve particulars. The input and output cables/wires (RDSO approved) used for interface wiring of EI shall be made of twisted pair.
- 2) Supply of 2 sets of hard copies of Design documents (Application Logic and Interface Circuits) for approval and supply of 2 sets of final approved copy as per the Approved SIP and TOC.
- 3) Wiring the External relay contacts to existing Datalogger, testing & commissioning (All the internal variables of EI should be monitored by the data logger.)
- 4) Submission of "As Made" documents for EI: as mentioned in above Para 10.3

Note:

- (1). During the stage of execution, if there is any alteration in the approved TOC, up to 20% Positive Variation in Number of Routes, need to be catered within the scope of this item. No additional cost will be given by K-Ride.
- (2). Fuses, LED indicators for fuses, indoor cable, wire coils, etc. required to wire the various relays and all other miscellaneous materials required for the work shall be supplied by the contractor. Any other materials other than EI modules/cards and DC-DC converters required for the commissioning of EI shall be supplied by the contractor.

## 11. Function Table for I/O Bit Calculation:

FUNCTION TABLE FOR EI I/O BIT CALCULATION					
SN	FUNCTION	VITAL OUTPUT		VITAL INPUT	
		NAME	BITS	NAME	BITS
1	Signal 4A	HR, HHR, DR	3	RECR, HECR, HHECR, DECR	4
2	Signal 3A	HR, DR	2	RECR, HECR, DECR	3
3	Signal 2A	HR	1	RECR, HECR	2
4	Route Indicator - 1	UGR1	1	UECR	1
5	Route Indicator - 2	UGR1, UGR2	2	UECR	1
6	Route Indicator - 3	UGR1, UGR2, UGR3	3	UECR	1
7	Route Indicator - 4	UGR1, UGR2, UGR3, UGR4	4	UECR	1
8	Calling-On Signal	Co-HR	1	Co-HECR	1
9	Shunt - Ground Type	HR	1	HECR, RECR	2
10	Shunt - Post Type	HR	1	HECR	1
11	Point	WCR, WNR, WRR	3	NWKR, RWKR	2
12	Track Circuits			TPR	1
13	Crank Handle	CHZR	1	CHR	1
14	LC Gate	LCAR, LCYR	2	LCPR, EKPR	2
15	Axle Counter	Reset	1	VPR	2
16	UFSBI (DL/SL)	LSS-SR, LSS-NR, FSS-RR, FSS-NR	4	ASCR	1
17	FM (Diado)	1R, 2R	2	ASCR	1
18	SLBI (TLBI)	SNR, TAR	2	ASCR, SHZR	2
19	SMR			SMR	1
20	Relay Room Door			RR.DOOR	1
21	TJ Failure			Up TJ, Down TJ	2
22	DC-DC Converter Fail			DC-DC Fail	1
23	Emergency Crank Handle	ECHR-Key	1	EMR.CHR.CR	1

Quantum of Hardware Cards, Components and Sub-systems and Spares to be supplied by the Contractor as per the requirement for all RDSO approved OEMs (as on the date of Tender Uploading) for System Configuration are as below.

## 39.1. Hardware Cards, Components, Sub-systems and Spares for Medha Make

SN	Description	Unit	Sys. Config. 1
			Qty
a.	Hardware Components/ Cards		
	Central Interlocking Unit		
a.1	Vital Interlocking Computer Card	Nos	2
a.2	Communication Processor Card	Nos	2
a.3	Communication Interface Card	Nos	2
a.4	CIU Voltage and Health Monitoring Card	Nos	2
a.5	Power Supply Card Type B	Nos	4
a.6	Front Panel Display	Nos	2
a.7	RS232-OFC Converter	Nos	8
a.8	Single Mode RS485-OFC Bi-Dir. Converter	Nos	8
a.9	RS485 Distribution Card	Nos	2
a.10	24V EMI Filter	Nos	12
a.11	CIU Cardfiles, Enclosure	Set	1
	Object Controller		
a.12	IOCOM CPU Card	Nos	6
a.13	IOCOM Voltage and health monitoring Card	Nos	6
a.14	Input WFM CPU Card	Nos	12
a.15	Output WFM CPU Card	Nos	8
a.16	WFM Relay Driver Card	Nos	8
a.17	OCM Vital Cut off Card	Nos	3
a.18	Power Supply Card Type B	Nos	6
a.19	Power Supply Card Type C	Nos	6
a.20	Single Mode RS485-OFC Bi-Dir. Converter	Nos	6
a.21	24V EMI Filter	Nos	15
a.22	OC Card files enclosure	Set	3
	Counter Box		
a.23	Single Mode RS485-OFC Bi-Dir. Converter	Nos	1
a.24	Panel Processor CPU Card	Nos	1
a.25	Panel Processor Output Card	Nos	1

SN	Description	Unit	Sys. Config. 1
			Qty
a.26	Power Supply Card Type B	Nos	2
a.27	24V EMI Filter	Nos	2
a.28	CB Card files enclosure	Set	1
b.	Power Supply Equipments		
	DC-DC Converters(Rating: 110V-24V/5A), Make: Medha	Nos	34
	Supply of Essential Spares		Spare Set 1
2.1	Vital Interlocking Computer Card	Nos	1
2.2	Communication Processor Card	Nos	1
2.3	Communication Interface Card	Nos	1
2.4	CIU Voltage and Health Monitoring Card	Nos	1
2.5	Power Supply Card Type B(CIU)	Nos	1
2.6	RS232-OFC Converter	Nos	1
2.7	Single Mode RS485-OFC Bi-Dir. Converter	Nos	1
2.8	IOCOM CPU Card	Nos	1
2.9	IOCOM Voltage and health monitoring Card	Nos	1
2.10	Input WFM CPU Card	Nos	2
2.11	Output WFM CPU Card	Nos	1
2.12	WFM Relay Driver Card	Nos	1
2.13	OCM Vital Cut off Card	Nos	1
2.14	Power Supply Card Type B(OC)	Nos	1
2.15	Power Supply Card Type C	Nos	1
2.16	24V EMI Filter	Nos	3

## 39.2. Hardware Cards, Components, Sub-systems and Spares for Kyosan Make

SN	Description	Unit	Sys. Config. 1
			Qty
a.	Hardware Components/ Cards		
a.1	L-K7C SUBRACK with Mother Board	Nos	1
a.2	CPU CARD, F486-4I	Nos	2
a.3	IF CARD, FSIO	Nos	2
a.4	IF CARD, FSIO-EX	Nos	2
a.5	I/O CARD, FIO7-[P ]	Nos	2
a.6	I/O CARD, EXTFIO7-[P]	Nos	2
a.7	I/O CARD, DID.	Nos	2
a.8	POWER CARD, IPU6C	Nos	2
a.9	E-P5 SUBRACK	Nos	1
a.10	IF CARD, LINE2B	Nos	2
a.11	I/O CARD, ET-PIO2	Nos	4
a.12	PCINIO CARD FOR OPC	Nos	2
a.13	PCINIO CARD FOR MTC	Nos	2
a.14	SM480 RELAY	Nos	4
a.15	TCF-142M Card (Media Converter)	Nos	4
b.	Power Supply Equipments		
	DC-DC Converters for EI Internal Power Supply (Gallant Make: DD2410 or better)	Nos	16
	Supply of Essential Spares		Spare Set 1
2.1	CPU CARD, F486-4I	Nos	1
2.2	IF CARD, FSIO	Nos	1
2.3	IF CARD, FSIO-EX	Nos	1
2.4	I/O CARD, FIO7-[P ]	Nos	1
2.5	I/O CARD, EXTFIO7-[P]	Nos	1
2.6	I/O CARD, DID.	Nos	1
2.7	POWER CARD, IPU6C	Nos	1
2.8	IF CARD, LINE2B	Nos	1
2.9	I/O CARD, ET-PIO2	Nos	1

## 39.3. Hardware Cards, Components, Sub-systems and Spares for Ansaldo Make

Hardware Cards, Components, Sub-systems and Spares for Ansaldo Make			
SN	Description	Unit	Sys. Config. 1
			Qty
a.	Hardware Components/ Cards		
a.1	MLK_II Card file	Nos	2
a.2	CPU_PCB	Nos	2
a.3	PS_PCB	Nos	2
a.4	MLK_II Vital Input	Nos	12
a.5	MLK_II Vital Output	Nos	8
a.6	MLK_II Non-Vital I/O	Nos	2
a.7	SYNC_PCB (MDSC)	Nos	2
a.8	COMM_PCB	Nos	2
a.9	Relay VCOR	Nos	2
a.10	Relay Base VCOR	Nos	2
a.11	Address select PCB-48 pin	Nos	24
a.12	Address select PCB-96 pin	Nos	2
a.13	CPU EEPROM PCB	Nos	2
a.14	48-Pin Connector Housing Assambly	Nos	28
a.15	48-Pin Connector Guide Element	Nos	28
a.16	96-Pin Connector Housing Assambly	Nos	2
a.17	96-Pin Connector Guide Element	Nos	2
a.18	48-Pin Female Connector	Nos	28
a.19	48-Pin Female Crimp Contact	Nos	750
a.20	96-Pin Female Connector	Nos	2
a.21	96-Pin Female Crimp Contact	Nos	140
a.22	1-Wide Blank Front Panel Assembly	Nos	6
a.23	PCB Keyin Plug	Nos	180
b.	Power Supply Equipments		
b.1	DC-DC Converters 12V	Nos	4
b.2	DC-DC Convertres 24V	Nos	8
	Supply of Essential Spares		Spare Set 1
2.1	CPU_PCB	Nos	1
2.2	PS_PCB	Nos	1
2.3	MLK_II Vital Input	Nos	1
2.4	MLK_II Vital Output	Nos	2
2.5	MLK_II Non-Vital I/O	Nos	1
2.6	SYNC_PCB (MDSC)	Nos	1
2.7	COMM_PCB	Nos	1

## 39.4. Hardware Cards, Components, Sub-systems and Spares for Siemens Westrace Mk-II Make

Hardware Cards, Components, Sub-systems and Spares for Siemens Westrace Mk-II Make			
SN	Description	Unit	Sys. Config. 1
			Qty
a.	Hardware Components/ Cards		
a.1	Processor Module	Nos.	2
a.2	Processor Module Backplane	Nos.	2
a.3	Parallel Input Module (50V)	Nos.	10
a.4	Relay Output Module (50V)	Nos.	9
a.5	WestraceMkII housing for one full backplane	Nos.	3
a.6	Full backplane with shield and Screws	Nos.	3
a.7	SMB Termination Dongle (plug)	Nos.	10
a.8	I/O back plate connector - Crimp - PIM	Nos.	10
a.9	I/O back plate connector - Crimp - ROM	Nos.	9
a.10	Front filler panel-8hp	Nos.	9
a.11	Rear Filler panel- 8hp	Nos.	9
b	Power Supply Equipments		
b.1	DC DC Converter,110V/24V,10 Amps	Nos.	8
b.2	DC DC Converter,110V/50V,5 Amps	Nos.	6
	Supply of Essential Spares		Spare Set 1
2.1	Processor Module	Nos.	1
2.2	Processor Module Backplane	Nos.	1
2.3	Parallel Input Module (50V)	Nos.	1
2.4	Relay Output Module (50V)	Nos.	1
2.5	I/O back plate connector - Crimp - PIM	Nos.	1
2.6	I/O back plate connector - Crimp - ROM	Nos.	1

40. In case of RDSO approved OEMs as mentioned above, Detailed Cost-wise and Quantity-wise Break-up for Schedule E items related to

Electronic Interlocking System- Supply, Installation, Testing and Commissioning and Spares for these items are not required to be submitted by the Contractor. Supply and Execution of the items related

41. to Electronic Interlocking should be carried out strictly as per the Schedule of works and Quantum of Hardware Cards, Components and Sub-systems and Spares are to be supplied by the Contractor as mentioned in previous para.
42. In case of any OEMs getting RDSO Approval after the date of Tender Uploading and before Tender Closing, Detailed Cost-wise and Quantity-wise Break-up for Schedule E items related to Electronic Interlocking System- Supply, Installation, Testing and Commissioning and Spares for these items need to be uploaded by the Contractor along with his offer. In this case, as per the requirement for each type of System Configuration, Quantity will be deduced by the K-Ride before finalization of tender and Contractor need to supply the material as per the quantity deduced by the K-Ride/Railways only.
43. During the stage of execution, additional software work due to change in scope of signal Interlocking plan shall be carried out by the contractor without any extra cost up to the maximum available Input/ Output functions/Hardware Cards of that particular System Configuration. However, if hardware augmentation is involved for such changes in scope beyond above mentioned limit of input/output functions, then cost of supply of requisite hardware will be considered for payment as a new/additional item. Re-Designing and Installation will be paid as under relevant schedule item.

### PART-(III)

#### TECHNICAL REQUIREMENTS OF EARTHING ARRANGEMENT

1. Earthing arrangement for Electronic Interlocking and End goomties shall be as per RDSO Guidelines STS/E/TAN/3006 or latest and further guidelines issued by K-Ride board/ RDSO for achieving earth value less than One Ohm. At locations, where it may not be possible to form a perimetric ring earth around the EI room, Power supply room and station room, in such stations parallel earthing arrangement consisting of interconnected multiple earth electrode may be made at the free space near the station building such that following requirements are made
  - (a) Single point entry of Main earth bond with all other cables to the EI room shall be adhered.
  - (b) The earth connections to the Perimetric ring earthing for all the items shall be made using shortest possible path.
  - (c) All earth electrodes must be interconnected with buried conductor however visible and provided with RCC enclosure/ skirting.
2. The lightning protection system shall be installed in accordance with RDSO/SPN/197/2008 or latest and additional requirements of local authority. The system shall consist of air terminations, down conductors, joints & bends, testing joints, earth terminations & earth electrodes. Advanced lightning

protection system shall include components as follows: Air terminations, mechanical supports, low impedance insulated down conductor, performance recording equipment, and a low impedance grounding earthing system.

## 2.1 Design of Lightning Protection System

### 2.1.1 Air Terminal

Advanced Controlled Streamer Emission based Lightning Protection System is suitable for protection of Buildings and Towers against Direct lightning Strike complete with Controlled Streamer Emission (CSE) lightning conductor air Terminal. The round shaped Air terminal should be based on the latest lightning research and technology, which has an enhanced area of protection. Placement of the Air terminals is determined using the „Collection Volume Design Method“. Unlike conventional design theories, this method provides an imperial and quantitative method based on design parameters such as the structure height, field intensification of structural projections.

The Controlled Steamer Emission Air Terminal shall be working on the principle of field intensification and responds dynamically to the appearance of a lightning downleader by creating free electrons and photo-ionization between a semispherical surface and an earthed control finial and chart have a shape of semi-spherical with outer diameter of 260mm and height from the base of 115mm. and approximate weight of terminal being 2.8 Kg, to significantly reduce the build up of sharp point corona discharge under static field thunderstorm conditions.

The supporting accessories and mast system are comprising of the insulated FRP pipe of min. 2m length, high grade Aluminium mast of min. 2 Mtr., the U Bolts so as to withstand maximum recorded wind velocities of 100 kmph and the Event Counter with triggering impulse of 1500 Amps. For 8/20 micro second without any external power supply and complete as required as per the specifications. The Air Terminal should be UL listed as per the UL96. „Lighting Protection Components“ (Standard for Safety). The round shape of the Air Terminal is designed to reduce the build up of Corona space charge which inhibits the formation of upward streamers. Standard Franklin rods and ESE terminals which are pointed, create a lot of Corona which is a main reason for conventional lightning protection system failures. The geometry of the air terminal is a significant factor in its performance. The round Air Terminal launches a streamer before other competing structures of the structure can launch their

streamers giving it a time advantage, which allows its streamer to become the preferred attachment point for the approaching down leader.

The protective zone provided by the air termination shall be such that it becomes the preferred strike point for all discharges exceeding a peak amplitude return strike current of  $XkA$ , according to the statistical level  $Y$  per IEC 61024. The design shall take account of upward leader competing projections on the structure.

Strike Current (X)	Level of protection (Y)	Exceedance Probability
2.9 kA	Protection Level-I Very High	99%
5.4 kA	Protection Level-II High	97%
10.1 kA	Protection Level-III Medium	91%
15.7 kA	Protection Level-IV Standard	84%

### 2.1.2 Down conductor

The Down conductor should be in form of multi layered cable consisting of plastic filler, multi stranded copper conductor with the cross sectional area of 55 Sq.mm. inner insulation, outer copper conductor, conductive sheath, all concentrically arranged with outer diameter of 36mm. characteristic impedance of 4.5 Ohms, inductance of 22nH/m and voltage withstand capability of 250kV, i.e. core to screen 250kV based on 1/50us wave shape as defined under ANSI C62.41, with factory done upper termination and the kit for lower termination and all fixings and accessories as per specifications. The multilayered cable is the Shielded conductor which reduces the risk of side flashing to the building/structure, thereby eliminating the possibility of damage of equipment and injury to people. The conventional GI or Copper strips can cause side flashing.

The down conductor shall have a capacitance equal to 1100 or greater than 1100 pF/m and the resistance should be equal to or less than 0.5m.ohm/m.

The main copper conductor of Down conductor cable shall be capable of direct connection to the base of the air termination by use of a compression coupling or CADWELD

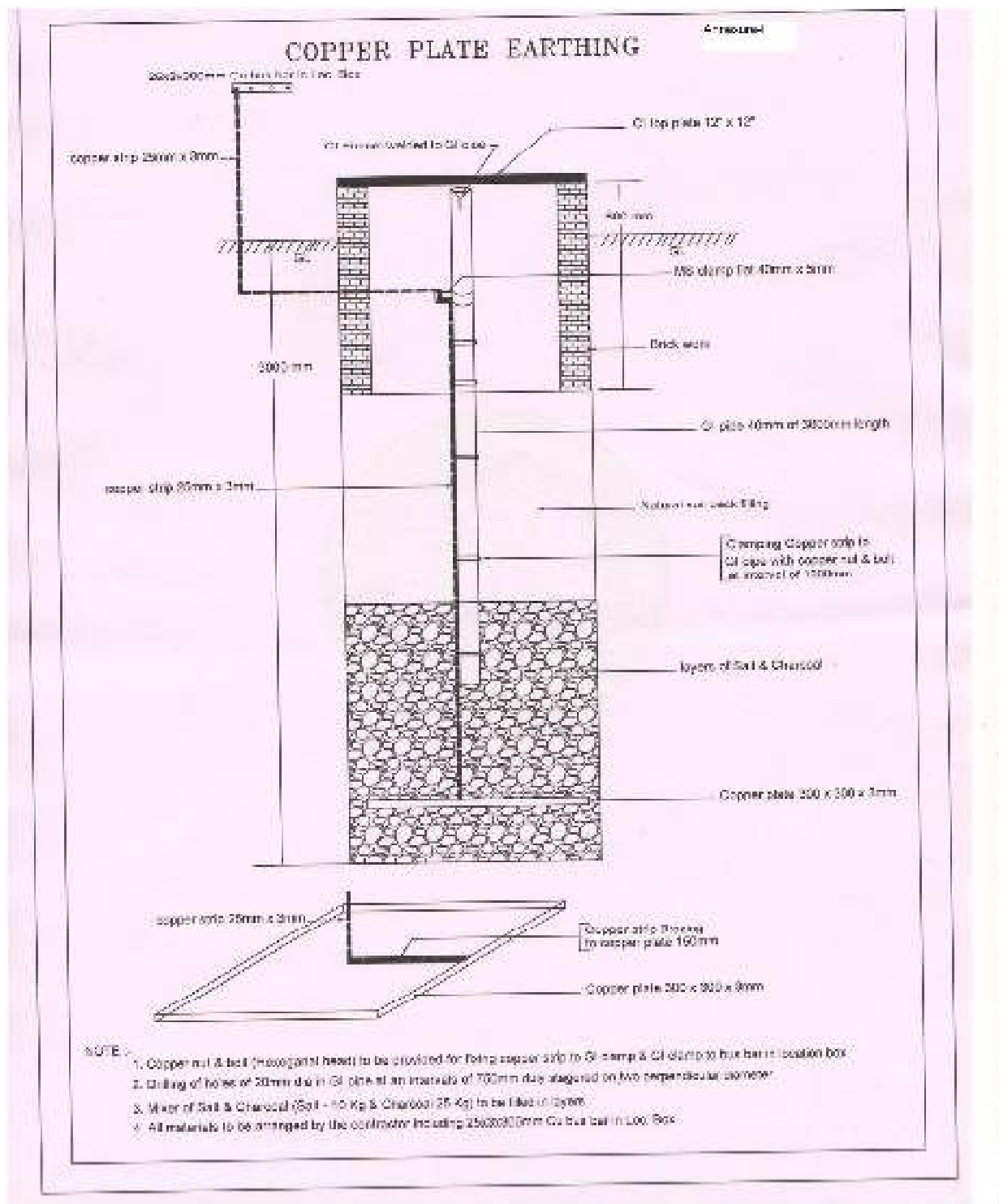
### 2.1.3 Performance recording Equipment

Each Protection system shall be provided with Lightning Event Counter. The lightning event counter shall have a register that activates one count for every discharge where the peak current exceeds 1500A. The test wave shape shall be the 8/20us standard as defined by A SI C62.41.

The lightning event counter shall be robust, easy to install & housed in a IP67 rated enclosure. The counter shall operate from the energy of the lightning discharge and not depend external or battery power to operate.

The lightning event counter shall be installed to the manufacturer's instructions in a readily accessible manner so that readings can be taken at regular intervals. It shall be so positioned such that its operating temperature is within the range -10 deg. C to +50 deg. C.

## SCHEMATIC DIAGRAM OF COPPER PLATE EARTHING



**PART- (IV)****TECHNICAL REQUIREMENTS OF DATA LOGGER**

1. The Data Loggers shall confirm to RDSO Specification No. IRS S. 99/2006 with latest amendment equipped with cards for 512 digital input or as specified in the Schedule of work , to monitor the internal relays and to 32 analog inputs and digital data from SSIs including Networking Modem and shall be procured from RDSO approved firm with RDSO inspection.
2. Information required as per Para. 11 of RDSO specifications No. IRS S. 99/2006 is as under:

S. No.	Description of Information	Details of Information
11.1	Total number of Digital and Analog inputs to be monitored	
11.1.1	Number of Digital inputs	512
11.1.2	Number of Analog inputs	32
11.1.3	Whether RTU is required for monitoring of equipments at distant place	Required in Case of IBS / End Gunties. Digital Input: 64 Analog Input: 16 Approx. distance from Data logger: Approx. 10 Km
11.2	Additional Exception Reports (Other than those mentioned in Annex-C to be generated)	Yes. As per the present practice followed over SWR.
11.3	List of functions to be monitored (if any other than Annexure "B")	Digital inputs from EI and Internal Relays
11.4(a)	Central Monitoring Unit (CMU) Required?	Required if mentioned in Tender Schedule
11.4(b)	FEP Required?	Required if mentioned in Tender Schedule
11.5	Printer Required?	Yes

3. Other features of the proposed Data logger system shall be as under:
  - 3.1. The data loggers proposed are to be networked to the existing Datalogger network of respective division and enabled for centralized monitoring. All required additional hardware and software has to be provided by the contractor.
  - 3.2. 2 MBPS E1 Converter – E1 to Serial Port suitable for data logger monitoring scheme issued by RDSO vide letter No. STS/E/Data logger/Vol.XX, dtd.12.09.2011 is to be supplied in place of 64 KBPS Modems which is part of standard configuration of datalogger.
  - 3.3. Guidelines issued by RDSO/ Railway Board to supplement the RDSO specification of the data logger until the date of closing of the tender must be complied and implemented.

- 3.4. Power extension board with O/V, U/V, fuse and spike protection shall be supplied along with each Data logger.
- 3.5. The PC to be provided with Datalogger shall be Commercially available HP/DELL/IBM desktop PC based with Intel Core i7-860 2.8GHz, 8MB cache or latest processor, Compatible RAM and minimum 500 GB HDD, Suitable Communication ports, accessories, 22" monitor, Window Operating system, Antivirus software as specified in the RDSO Guideline issued vide letter no. STS/E/Data logger/vol. XX, dtd 12.09.2011 or better.

#### PART-(V)

##### TECHNICAL REQUIREMENTS OF SSBPAC(D) BLOCK WORKING

1. The system must meet the requirements of RDSO Specification RDSO/SPN/175/2005 Ver.1 or Latest for SSBPAC(D) complete for Double Line
2. Block Proving System will require the following sub systems for its working
  - i) Block Panel
  - ii) Microprocessor based SSBPAC(D) Block Interface.
  - iii) High Availability Single Section Digital Axle Counter
  - iv) Block Telephone.
  - v) Telecom cable/ voice/ data channels provided over optic fiber subsystem using proper multiplexer.
  - vi) Battery Set and Battery Charger/ IPS module.
  - vii) Relay racks and pre-inspected Relays.
3. Except Communication media and 24 V DC supply from IPS module; all other equipments and materials required for commissioning of Block proving system by HABPAC(D) with block panel shall be supplied by the contractor.
4. 24V DC supply from station IPS module; all other voltages required for Block proving system working shall be supplied and arranged by the contractors as per RDSO specifications.
5. Contractor should supply maintenance tool kit for maintaining the devices and equipment along with the products and equipments.
6. Contractor should arrange three sets of printed and soft copies of Installation, maintenance, trouble shooting and user manuals along with product.
7. Contractor should arrange training at site or factory premises for Railway officials, supervisors and staff in installation, maintenance and trouble shooting of the Block proving system.
8. Media change over between OFC and Quad should be automatic as per Railway requirement.
9. OEM Engineer shall demonstrate the parameters and fill up the pre-commissioning check list which shall be jointly signed with Railway/ K-Ride Representative after detailed quality check of the installation.
10. OEM shall verify the installation and commissioning and issue the OEM certificate as per RDSO guidelines for Electronics based system.

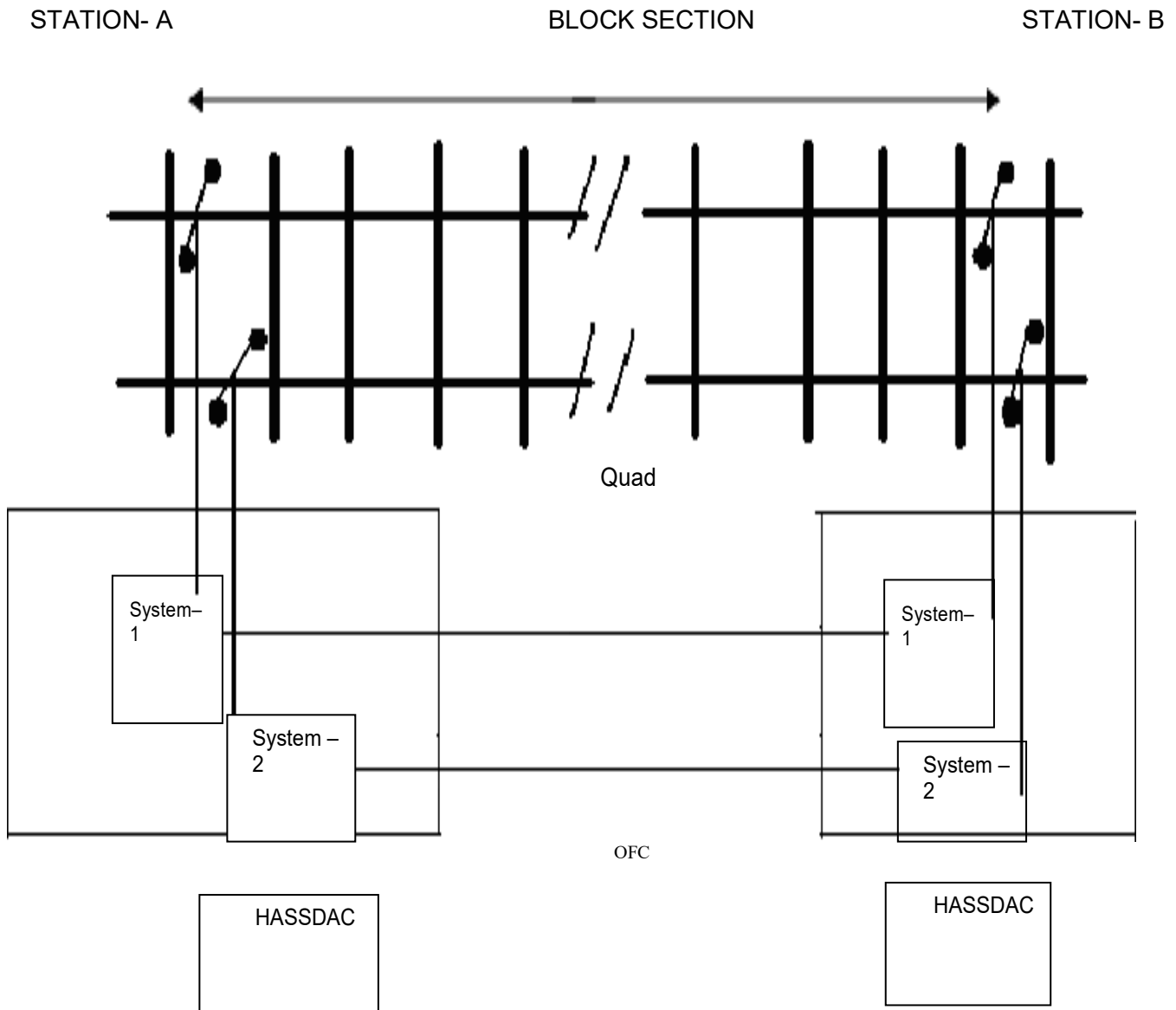
11. Requirements as per RDSO Specification:

- i. Medium of working : OFC and Quad Cable with Auto Changeover
- ii. Type of Block Instrument : SSBPAC(D) Double Line with Block Panel
- iii. Communication : Voice/ Data

PART-(VI)

(A) TECHNICAL REQUIREMENTS OF HIGH AVAILABILITY SINGLE SECTION  
DIGITAL AXLE  
COUNTER

- 1. The High Availability Single Section Digital Axle Counter (HASSDAC) must be confirming to RDSO Specification no. RDSO/SPN/177/2012 (Ver. 3) or latest and shall be provided with High Availability Dual track sensor.
- 2. Wiring Discipline should be as per RDSO TAN No. STS/E/TAN/6001, dtd. 04.10.2011.
- 3. 19" rack Mountable Multi service multiplexer chassis consisting of 4 E1 Interface uplink and 3 module slots, one slot populated with 2W/4W E & M supporting up to eight interfaces, balance two empty, unit should supports both AC/DC power supply (MRO TEK make MAPLE 4C PCM 1U or similar specifications) shall be provided for auto changeover of the transmission media.
- 4. Requirements as per Para 18 of RDSO specification no. RDSO/SPN/177/2012 (Ver. 3)
  - i. Configuration : 2 DP 1 Section
  - ii. Length of cable : 15 Meter
  - iii. Supply option :
    - a) High Availability SSDAC
    - b) Dual track sensor device



**Note:**

1. Two sensors shall be put on two different rails with 1.25m longitudinal spacing along the track. This will ensure 2m diagonal distance between two sensors.
2. HASSDAC having system – 1 & system – 2 shall be preferably using diverse media (Quad/OFC).
3. When one of the SSDAC is clear whereas other is showing occupied for more than 10 seconds, the clear SSDAC will automatically reset the failed one.
4. All resetting will only be of preparatory reset type.
5. Use of dual track sensors on different all with high availability system is based on MTBF requirements.

Wiring and Installation and Commissioning details:

1. Fixing of MSDAC/HASSDAC system in the location box.
2. Wiring of of MSDAC / HASSDAC system in the location box. (The different cables for signalling& Communication cable will be laid and terminated in the location box ).
3. Supply, fixing and wiring of suitable Lightning Dischargers, fuse terminals and fuses.
4. Marking and drilling of holes in Rail, fitting of track device and laying of underground cable from the of MSDAC / HASSDAC system to track device using 40mm dia HDPE pipe. Trans and receive cables has to be taken in separate HDPE Pipe. This includes required trenching from location box to track device. All the materials including HDPE & Cable from system to track device to be supplied by the contractor.
5. Fixing, wiring and installation of Reset box in the SM's room. This includes the supply & fixing of 25mm PVC casing & capping and drawl of required cable from reset box to Cable Termination Box. All the materials like cable, PVC casing & capping to be supplied by the contractor.
7. Connecting of HASSDAC system at location box and reset box at SM's room to earth bus bar
8. HASSDAC will be installed, wired, tested & commissioned by OEM's engineer as per guidelines issued by RDSO. The pre-commissioning check list issued by RDSO for SSDAC will be prepared by OEM's Engineer and signed jointly with Railway/ K-Ride Engineer. Before commissioning of SSDAC, OEM will submit site installation certificate to Railways by mentioning that SSDAC has been installed, wired, tested and commissioned by OEM.
9. 19" rack Mountable Multi service multiplexer chassis and interface equipments required for Mountable Multi service multiplexer chassis should be installed and configured as per requirements of Railway/ K-RideEngineer at site.

**(B) TECHNICAL REQUIREMENTS OF MULTI SECTION DIGITAL AXLE COUNTER:**

MSDAC is a multi section digital axle counter system that is designed using the principles of fail-safety and has a two-out-of-three fail safe architecture. It is microcontroller based and has redundant power supply arrangement. Its modular nature allows you to plan your upgrade and extensions without any problem. It is extensible with 8 detections points in a module set. It provides an easy to use GUI for configuration.

It is used for detecting railway track occupancy primarily in a station. It is used for track circuiting a whole station. MSDAC is modular in design and can be used with more detection points per chassis. Each detection point has a track sensor that identifies a track section boundary. A track section can be defined with 2/3/4 detection points.

The system consists of the following components:

1. Axle Detectors
2. Electronics Field Units
3. Track side junction boxes
4. Central Evaluator
5. SM's Reset Panel
6. LV boxes
7. Monitoring Unit

The Central Evaluator of MSDAC has been designed to be modular. The system can be configured for up to more field units in steps. Therefore, the system has the provision to scale up or scale down according to the requirement at station.

The Axle Detectors are installed at the limits of a track section along with their electronic field units on track side. The number of detection points is decided based on the track circuiting requirement of a station. The field units are connected with Central Evaluator by means of ½ Quad cable. The Central Evaluator is installed at the station and is powered by 24V DC local supply. The field units are also powered using 24V DC that is derived from the power source that powers the central evaluator. The Axle Detectors operates on high frequency (21 KHz & 23 KHz) electromagnetic wheel detection technology. When a train wheel passes over the Axle detectors, the change in electromagnetic field is sensed. This change triggers a complex algorithm that decides if a wheel has passed over the axle detector. The Axle detectors and the electronics associated with it is working on the principle of Phase Modulation.

The wheel-detection events are converted into pulses and these pulses are counted by the field units. These counts are stored as well here. The stored counts as well as the heal of the track sensor are monitored and are continuously transmitted by the field unit by means of telegram packets to Central Evaluator on the ½ Quad cable that also powers the field unit. The central Evaluator receives the count from each of the field unit it is connected to and it then takes the decision of the track section is occupied or not. MSDAC signals the occupancy of the track section by means of an electro-mechanical relay called VR relay. The contacts of VR is used in the signaling circuits of signalling system at the station.

MSDAC has a mechanism to reset a particular track section to recover from an error or a failure condition. This is done through the SM's reset panel. The section is to be physically verified by authorized person to be unoccupied and then the reset command is to be given from the LV box. This command is received by the central evaluator and it then send the command to the respective field units to zero their counts.

**It is designed in accordance with the RDSO specification No. Specification No.RDSO/SPN/176/2013 version -3 or latest amendments.**

The tenderer shall design the scheme for provision of required number of Evaluator, track side jn. Box, detection points etc., and also it shall be design to have a facility to reset track section both automatic and Manual re-setting features.

The connectivity between evaluators and smart re-set to LV box shall be through both OFC and Quad cable with Automatic change over arrangement for Redundancy purpose.

Maximum care shall be taken place the evaluator in station building and if necessary barest minimum evaluator to be kept in Gumpy.

Installation, Programming, configuration and commissioning of MSDAC equipment to be carried out in accordance with latest guidelines issued by Railways/ RDSO preferably by authorized representative of OEM.

All the materials required for the work shall be supplied by the contractor.

Specification of Portable Data Analyzer:

Supply of Data Analyzer similar to HP /IBM/Dell or better specifications of following configuration. Necessary software tools required for data analysis should be pre-installed in the system.

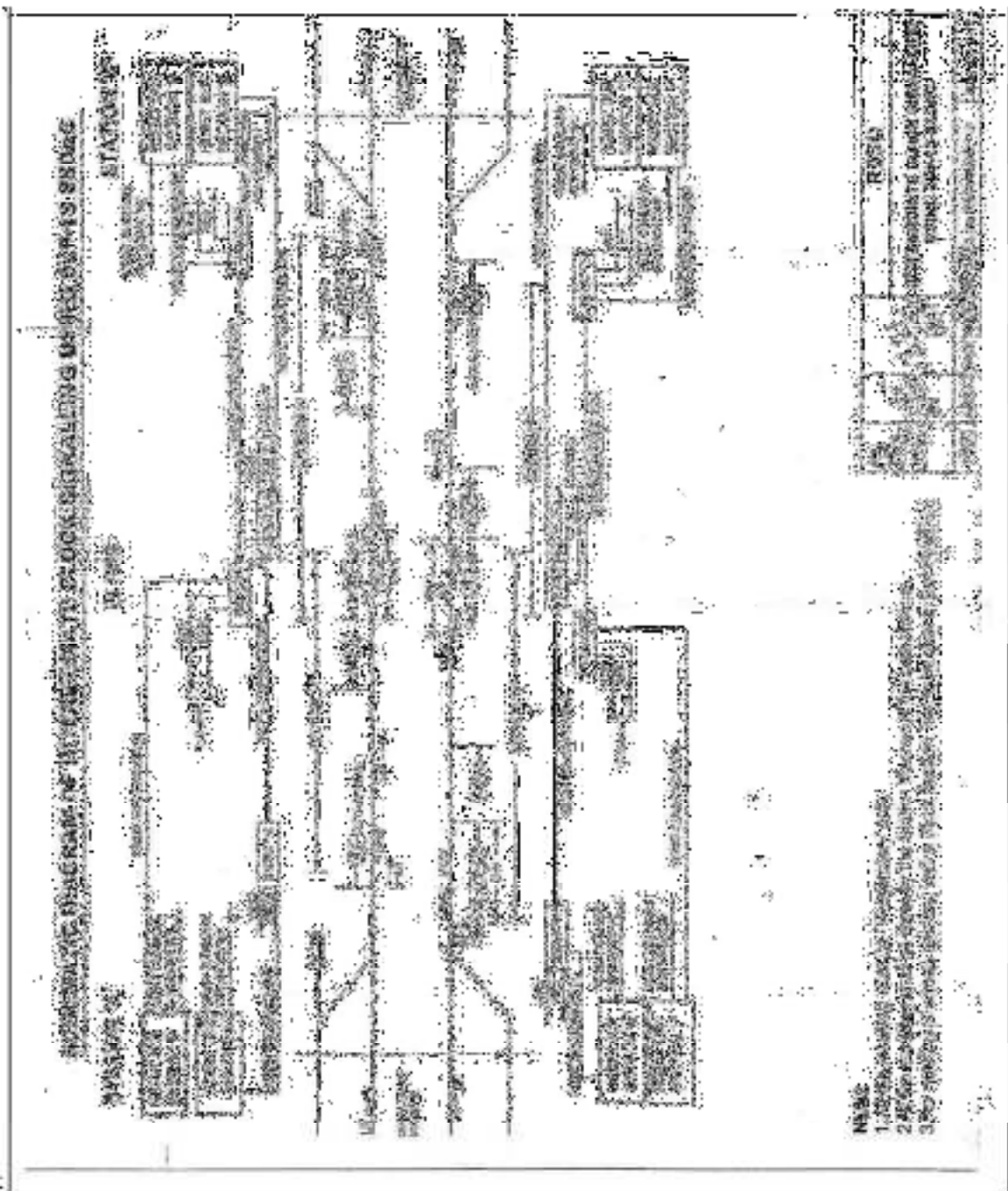
Microprocessor	2.50GHz 3rd generation Intel Core i5-3210M Processor or latest processor with  Turbo Boost Technology up to 3.10GHz or better
Memory	Minimum 8GB DDR3 SDRAM (2 DIMM)
Memory Max	Maximum supported - 16GB
Memory Slots	2 user accessible
Video Graphics	Intel HD graphics 4000 with up to 1696MB total graphics memory
Display	15.6-inch diagonal HD Bright View LED-backlit display (1366x768)
Hard Drive	1TB 5400RPM hard drive with HP Protect Smart Hard Drive or similar Protection
Multimedia Drive	Super Multi DVD burner
Network Card	10/100/1000 Gigabit Ethernet LAN (RJ-45 connector)
Wireless Connectivity	802.11b/g/n WLAN
Keyboard	Full-size island-style keyboard
Pointing Device	Touchpad supporting multi-touch gestures with on/off button

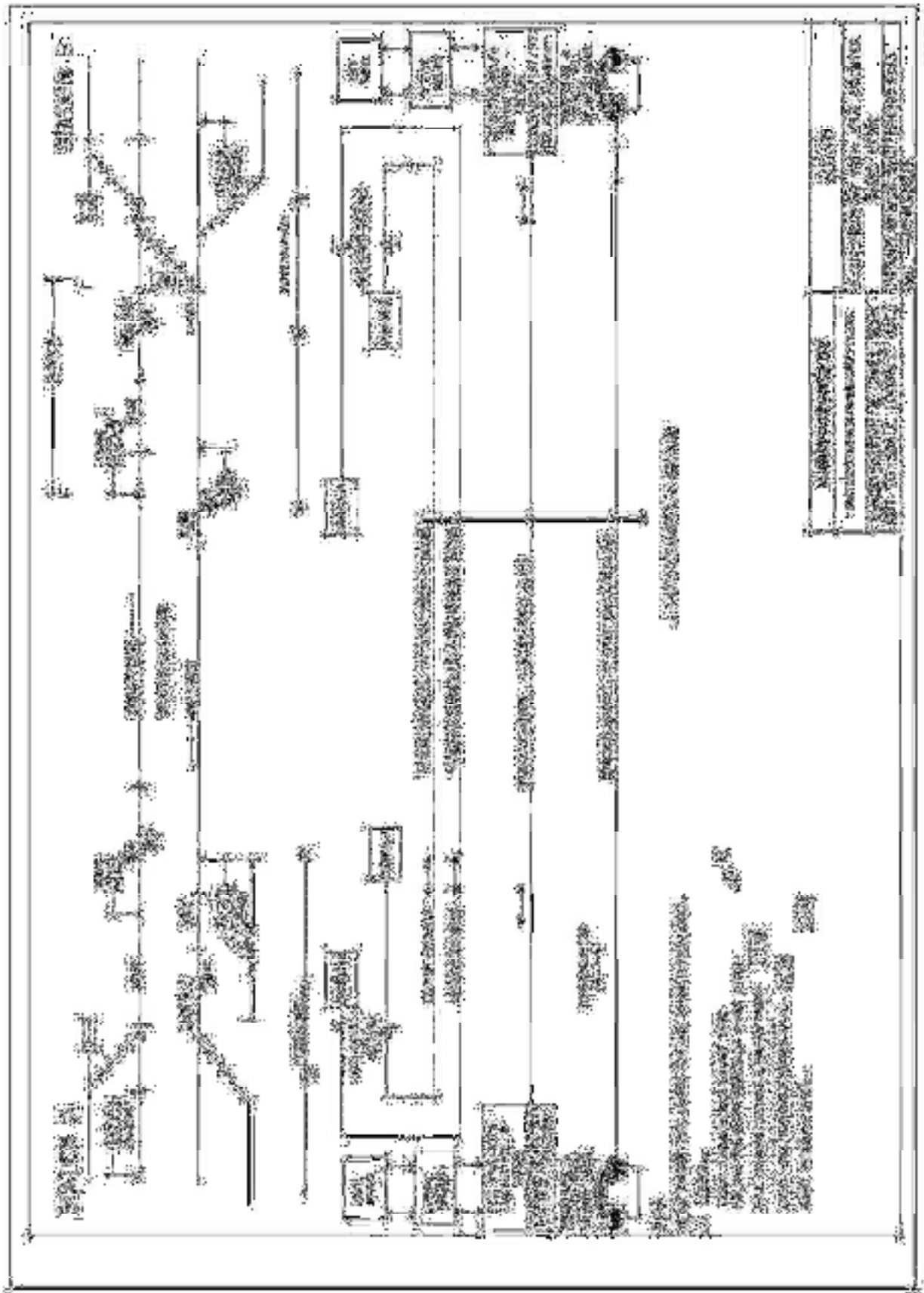
External Ports	Multi-Format Digital Media Card Reader for Secure Digital cards & Multimedia cards 3 SuperSpeed USB 3.0 1 Universal Serial Bus (USB) 2.0 1 HDMI 1 VGA (15-pin) 1 RJ-45 (LAN) 1 Headphone-out/Microphone-in combo jack
Dimensions	14.94 in (W) x 9.87 in (D) x 0.87 in (min H)/ 1.04 in (max H)
Power	65W AC adapter 6-cell 62WHr 2.8 Ah lithium-ion battery
ID Mech Description	HP TrueVision HD Webcam with integrated dual array digital microphone
Operating system	Genuine Windows 10

PART-(VII)

TECHNICAL REQUIREMENTS OF UFSBI FOR IB  
APPLICATION

1. The Universal Failsafe Block Interface (UFSBI) must be confirming to RDSO Specification no. IRS/S-104/2012 (Ver. 0) or latest for IB Signalling Application
2. Requirements as per Para 18 of RDSO specification no. RDSO/SPN/177/2012 (Ver. 3)
  - (a). Medium of working : OFC and Quad Cable with Auto Changeover
  - (b). Type of Block Instrument: : SSBPAC(D) Double Line with Block Panel
  - (c). Communication : Voice/ Data
  - (d). Relay Rack Wiring : To Suit IB Signalling Application





**PART- (VIII)**  
**TECHNICAL REQUIREMENTS OF DESIGN AND**  
**DRAWINGS**

**1.0 General:**

**1.1** Design of signalling circuits should meet the requirements of Signal Engineering Manual, Recommendations of Working Group on Signalling Practices and Interlocking Principles (SP & IP) accepted and circulated vide Ministry of Railway letter no. 2010/Sig/WG/Interlocking Principle, dated 22.05.2012, typical circuits issued by RDSO and Table of Control (TOC) approved and issued by K-RIDE through Railway. The K-Ride/ railways shall issue hard and soft copies of the Signal Interlocking Plan (SIP) and TOC to the contractor.

**1.2** Circuits shall be designed to RE standards unless specified otherwise. All interface circuits shall be designed with indirect feeding of signals for non-RE area also.

**1.3** System shall be designed for use with Dual Video Display Unit (VDU).

**2.0 Version Control:**

**2.1** Strict Version control shall be exercised. The Check Sum/ CRC details shall be furnished with the initial application logic and changed Check Sum/ CRC along with details of changes in Application Logics subsequently. No change in the Application Logic shall be made without the approval of K-Ride/Railways.

**2.2** After making any change in application logic, a comparison statement shall be submitted duly indicating the checksum prior and after the change.

**2.3** In case of no change in Application Logic during Factory Acceptance Test (FAT) and System Acceptance Test (SAT), the checksum of the initial submission and that of the service version shall be the same.

**3.0 Design:**

**3.1** The interface circuits must be designed as per the final phase of the Signalling plan so that alterations in the existing interface wiring of initial phases is limited to removal of wires and minimum re-use of bits so as to minimize the interface wiring alterations during Non-interlocked working period in subsequent phases. Additional functions/ alterations shall be catered in new terminations to the extent possible.

**3.2** Terminations shall be grouped function wise.

**3.3** In ASR logics, read back contact of HR/ DR/ UGR shall not be proved. It shall be ensured that all ASRs are dropped before booting the system.

**3.4** Crank handle logics shall be designed with NLR and RLR up contacts instead of back contact of HR and UCR.

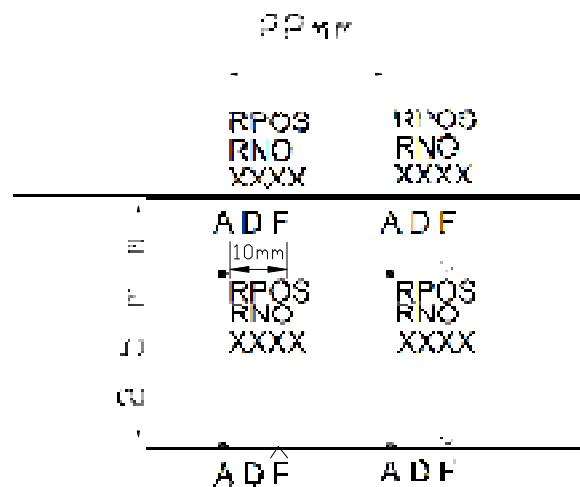
**3.5** CHRZR shall be slow to release for 30 sec for extracting the Crank Handles comfortably.

**3.6** In LR Logics, parallel movements with conditional points shall not be proved. However, these shall be ensured in UCR and HR logics.

**3.7** In Point operation circuit, XR shall be initially dropped before picking up WJR.

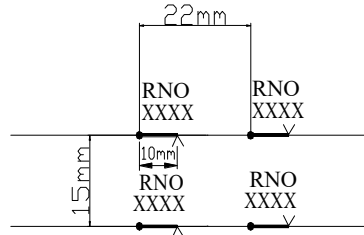
**3.8** ZWLKRs shall not be split and there shall be only one ZWLKR for a point with different conditional movements.

- 3.9 In UCR logics, conflicting ASR/ TRSR/ TLSR shall be proved but for Calling ON signals, only UCR back contact of the main signal above it shall be proved.
- 3.10 In yards with sectional route release, K Ride shall indicate the track circuits to be used in the ASR logics in the Table of Control (TOC) and all other back lock track circuits shall have sectional route release.
- 3.11 In HIR logics, drop contact of all the sectional route release bits (TRSR/TLSR) of the same direction in the route and up contacts of the conflicting direction shall be proved. For overlap, the conflicting ZR, ZR-G, SHZR up contacts shall be proved.
- 3.12 In ELU/RI/ERUYR logics, TSR & TSSLR down contact shall be proved in parallel to track circuits down contacts.
- 4.0 Documentation:
- 4.1 As per SEM, part- , Para No.8.3.4, the circuit diagrams shall be in A3 size sheet (297mm x 420mm) with 10MM border and on left hand side an extra margin of 30mm should be allowed for siding.
- 4.2 Plotting shall be done with minimum border setting in AutoCAD on the A3 size sheet.
- 4.3 Relay/ Contact font size should be 2.0 mm and style Times New Roman – Auto CAD.
- 4.4 Negative shall be tracing film for approval of As Made and after approval and signature thereon, RTF shall be submitted. As made negative print must not be fade and spread when subjected to any kind of liquid water drops.
- 4.5 Minimum space in the design elements in Interface or Relay circuits shall be maintained as follows:
  - (i) Arm to contact: 10 mm
  - (ii) Arm to Arm: 22 mm
  - (iii) Line to Line: 25 mm



**4.6** Minimum space in the design elements in Application Logic circuits shall be maintained as follows:

- (i) Arm to Contact: 10 mm
- (ii) Arm to Arm: 22 mm
- (iii) Line to Line: 15 mm



**4.7** Height of Title signature column) should be 30mm from inner borderline.

**4.8** Sheet Nos. should be serially marked in X of Y format without omitting any numbers in between sheets.

**4.9** Each booklet of Interface Circuit and Application logic shall be limited to 200 sheets for the convenience of handling. Index shall clearly indicate the specific description of circuit on each sheet.

**4.10** Outdoor location termination and wiring details shall be incorporated in the As Made Interface circuit diagrams.

**4.11** Circuits shall be grouped in the sequence of signal initiation to route release, panel indication, Block and Miscellaneous circuits as follows:

- KNOB/ BUTTON LOGIC
- NLR/ RLR
- LR/ UR
- NR/ RR
- ZNR/ ZRR
- ASR
- LOHR/ ROHR
- ROUTE CANCELLATION/ EMERGENCY CANCELLATION
- TRSR/ TLSR/ TLZR (STATION WITH SECTIONAL ROUTE RELEASE)
- POINT OPERATION
- PCR
- NWKSR/ RWKSR
- ZWLKR
- UCR
- CRANK HANDLE
- TSR

- HZR
  - HR/DR/UGR
  - INDICATION
  - BLOCK/UFSBI, BPAC
  - GFXR/ UNCR BUZZER/ POWER FAILURE/ TJ FAILURE/ DC-DC FAILURE LOGICS
  - FCOR
  - REDIRECTIONAL
  - DATA LOGGER
  - MISCELLANEOUS
- 4.12** After each group of circuits, Spare blank sheets shall be provided duly indicating in the index sheet while submitting for initial approval. These spare blank sheets shall be utilised for incorporation of any additional logic during subsequent stages of design, checking and testing without disturbing the sheet numbering.
- 4.13** Approved design sheet template shall be adopted for design of the Border, Title, Version and Signature block. Contractor must ensure the verification and collection of the same from the office of the Chief Signal & Telecommunication Engineer (Construction), South Western Railway before start of the design.

#### PART-(IX)

##### TECHNICAL REQUIREMENTS OF AS MADE DIAGRAMS

1. The following as made Design and documents shall be prepared by the contractor after completion of the work and submit the same for approval through K-RIDE by Railways. After receiving the approval, Soft copy in two sets and Hard copy One set on tracing film and 6 Sets of the bounded Blue Prints of the following design and documents shall be handed over to the K-Ride / Railway.
  - (a) Equipment Layout diagram
  - (b) Application Logic and associated Circuit diagrams
  - (c) Interface circuits
  - (d) Wiring diagram of All EI equipments including Object Controllers
  - (e) Panel Termination particulars
  - (f) Relay Contact particulars
  - (g) Terminal Analysis diagram
  - (h) Fuse Particulars
  - (i) Inspectors Completion Certificate
  - (j) Relay Index and disposition particulars
  - (k) Power distribution diagram etc

2. The sizes of different signaling documents are standardized as follows. However, contractor shall take the confirmation about the sizes and media etc before undertaking preparation of As Made drawings and designs.
  - (a) Circuit diagram: A3 Size.
  - (b) Panel termination particulars, FTOT particulars, location particulars: A3 Size.
  - (c) Font name: Times New Roman – Auto CAD.
  - (d) Font size: 10- 2.5 mm
- (e). The above drawings to be made as per SEM/ CSTE Circular (copy may be collected from K-RIDE office).
- (f). Two draft copies of above drawings to be submitted for approval. One copy will be returned either duly approved for making a fair copy or for resubmission for approval after incorporating the changes as required by Railways.
- (g). After completion of each phase work, the Application logic and Interface circuits has to be updated as per bell test copy / SAT copy and submit 2 sets of corrected Application logic and Interface circuits in plain paper.
- (h). After preliminary approval, required 2 number of prints are to be submitted for Administrative approval. After the Administrative approval negatives of the above drawings have to be made in tracing films for signature in token of approval. After signature on the tracings, 6 sets of these drawings in ammonia/ blue prints kept in standard plastic covers back to back and bounded neatly shall be handed over to the office of GM/K-Ride.
- (i). One set of the above drawings shall be submitted in Reproduction Tracing Film with 2 sets of soft copy in CD"s/Pen Drive.

**PART-(X)**  
**TECHNICAL REQUIREMENTS FOR PLASTIC DUCTS/ TRAYS**

Telephone : 2451200 Extn. 42666  
: 2465761  
Tele Fax : 91-0522-2452332  
E-mail : dsig@rdso@gmail.com  
Mob. : 9794863313



*Director/Signal*  
Room No. 205, 2<sup>nd</sup> Floor, Annex-I Building,  
Government of India - Ministry of Railways  
Research Designs & Standards Organisation  
LUCKNOW - 226011

Letter No: STS/Cable-Laying Practices Vol.- IV

Date: 09/05/18 ✓

मुख्य संकेत एवं पुरवधार अभियन्ता,	Chief Signal & Telecom Engineer,
मध्य रेलवे, मुम्बई सी.एस.टी.- 400001	Central Rly, Mumbai CST-400 001
पश्चिम रेलवे, चर्च गेट, मुम्बई - 400020	Western Rly, Churchgate, Mumbai - 400 020
पूर्व रेलवे, फैरीली प्लेस, कोलकाता - 001	Eastern Rly, Fairlie Place, Kolkata - 700 001
दक्षिण पूर्व रेलवे, गार्डन रीच, कोलकाता - 43	South Eastern Rly., Garden Reach, Kolkata - 43
उत्तर रेलवे, बरौदा हाउस, नई दिल्ली - 01	Northern Rly., Baroda House, New Delhi- 01
पूर्वांचल रेलवे, गोरखपुर - 273012	Northeastern Rly., Gorakhpur - 273 012
पूर्वांचल सीमान्त रेलवे, मालगाँव, गुवाहाटी 71	North Frontier Rly., Maligaon, Guwahati- 011
दक्षिण रेलवे, पार्क टाउन, चेन्नई - 800 003	Southern Rly., Park Town, Chennai -800 003
पश्चिम मध्य रेलवे, सिकन्दराबाद -500 371	South Central Rly, Rail Nilayam, Secunderabad-71
पूर्व मध्य रेलवे, हाजीपुर प 841 101	East Central Railway, Hazipur - 841 101
उत्तर पश्चिम रेलवे, जयपुर-302206	North Western Railway, Jaipur-300206
पूर्व तटीय रेलवे, बापटक तल, त्तारी ब्लाक, समन्त विहार, भुवनेश्वर-17	East Coast Railway, Rai Vihar, Ground floor, North Block, Samant Vihar, Bhubneshwar -17
उत्तर मध्य रेलवे, गंगा काम्पलेक्स, सुबेदारगंज, अलाहाबाद।	North Central Railway, Ganga Complex, Subedarganj, Allahabad.
दक्षिण पश्चिम रेलवे, क्लब रोड, केशवपुर, हुबली- 580023	South Western Railway, Club Road, Keshavpur, Hubli - 23
पश्चिम मध्य रेलवे, जबलपुर प 482 001	West Central Railway, II floor, DRM Office, Jabalpur - 01
दक्षिण पूर्व मध्य रेलवे, आर्यभट्टा ऑफिस कॉम्प्लेक्स, बिलासपुर 495004	South East Central Railway, R. E. Office Complex, Bilaspur-495004
मेट्रो रेलवे, 33/1, जवाहरलाल नेहरू रोड, कोलकाता-71	Metro Railway, 33/1, Jawaharlal Nehru Road, Kolkata -71
कोर, नवाब मुसुफ रोड सिविल लाइन्स अलाहाबाद -01	CORE, Nawab Yusuf Road, Civil Lines, Allahabad- 01

Sub. Plastic Cable Ducts / Tray. ✓

Ref: This office letter No. STS/Cable-Laying Practices Vol.- IV Dated 09.11.17 in reference to Railway Board's Letter no. 2006, 2012, 2014 and 2014/Sig/SGF/3(CABLE) dated 09/08/12, 13/05/14, 10/07/14 and 29/08/16.

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In continuation of above as referred, Railway board was enclosed technical and other details of plastic ducts/tray. These cable ducts being developed for laying of all types of cables e.g. Signalling, Telecommunication and Power etc.

Railway Board had further informed vide above referred letter that these cable ducts may be very useful for application in suburban sections where cable trenching and digging is a severe problem due to space constraints, proximity of other cables and utilities, traction bonds and cables etc.

To comply above mentioned Railway Board letters, all the railways are once again advised to send their performance feedback/Remarks, specification being followed with testing details, installation practices etc. to RDSO.

RDSO has already issued guidelines vide RDSO/SIG/2010 version 1.1 dated 04/02/2014 as a policy for laying of signalling cable. To ensure quality of plastic cables duct/tray, technical specification and testing procedures as attached with above referred Railway board letter is summarized and enclosed herewith for comments on the performance. ✓

DA : As above enclosed by Railway Board  
as Annexure- I

28  
9.5.18  
(A.K.Singh)  
Director/Signal-VIII  
for Director General /Signal

RDSO - Ref No: STS/Cable-Laying Practices Vol- IV/ Dated: 09/05/2018

**Annexure- I****I. Technical Specification of – Injection Moulded – Plastic Cable Duct / Trays****1. Basic/ Minimum Technical specifications /Testing procedures & Check list**

Properties	Type - I (2434 )	Type- II (1020)
Width ( Internal / External )	240mm/340mm	100mm/200mm
Height ( Internal / External )	155mm/ 230mm	155mm/230mm
Weights per Mtr /PC ( Including Bottom and top cover )	8.00 kg ( Minimum)	5.00 kg( Minimum)
Length per pc / per mtr -	1000mm ( appx )	
Material	Polyolefin / polymers/Engineering plastics	
Fire Behavior	Fire Protection Class K 1 in accordance and referenced with DIN 53438 part-2	
Breaking Load ( Minimum )	≥ 12 KN.at room Temperature, over the specified surface area of: 250mm x 150mm for Type I (2434) 250mm x 75mm for Type II (1020)	
Thermal Characteristics ( Type Test- Frequency 6 months )	Thermal stability from -10 degree to +70 degree As per IS 9000- part- 2 & part- 3 :1977	
Electrical Characteristics ( Type Test- Frequency 6 months )	Dielectric Strength: 48 kV (Min breakdown voltage) as per IEC-60243-1-2013	
Tolerance in Dimensions	( +/ - ) 10mm	

2. The cable ducts should be horizontally attachable to each other with male/female swallow tail connections with suitable detachable/ push fit cover.
3. Required accessories/ earth pins etc. for fixing of cable ducts should be supplied, if required at the time of installation.
4. The cable duct should have predetermined breaking points/ perforated opening/ outlet on the sides for taking cables inside/outside the duct.

**II. Tests Procedures:**

- I. Load Bearing Capacity (at Room temperature of 27°C):
  - 1.1 Sample - Complete cable channel with cover.
  - 1.2 Conditioning for room temperature test - 27°C ± 2°C for 2 hours.
  - 1.3 Sampling size of each test – Complete cable channel with cover.

**RDSO - Ref No: STS/Cable-Laying Practices Vol- IV/ Dated: 09/05/2018**

**1.4 Test Procedure:-**

- 1.4.1 The test specimen to be tested should be in locked position and to be kept on the surface in such a way that bottom surface of the box will get total support. The force shall be applied in the Centre of the cover. A rubber or wooden pad should be introduced in between the plate and box to avoid direct rupture due to sharp edges of the plate. The load test equipment should have at least load capacity of 12 KN.
- 1.4.2 The force measurement should be carried out with a load cell with an accuracy of 1N. Using hydraulic test cylinder, the force should be continually increased.
- 1.4.3 This load to be increased up to the 12 KN. Then the test may be discontinued once the sample survives the minimum breaking load criteria.
- 1.4.4 Size of steel plate shall be as under:
  - Type 1 (2434)- 250mm x 150 mm
  - Type 2 (1020)- 250mm x 75 mm
- 1.5 Acceptance criteria: Breaking load  $\geq 12\text{KN}$

**2. Determination of Burning Behaviour (Edge combustion):**

- 2.1 Sample - 190mm X 90mm (to be cut from the cable tray).
- 2.2 Sampling - One sample should be tested.
- 2.3 The Test Apparatus for this test shall comply the standard DIN: 53438 Part-2.
- 2.4 **Test Procedure:-**
  - 2.4.1 A specimen of 190mm X 90mm should be mounted in a vertical position.
  - 2.4.2 A measuring mark is to be made at a distance of 150mm from the bottom edge.
  - 2.4.3 The height of flame is to be adjusted to 20mm.
  - 2.4.4 The angle of burner should be inclined to 45° to the surface of the test specimen.
  - 2.4.5 The flame is to be applied to the edge of sample for 15 second.
- 2.5 **Acceptance Criteria:-**
  - 2.5.1 The test shall satisfy the requirements of classification K1. (Classification K1: If the tip of the flame of the burning specimen does not reach the measuring mark or if the flame has extinguished.)

**RDSO - Ref No: STS/Cable-Laying Practices Vol- IV/ Dated: 09/05/2018****III. Check lists for Testing of The cable Ducts:**

1. Size of Sample: For Acceptance Test- As per standard sampling from lot and for Type Test - One sample.
2. Following Acceptance Tests & Type Test shall be conducted.

SN	Tests Parameters	Requirements	Observations	Remarks
<b>Acceptance Tests</b>				
2.1	Visual	No sharp edges, burrs, or surface projection which is likely to damage conductor or cable.	No sharp edges, burrs or surface projection should be found.	
2.2	Dimensions / Min. weights per mtr/pe ( cover and bottom )  Length- 1000mm both the types  Tolerances +/- 10mm	For Type – I ( 2434 ) Width = 240mm (int.) / 340mm (ext.) Height = 155mm (int.) / 230mm (ext.) Weight : 8.00Kg (min) per meter  For type – II ( 1020 ) Width = Int. -100mm / Ext. -200mm Height = Int.-155mm / Ext.-230mm Weight : Per Mtr 5.00 Kg ( min )	Dimensions should be within limit.	
2.3	Load bearing capacity at room temperature	Conditioning for room temperature test = 27°C ± 2°C for 2 hours Min. breaking load ≥ 12 KN	No crack or failure of the cable channel should observed	
2.4	Burning Behavior	The test shall satisfy the requirements of class - K1/ with DIN 53438 part-2.	It should confirm to Fire Protection Class K -1	
2.5	Outlet for taking cables inside/outside of duct	Cable Ducts/ Tray should have predetermined breaking points/ perforated opening / outlet on the sides for taking cables inside/outside.	Plastic cable duct should confirm the requirement.	
<b>Type Tests</b>				
2.6	Thermal Characteristics	Thermal stability from -10 degree Celsius to + 70 degree Celsius as per IS 9000- part- 2 & part- 3 :1977	Test reports shall be submitted from approved laboratory.	
2.7	Electrical Characteristics	Dielectric Strength: 48 kV (Min breakdown voltage) as per IS-60243- 1-2013.	Test reports shall be submitted from approved laboratory.	

## Section 8

## Contract Forms

*This Section contains forms which, once completed, will form part of the Contract. The forms for Performance Security and Advance Payment Security, when required, shall only be completed by the successful Bidder after contract award.*

*All italicized text is for guidance how to prepare the various forms and shall be deleted from the final documents.*

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COF/3

**FORM OF CONTRACT PERFORMANCE  
SECURITY(BANK GUARANTEE)**

*[Refer Clause 41 of Instructions to Bidders]*

*(On non-judicial stamp paper of the appropriate value in accordance with stamp Act.  
The stamp paper to be in the name of Executing Bank).*

**From:**

Name and Address of the Bank.....

.....

**To:**

The Managing Director,  
Rail Infrastructure Development Company (Karnataka) Limited,  
MSIL House, 7th Floor,  
#36, Cunningham Road,  
Bangalore – 560052

WHEREAS, Rail Infrastructure Development Company (Karnataka) Limited, hereinafter called the **Employer**, acting through **[Insert Designation and address of the Employer's Representative]**, has accepted the bid of **[Insert Name and address of the Contractor]**, hereinafter called the **Contractor**, for the work of **[Insert Name of Work]**, vide Notification of Award No. **[Insert Notification of Award No.]**.

**AND**

WHEREAS, the contractor is required to furnish Performance Security for the sum of **[Insert Value of Performance Security required]**, in the form of bank guarantee, being a condition precedent to the signing of the contract agreement.

WHEREAS, **[Insert Name of the Bank]**, with its Branch **[Address]** having its Headquarters office at **[Address]**, hereinafter called the **Bank**, acting through **[Designation(s) of the authorised person of the Bank]**, have, at the request of the **[Insert name of the JV partner]**, a JV partner on behalf of the contractor, agreed to give guarantee for performance security and additional performance security as hereinafter contained:

- 1 KNOW ALL MEN by these present that I/We the undersigned **[Insert name(s) of authorized representatives of the Bank]**, being fully authorized to sign and incur obligations for and on behalf of the Bank, confirm that the Bank, hereby, unconditionally and irrevocably guarantee to pay the Employer the full amount in the sum of **[Insert Value of Performance Security required]** as above stated.
- 2 The Bank undertakes to immediately pay on presentation of demand by the Employer any amount up to and including aforementioned full amount

without any demur, reservation or recourse. Any such demand made by the Employer on the Bank shall be final, conclusive and binding, absolute and unequivocal notwithstanding any disputes raised/ pending before any Court, Tribunal, Arbitration or any Authority or any threatened litigation by the Employer of Bank..

- 3 On payment of any amount less than aforementioned full amount, as per demand of the Employer, the guarantee shall remain valid for the balance amount i.e. the aforementioned full amount less the payment made to the Employer.
- 4 The Bank shall pay the amount as demanded immediately on presentation of the demand by Employer without any reference to the contractor and without the Employer being required to show grounds or give reasons for its demand or the amount demanded.
5. The Bank Guarantee shall be unconditional and irrevocable.
- 6 The guarantee hereinbefore shall not be affected by any change in the constitution of the Bank or in the constitution of the Contractor.
- 7 The Bank agrees that no change, addition, modifications to the terms of the Contract Agreement or to any documents, which have been or may be made between the Employer and the Contractor, will in any way release us from the liability under this guarantee; and the Bank, hereby, waives any requirement for notice of any such change, addition or modification to the Bank.
- 8 This guarantee is valid and effective from the date of its issue, which is ***[insert date of issue]***. The guarantee and our obligations under it will expire on ***[Insert the date twenty-eight days after the expected end of defect liability period]***. All demands for payment under the guarantee must be received by us on or before that date.
- 9 The Bank agrees that the Employers right to demand payment of aforementioned full amount in one instance or demand payments in parts totaling up to the aforementioned full amount in several instances will be valid until either the aforementioned full amount is paid to the Employer or the guarantee is released by Employer before the Expiry date.
- 10 The Bank agrees that its obligation to pay any amount demanded by the Employer before the expiry of this guarantee will continue until the amount demanded has been paid in full.
- 11 The expressions Bank and Employer herein before used shall include their respective successors and assigns.
- 12 The Bank hereby undertakes not to revoke the guarantee during its currency, except with the previous consent in writing of the employer. This guarantee

is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 758.

- 13 The Guarantee shall be in addition to and without prejudice to any other security Guarantee (s) of the contractor in favour of the Employer available with the Employer. The Bank, under this Guarantee, shall be deemed as Principal Debtor of the Employer.

Date .....

Place.....

.....  
[Signature of Authorised person of Bank]

.....  
[Name in Block letters]

.....  
[Designation]

.....  
[P/Attorney] No.

.....  
Bank's Seal

.....  
[P/Attorney] No.....

Witness:

1. *Signature*  
*Name & Address & Seal*
2. *Signature*  
*Name & address & Seal*

*Note :*

1. *All italicized text is for guidance on how to prepare this bank guarantee and shall be deleted from the final document.*
2. *In case the guarantee is issued by a foreign Bank, which does not have operations in India, the said bank shall have to provide a counter-guarantee by State Bank of India.*
3. *In case the Contractor is a JV, the Performance Security is required to be furnished on behalf of the JV in favour of the Employer by the JV Partners in proportion of their respective percentage share specified in the JV Agreement. The percentage share of M/s [Insert Name of the JV Partner] in the JV is [Fill share % in the JV] percent. All the Bank Guarantee of JV Partners are liable to be encashed cumulatively.*

**FORM OF ADDITIONAL PERFORMANCE SECURITY  
(BANK GUARANTEE)**

*[Refer Clause 35.5 of Instructions to Bidders]*

*(On non-judicial stamp paper of the appropriate value in accordance with stamp Act.  
The stamp paper to be in the name of Executing Bank)*

**From:**

*Name and Address of the Bank.....*

.....

**To:**

The Managing Director,  
Rail Infrastructure Development Company (Karnataka) Limited,  
MSIL House, 7th Floor,  
#36, Cunningham Road  
Bangalore – 560052

WHEREAS, Rail Infrastructure Development Company (Karnataka) Limited, hereinafter called the **Employer**, acting through **[Insert Designation and address of the Employer's Representative]**, has accepted the bid of **[Insert Name and address of the Contractor]**, hereinafter called the **Contractor**, for the work of **[Insert Name of Work]**, vide Notification of Award No. **[Insert Notification of Award No.]**.

**AND**

WHEREAS, the contractor is required to furnish additional Performance Security for the sum of **[Insert Value of additional Performance Security required]**, in the form of bank guarantee, being a condition precedent to the signing of the contract agreement.

WHEREAS, **[Insert Name of the Bank]**, with its Branch **[Address]** having its Headquarters office at **[Address]**, hereinafter called the **Bank**, acting through **[Designation(s) of the authorised person of the Bank]**, have, at the request of the [Insert name of the JV/Consortium partner], a JV/Consortium partner on behalf of the contractor, agreed to give guarantee for additional performance security as hereinafter contained:

- 1 KNOW ALL MEN by these present that I/We the undersigned **[Insert name(s) of authorized representatives of the Bank]**, being fully authorized to sign and incur obligations for and on behalf of the Bank, confirm that the Bank, hereby, unconditionally and irrevocably guarantee to pay the Employer the full amount in the sum of **[Insert Value of additional Performance Security required]** as above stated.
- 2 The Bank undertakes to immediately pay on presentation of demand by the Employer any amount up to and including aforementioned full amount without any demur, reservation or recourse. Any such demand made by the Employer on the Bank shall be final, conclusive and binding, absolute and unequivocal notwithstanding any disputes raised/ pending before any Court, Tribunal, Arbitration or any Authority or any threatened litigation by the Employer of Bank.

- 3 On payment of any amount less than aforementioned full amount, as per demand of the Employer, the guarantee shall remain valid for the balance amount i.e. the aforementioned full amount less the payment made to the Employer.
- 4 The Bank shall pay the amount as demanded immediately on presentation of the demand by Employer without any reference to the contractor and without the Employer being required to show grounds or give reasons for its demand or the amount demanded.
- 5 The Bank Guarantee shall be unconditional and irrevocable.
- 6 The guarantee hereinbefore shall not be affected by any change in the constitution of the Bank or in the constitution of the Contractor.
- 7 The Bank agrees that no change, addition, modifications to the terms of the Contract Agreement or to any documents, which have been or may be made between the Employer and the Contractor, will in any way release us from the liability under this guarantee; and the Bank, hereby, waives any requirement for notice of any such change, addition or modification to the Bank.
- 8 This guarantee is valid and effective from the date of its issue, which is ***[insert date of issue]***. The guarantee and our obligations under it will expire on ***[Insert the date twenty eight days after the expected end of defect liability period]***. All demands for payment under the guarantee must be received by us on or before that date.
- 9 The Bank agrees that the Employers right to demand payment of aforementioned full amount in one instance or demand payments in parts totaling up to the aforementioned full amount in several instances will be valid until either the aforementioned full amount is paid to the Employer or the guarantee is released by Employer before the Expiry date.
- 10 The Bank agrees that its obligation to pay any amount demanded by the Employer before the expiry of this guarantee will continue until the amount demanded has been paid in full.
- 11 The expressions Bank and Employer herein before used shall include their respective successors and assigns.
- 12 The Bank hereby undertakes not to revoke the guarantee during its currency, except with the previous consent in writing of the employer. This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 758.
- 13 The Guarantee shall be in addition to and without prejudice to any other security Guarantee(s) of the contractor in favour of the Employer available with the Employer. The Bank, under this Guarantee, shall be deemed as Principal Debtor of the Employer.

Date .....

Place.....

.....  
[Signature of Authorised person of Bank]

.....  
[Name in Block letters]

.....  
[Designation]

.....  
[P/Attorney] No.

.....  
Bank's Seal

[P/Attorney] No. ....

Witness:

1. Signature  
Name & Address & Seal

2. Signature  
Name & address & Seal

Note :

- 1 *All italicized text is for guidance on how to prepare this bank guarantee and shall be deleted from the final document.*
- 2 *In case the guarantee is issued by a foreign Bank, which does not have operations in India, the said bank shall have to provide a counter-guarantee by State Bank of India.*
- 3 *The Bank Guarantee should be duly attested by Notary public with notarial stamp of appropriate value affixed thereon.*
- 4 *In case the Contractor is a JV/Consortium, the additional Performance Security is required to be furnished on behalf of the JV/ Consortium in favour of the Employer by the JV/Consortium Partner(s) who is responsible for execution of schedule(s) (as per JV/Consortium agreement) against which additional Performance Security is required to be submitted in terms of ITB 35.5. All the Bank Guarantee of J/VConsortium Partners are liable to be encashed cumulatively.*

## **Advance Payment Security**

*[Refer Clause 14.2 of GCC]*

***(On non-judicial stamp paper of appropriate value in accordance with stamp Act.  
The stamp paper to be in the name of Executing Bank)***

**From**

*[Name and Address of the Bank]*

**To**

The Managing Director,  
Rail Infrastructure Development Company (Karnataka) Limited,  
MSIL House, 7th Floor,  
#36, Cunningham Road  
Bangalore – 560052

**Beneficiary:** Rail Infrastructure Development Company (Karnataka) Limited.

**Guarantee No.:** *[.....reference number of the guarantee.....]* **Dated:** *[.....]*

WHEREAS, Rail Infrastructure Development Company (Karnataka) Limited **(hereinafter called the Employer)** has entered into Contract No. *[.....reference number of the Contract.....]* dated *[.....]* for the execution of *[name of the contract]* **(hereinafter called the Contract)** with *[.....name of the Contractor.....]* **(hereinafter called the Contractor)**.

WHEREAS, according to the Conditions of the Contract, an advance payment is admissible to the contractor against submission of bank guarantee(s).

At the request of the Contractor, we *[.....name of the Bank.....]* with our branch at *[.....address.....]*, having our Head Office at *[.....address.....]* **(hereinafter called the Bank)** have, at the request of *[.....Insert name of the JV partner.....]*, a JV partner on behalf of the Contractor, agreed to give the said guarantee as hereinafter contained:

1. KNOW ALL MEN by these present that I/We the undersigned *[.....Insert name(s) of authorized representative(s) of the Bank.....]*, being fully authorized to sign and incur obligations for and on behalf of the Bank, confirm that the Bank, hereby, unconditionally and irrevocably guarantees

to pay the Employer the sum of Rs.[....*value in figure*....](Rupees [....*value in words*....] **only(hereinafter called the Full Amount).**

2. The Bank undertakes to immediately pay to the Employer, without any demur, reservation or recourse, any amount up to and including aforementioned full amount upon first written demand/demands from the Employer.
3. On payment of any amount less than aforementioned full amount, as per demand of the Employer, the guarantee shall remain valid for the balance amount i.e. the aforementioned full amount less the payment made to the Employer.
4. The Bank shall pay the amount so demanded without any reference to the contractor and without the Employer being required to show grounds or give reasons for its demand or the amount demanded.
5. The guarantee hereinbefore shall not be affected by any change in the constitution of the Bank, the Contractor or the Employer.
6. The Bank agrees that no change, addition, modification to the terms of the Contract Agreement or to any document, which have been or may be made between the Employer and the Contractor, will in any way release us from the liability under this guarantee; and the Bank, hereby, waives any requirement for notice of any such change, addition or modification to the Bank.
7. This guarantee is valid and effective from the date of it's issue, which is [....*date of issue*....]. The guarantee and our obligations under it will expire on dated .....[....*Please refer note 4 & 5*....]. All demands for payment under the guarantee must be received by us on or before that date.
8. The Bank agrees that the Employer's right to demand payment of aforementioned full amount in one instance or demand payments in parts totaling up to the aforementioned full amount in several instances will continue until either the aforementioned full amount is paid to the Employer or the guarantee validity period expires.

9. The Bank agrees that it's obligation to pay any amount demanded by the Employer before the expiry of this guarantee will continue until the amount demanded has been paid in full.
10. The expressions Bank and Employer herein before used shall include their respective successors and assigns.
11. The Bank hereby undertakes not to revoke the guarantee during its currency, except with the previous consent in writing of the employer. This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 758.

**Dated**[.....]

**Place**[.....]

.....  
**(Signature of the Authorized Person of the Bank)**

.....  
**(Name in Block Letters)**

.....  
**(Designation)**

.....  
**(Bank's Seal)**

.....  
**(Authorization No.)**

**Witness:**

1. ....  
*Signature, Name & Address*

2. ....  
*Signature, Name & Address*

**Note:**

1. *All italicized text in brackets [....text....] is for guidance on how to prepare this bank guarantee and shall be deleted from the final document.*
2. *In case the guarantee is issued by a foreign Bank, the said bank shall have operations in India and should be issued by Indian operations branch of the said bank.*
3. *The Bank Guarantee should be duly attested by Notary Public with notarial stamps of appropriate value affixed thereon.*
4. **Mobilization Advance under GCC 14.2.1:**

**(a) For Single Entity**

*For each Installment of Advance, two Bank Guarantees of equal amounts (each equal to half of the first installment of advance plus 10%) shall be furnished. Each Bank Guarantee shall be valid for the stipulated completion period of the contract.*

**OR**

**(b) For JV/Consortium**

*For each Installment of Advance, individual JV/Consortium partner shall furnish Bank Guarantee equal to his share in the installment of Advance plus 10%. Each Bank Guarantee shall be valid for the stipulated completion period of the contract.*

**5. Advance against Plant and Machinery under GCC 14.2.2:**

**(a) For Single Entity**

*For each Installment of Advance, a Bank Guarantee equal to the installment of advance plus 10% shall be furnished. The Bank Guarantee shall be valid for the stipulated completion period of the contract.*

**OR**

**(b) For JV/Consortium**

*For each Installment of Advance, individual JV/Consortium partner shall furnish a Bank Guarantee equal to his share in the installment of advance plus 10%. Each Bank Guarantee shall be valid for the stipulated completion period of the contract.*

---

**FORM OF BANK GUARANTEE FOR RELEASE  
OF BALANCE RETENTION MONEY**

*(On non-judicial stamp paper of the appropriate value in accordance with stamp Act.  
The stamp paper to be in the name of Executing Bank).*

**From:**

.....  
.....Name and Address of the Bank.....  
.....

**To:**

The Managing Director,  
Rail Infrastructure Development Company (Karnataka) Limited,  
MSIL House, 7th Floor,  
#36, Cunningham Road  
Bangalore – 560052.

- a) WHEREAS, Rail Infrastructure Development Company (Karnataka) Limited, (hereinafter called the **Employer**), acting through **[Insert Designation and address of the Employer's Representative]**, has entered into a contract with **[Insert Name and address of the Contractor's Representative]**, (hereinafter called the **Contractor**), for the work of **[Insert Name of Work]**, vide Notification of Award No. **[Insert Notification of Award No.]**.
- b) WHEREAS as per conditions of contract Employer has deducted an amount of RS **[Insert Amount deducted as retention money]** towards retention money till date, and WHEREAS now the contractor has requested the Employer for releasing the said amount on submission of a bank guarantee of equivalent amount which has been accepted by the Employer. \*\*\*\*

OR

WHEREAS as per conditions of contract Employer has deducted an amount of RS **[Insert Amount deducted as retention money]** towards retention money till date, out of a total amount of Rs **[Insert total Amount of retention money deductible as specified in the contract]** which is due to be deducted as retention money as per Contract agreement and WHEREAS now the Contractor has requested the Employer to accept a bank guarantee of the equivalent amount of the total retention money due as per contract agreement so that the amount already deducted may be released in favour of the contractor and that no further deduction towards retention money will be made in future which has been accepted by the Employer. \*\*\*\*

- c) WHEREAS, **[Insert Name of the Bank]**, with its Branch **[Address]** having its Headquarters office at **[Address]**, hereinafter called the **Bank**, acting through **[Designation(s) of the authorised person of the Bank]**, have, at the request of the contractor, agreed to give guarantee as hereinafter contained:

1. KNOW ALL MEN by these present that I/We the undersigned ***[Insert name(s) of authorized representatives of the Bank]***, being fully authorized to sign and incur obligations for and on behalf of the Bank, confirm that the Bank, hereby, unconditionally and irrevocably guarantee the Employer to pay the full amount in the sum of ***[Insert Value of the Bank Guarantee being submitted]*** as above stated.
2. The Bank undertakes to immediately pay to the Employer any amount up to and including aforementioned full amount upon written order/orders from the Employer without any demur, reservation or recourse.
3. On payment of any amount less than aforementioned full amount, as per demand of the Employer, the guarantee shall remain valid for the balance amount i.e. the aforementioned full amount less the payment made to the Employer.
4. The Bank shall pay the amount so demanded without any reference to the contractor and without the Employer being required to show grounds or give reasons for its demand or the amount demanded.
5. The guarantee hereinbefore shall not be affected by any change in the constitution of the Bank or in the constitution of the Contractor.
6. The Bank agrees that no change, addition, modifications to the terms of the Contract Agreement or to any documents, which have been or may be made between the Employer and the Contractor, will in any way release us from the liability under this guarantee; and the Bank, hereby, waives any requirement for notice of any such change, addition or modification to the Bank.
7. This guarantee is valid and effective from the date of it's issue, which is ***[insert date of issue]***. The guarantee and our obligations under it will expire on ***[Insert the date twenty eight days after the expected end of defect liability period.]***. All demands for payment under the guarantee must be received by us on or before that date.
8. The Bank agrees that the Employers right to demand payment of aforementioned full amount in one instance or demand payments in parts totaling up to the aforementioned full amount in several instances will continue

until either the aforementioned full amount is paid to the Employer or the guarantee expires.

9. The Bank agrees that it's obligation to pay any amount demanded by the Employer before the expiry of this guarantee will continue until the amount demanded has been paid in full.
10. The expressions Bank and Employer herein before used shall include their respective successors and assigns.
11. The Bank hereby undertakes not to revoke the guarantee during its currency, except with the previous consent in writing of the employer. This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 758.

Date .....

Place.....

.....  
[Signature of Authorised person of Bank]

.....  
[Name in Block letters]

.....  
[Designation]

.....  
.....[Address].....  
.....

Witness :

1. *Signature*  
*Name & Address & Seal*
2. *Signature*  
*Name & address & Seal*

*Bank's Seal*  
*Authorisation No.....*

Note :

- 1) *All italicized text is for guidance on how to prepare this bank guarantee and shall be deleted from the final document.*
- 2) *In case the guarantee is issued by a foreign Bank, the said bank shall have operations in India and should be countersigned by Indian operations branch of the said bank.*
- 3) *The Bank Guarantee should be duly attested by Notary public with notarial stamps of appropriate value affixed thereon.*
- 4) *\*\*\*\* strike out whichever is not applicable.*

**BANK GUARANTEE FOR THE SAFE CUSTODY OF THE  
MATERIALS SUPPLIED BY THE CONTRACTOR**

[Refer Clause 14.5 of GCC]

(To be executed on Non-Judicial Stamp Paper of Appropriate Value and notarised)

THIS BANK GUARANTEE made on this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_ by \_\_\_\_\_ (*insert the name of the Contractor and its registered address*) (hereinafter called “the Contractor”) which expression shall where the context do admits or implies be deemed to include its executors, administrators and assigns, in favour of the Rail Infrastructure Development Company (Karnataka) Limited, MSIL House, 7th Floor, #36, Cunningham Road, Bangalore – 560052 (hereinafter called “K RIDE”) on the other part.

WHEREAS by an Agreement/Letter of Acceptance No. \_\_\_\_\_ dated \_\_\_\_\_ (hereinafter called “the said agreement”), the Contractor has agreed to execute the \_\_\_\_\_ (*Name of Work*) (hereinafter called “the Works”) .

AND WHEREAS the Contractor has submitted to K RIDE/ the Engineer for payment on materials procured by him and brought to the site of the Works or his workshop for use in the Works.

AND WHEREAS K RIDE/ the Engineer has agreed to make advance/stage payment to the Contractor the total sum of Rs. \_\_\_\_\_ (*in Figures*) [Rupees \_\_\_\_\_ (*in Words*)] in Interim Payment Certificate (IPC) No. \_\_\_\_\_, the quantities and other particulars of which are detailed in this IPC for the said works signed by the Contractor on \_\_\_\_\_ for the Materials brought by the Contractor to site of the works. Brief details are also mentioned in schedule 1 appended hereto.

NOW THIS BANK GUARANTEE WITNESS that in pursuance of the said agreement and in consideration of the sum of Rs. \_\_\_\_\_ (*in Figures*) \_\_\_\_\_ (*in Words*) on or before the execution of these presents to be paid to the Contractor by K RIDE so aforesaid, the Contractor doth hereby covenant and agree with K RIDE and declare as follows: -

1. That the said sum of Rs. \_\_\_\_\_ (*In Figures*) \_\_\_\_\_ (*in Words*) to be paid by K RIDE to the Contractor as aforesaid shall be utilized by the Contractor in or towards the execution of the said works and for no other purpose whatsoever.
2. That the Materials detailed in the said IPC which have been offered to and accepted by K RIDE/ the Engineer, are absolutely the Contractor’s own property and free from encumbrances of any kind and the Contractor will not make any

application for or receive any further payment on the Materials which are not absolutely his own property and free from encumbrances of any kind, the Contractor indemnifies the K RIDE against all claims on any Materials in respect of which payment is to be made to him as aforesaid.

3. That the Contractor undertakes that the Plant and Materials shall be used exclusively for the performance / execution of the Contract strictly in accordance with the terms and conditions of the Contract and no part of the Plant and Materials shall be utilized for any other work or purpose whatsoever.
4. That the Contractor is obliged and shall remain absolutely responsible for the safe transit / protection and custody of the Materials against all risks whatsoever including acts of the God till the Materials are duly incorporated in the works, commissioned and are taken over by K RIDE/Railway (including surplus Materials, if required as instructed by K RIDE/ the Engineer) in accordance with the terms of the Contract. The Contractor undertakes to keep K RIDE harmless against any loss or damage that may be caused to the Plant and Materials.
5. That the said Plant and Materials shall not on any account be removed from the site of the works except with the written permission of K RIDE/ the Engineer. Further, K RIDE/ the Engineer shall always be free at all times to take possession of the materials in whatever form the materials may be in, if in its opinion, the Materials are likely to be endangered, mis-utilized or converted to uses other than those specified in the Contract, by any acts or omission or commission on the part of the Contractor or any other person or on account of any reason whatsoever and the Contractor binds himself and undertakes to comply with the directions of demand of K RIDE to return the Plant and Materials without any demur or reservation.
6. That the said plant and materials shall, at all times, be open to inspection by K RIDE/ the Engineer or any authorized representative. In the event of the said material or any part thereof at any time being found to be in lesser quantity than for which payment has been released or the same has been stolen, destroyed or damaged or becoming deteriorated, the Contractor will forthwith replace the same or repair and make good the same as required by K RIDE/ the Engineer.
7. That making payment does not mean that Materials are of required specifications and quality or that whole of the quantity brought to site by Contractor will be used

in the work. The Contractor is fully responsible for the materials to conform to required quality and specification and if at any time K RIDE/ the Engineer do not find the material satisfactory, the Contractor at his own cost would replace these. K RIDE/ the Engineer would be at liberty to recover cost of these from any dues of the Contractor. Also any Plant and Materials which are in excess of what is finally required under the contract would be the Contractor's property without any liability on K RIDE/ the Engineer who would recover the cost of this from the Contractor.

8. That this Bank Guarantee is irrevocable. If at any time, any loss or damage occurs to the Materials or the same or any part thereof is mis-utilized in any manner whatsoever, then the Contractor hereby agrees that the decision of K RIDE/ the Engineer as to assessment of loss or damage to the Materials shall be final and binding on the Contractor. The Contractor binds itself and undertakes to replace the lost and/or damaged Materials at its own cost and/or shall pay the amount of loss to K RIDE without any demur, reservation or protest. This is without prejudice to any other right or remedy that may be available to K RIDE/ the Engineer against the Contractor under the Contract or under this Bank Guarantee.
9. That if the Contractor shall at any time make any default in the performance or observance in any respect of any of the terms and provisions of the said agreement or of those presents, the total amount of the payment shall immediately on the happening of such default be recovered by K RIDE/ the Engineer from any dues of Contractor. It is also clearly understood by the Contractor that non-observance of the obligations under this Indemnity Bond by the Contractor shall inter-alia constitute a criminal breach of trust on the part of the Contractor for all intents and purpose including legal / penal consequences.
10. IN WITNESS WHEREOF, the Contractor has hereunto set its hand through its authorized representative, the day, month and year first above mentioned.

11. SCHEDULE 1

Particulars of the Materials	Quantity	Value of the Materials

Signed, Sealed and Delivered by the said Contractor

(Contractor's Name)

Dated:.....

(AUTHORISED SIGNATORY)

Place: .....

SEAL OF COMPANY

IN THE PRESENCE OF:

WITNESS: SIGNATURE \_\_\_\_\_

NAME: \_\_\_\_\_

ADDRESS : \_\_\_\_\_

**Note:**

*The contractor has the option to submit the Bank Guarantee to cover all the items and quantities of Materials of stage payment or to submit Bank Guarantee each time the stage payment is to be taken or Plant and Materials advance is to be taken.*

## **FORM OF CONTRACT AGREEMENT**

**CONTRACT No.** \_\_\_\_\_

This AGREEMENT (hereinafter, together with all the appendices/attachments attached hereto called the “Contract”) is made on the \_\_\_\_\_ day of \_\_\_\_\_, 2020, between the \_\_\_\_\_ on the one part (hereinafter called the “Employer”) acting through the Managing Director, and \_\_\_\_\_ in association with \_\_\_\_\_ (hereinafter [jointly] called the “Consultant”) on the other part [notwithstanding such association] the Consultant will be represented hereunder at all times by \_\_\_\_\_ which will retain full and undivided responsibility for the performance of obligations hereunder and for the satisfactory completion of the Consultant's services to be performed hereunder.

WHEREAS the Employer desires that the Works known as . . . . . [name of the Contract]. . . . . should be executed by the Contractor, and has accepted a Bid by the Contractor for the execution and completion of these Works and the remedying of any defects therein,

The Employer and the Contractor agree as follows:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Contract documents referred to.
2. The following documents shall be deemed to form and be read and construed as part of this Agreement. This Agreement shall prevail over all other Contract documents.
  - the Letter of Acceptance
  - the Letter of Technical Bid
  - the Letter of Price Bid
  - the Addenda Nos. . . . . [insert addenda numbers if any]. . . . .
  - the Special Conditions of Contract
    - Part A : Contract Data
    - Part B : Specific Provisions
  - the General Conditions of Contract;
  - the Specification

- the Drawings;
  - the Work's Requirements
  - the completed Schedules including (priced Bill of Quantities)
  - Any other documents
3. In consideration of the payments to be made by the Employer to the Contractor as indicated in this Agreement, the Contractor hereby covenants with the Employer to execute the Works and to remedy defects therein in conformity in all respects with the provisions of the Contract.
4. The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

IN WITNESS whereof the parties hereto have caused this Agreement to be executed in accordance with the laws of . . . . [name of the borrowing country].  
. . . .on the day, month and year indicated above.

Signed by ..... Signed by .....

FOR AND ON BEHALF OF (THE EMPLOYER)FOR AND ON BEHALF OF (THE  
CONSULTANT)

---

(Authorized Representative)(Authorized Representative)

Witness, Name, Signature, Address, DateWitness, Name, Signature, Address,Date

PROFORMA – 12

**AFFIDAVIT/UNDERTAKING FOR PROCUREMENT OF  
ELECTRONIC INTERLOCKING SYSTEM FROM RDSO  
APPROVED SOURCE**

*(To be executed in the presence of Notary Public on non-judicial stamp paper of Rs.100/- or appropriate value. The Stamp paper to be in the name of tenderer)\*\**

I.....(Name and designation)\*\* appointed as the attorney/authorized signatory of the tenderer(including its constituents),M/s (hereinafter called the tenderer which expression unless repugnant to context or meaning thereof includes its successors or permitted assigns) for the purpose of Work.....procurement, Design, Installation, Testing and commissioning and post execution services support for Electronic Interlocking System work as per the tender Notice No.....date.....of South Western Railway, do hereby solemnly affirm and state on oath on behalf of the tenderer including its constituents as under:

1. I/We M/s.....Tenderer(s) am/are signing this document after carefully reading the contents.
2. I/We M/s Tenderer(s) also accept all the conditions of the tender and have digitally signed all the pages in confirmation thereof.
3. I/We M/s. do hereby agree and undertake that I/We shall procure the Electronic Interlocking System (Hardware and Software) from RDSO approved sources and installation, testing and commissioning of Electronic Interlocking shall also be got done from the same source including after sales support required during the warranty period.
4. I/We M/s.....do hereby agree and undertake that after the receipt of Letter of acceptance and before signing contract agreement and supply of Electronic Interlocking System including Hardware and Software is taken up, to submit the Memorandum of Understanding with RDSO approved source for Electronic Interlocking System covering supply of Equipment, Design, Installation and commissioning by the same RDSO approved source including after sales support required during the warranty period.

5. I/WeM/s.....do hereby agree and understand that in the event of breach of any of the above conditions undertaken by us, will lead to the termination of contract along with forfeiture of EMD/SD and Performance Guarantee without prejudice to right of Railway to take any other action as provided in the contract and in accordance with Law.
6. I/WeM/s.....do hereby agree and undertake that I/We abide the above conditions and any decision of Railway in this regard is final and binding on us.

DEPONENT  
SEAL AND SIGNATURE

VERIFICATION

I/We above named tenderer do hereby solemnly affirm and verify that the contents of above affidavit from Para 1 to 6 are true and correct. Nothing has been concealed and no part of it is false.

Identified by me

DEPONENT  
SEAL AND SIGNATURE

Place :  
Date :

SWORN TO BEFORE ME  
(NOTARY)

*\*\* The contents in the italics are only for guidance purpose. Details as appropriate are to be filled in suitably by tenderer. Attestation before Magistrate/Notary Public.*

PROFORMA - 13

**MEMORANDUM OF UNDERSTANDING (MOU) FOR PROCUREMENT OF ELECTRONIC INTERLOCKING SYSTEM FROM RDSO APPROVED SOURCE**

*(To be executed in the presence of Notary Public on non-judicial stamp paper of Rs.100/- or appropriate value. The Stamp paper to be in the name of tenderer)\*\**

MOU between M/s.....(Name of Tenderer) and M/s.....(Name of RDSO Approved Source) for the work.....Name of the work) vide Tender Notice No....., Dated:.....

This MOU made and entered into this.....the day of.....(Name of Month)/----  
..... (Year).

**BETWEEN**

M/s. .... (Name of Tenderer), hereinafter referred to as M/s.

.....  
(Tenderer) which expressions shall, unless repugnant to the context or meaning thereof, be deemed to mean and include its Parent/Holding Companies, Subsidiaries, Associate Companies, their successors, Successors-in-interest, administrators and permitted assignees of the ONE PART.

**AND**

M/s. (Name of RDSO Approved Source) a company registered in India under the Companies Act, 1956 and having its Registered Office at....., India hereinafter referred to as M/s. .... (RDSO Approved Source) which expressions shall unless excluded by or repugnant to the context or meaning thereof be deemed to include its successors, Successors-in-interest and assignees of the OTHER PART Collectively hereinafter referred to as the PARTIES

**WITNESSETH**

Whereas South Western Railway (hereinafter referred to as PURCHASER) is desirous of doing the work of..... (hereafter referred to as PROJECT) for which the PURCHASER has issued a Tender Notice No....., Dated:..... opened on the day of ...../.....

AND Whereas M/s (Tenderer) received Letter of Acceptance in the said PROJECT.

AND Whereas M/s. .... (Tenderer), have approached M/s. .... (RDSO Approved Source) to be its Sub-Contractor for the

scope of work as

mentioned in the Annexure attached along with this MOU and is part of the MOU mentioned for the PROJECT.

AND whereas in the event of M/s *(Tenderer)*, being successfully awarded the PROJECT by the PURCHASER, then M/s.....*(Tenderer)*, shall place the order on M/s.

.....*(RDSO Approved Source)* for the PROJECT, as its nominated specialist

Subcontractor clearly defining the scope of work along with such mutually agreed terms and conditions as mentioned in M/s. ....*(RDSO Approved Source)* offer and based on the mutually agreed prices submitted by M/s. ....*(RDSO Approved Source)* to M/s.

.....*(Tenderer)*

NOW THEREFORE IN CONSIDERATION OF THE ABOVE PREMISES THE PARTIES DO AGREE TO ABIDE BY AS FOLLOWS:

No.

Office of the.....

Date:.....

**WORK EXPERIENCE CERTIFICATE**

To whom so ever it may concern  
(Issued for the purpose of Quoting in K-RIDE tenders)  
M/s/Sri ..... (Name and address of the contractor) is a working contractor of this unit and was awarded the following work. The relevant details of the work are as under: -

Sl.No	Description	Details
1	Name of work	
2	Acceptance Letter No and Date	
3	Agreement Number, date and name of the agency	
4	Agreement value in Rupees ( in words and figures)	
5	Due date of completion	
6	Actual date of completion of work	
7	Value of Final Bill if passed (in words)	
8	Work completed but Final measurements not recorded. a) Amount paid so far as in CC bill No.	
9	Work completed. Final measurements recorded with negative variation a) Amount so far paid as in CC bill No.	
10	Work completed. If Final measurements recorded with Positive variation which is not sanctioned yet. a) Original agreement value of Last sanctioned agreement value whichever is lower.	
11	Scope of work (Broad category of works i.e., the name of the work in the agreement on which work is	
12	Details of values of major components/ works executed in the completed work.	

**Note:**

The Certificate to satisfy similar work should be signed by an officer not lower than JAG officer in Railways and Executive Engineer rank or equivalent grade in other department of Govt. of India/State Government/PSUs of Government of India / State Undertaking and Competent Authority of Public Listed Company.

Signature :.. ..

Name of Officer .....

Designation: .....

Address: .....

Office seal: .....

Phone/FAX No.: .....

Date: .....

**Name of Work :** - Signaling outdoor works at Yesvantpur bye pass, Lottegolahalli, Hebbal and Banaswadi with MSDAC, Integrated power supply and interlocking of LC Gates in connection with doubling of YESVANTPUR-BAIYAPPANAHALLI section of Bangalore Division

### SUMMARY OF BILLS OF QUANTITIES

Particulars	Department Value (Rs.)
<b>SCHEDULE - A</b>	<b>20354613.00</b>
<b>SCHEDULE - B</b>	<b>5985951.00</b>
<b>SCHEDULE - C</b>	<b>1631316.00</b>
<b>SCHEDULE - D</b>	<b>17538339.00</b>
<b>SCHEDULE - H</b>	<b>90950461.00</b>
<b>SCHEDULE - J</b>	<b>35657805.00</b>
<b>SCHEDULE - K</b>	<b>3062800.00</b>
<b>Total</b>	<b>175181285.00</b>

<b>Name of Work</b> : - Signaling outdoor works at Yesvantpur bye pass, Lotteolahalli, Hebbal and Banaswadi with MSDAC, Integrated power supply and interlocking of LC Gates in connection with doubling of YESVANTPUR-BAIYAPPANAHALLI section of Bangalore Division						
<b>SCHEDULE "A"</b>						
<b>SL. NO</b>	<b>SOR No.</b>	<b>Description of work</b>	<b>Unit</b>	<b>Rate</b>	<b>QUANTITY</b>	<b>AMOUNT</b>
1	10_101	Excavation of cable trench in all kinds of soil except hard rocky areas including clearing of roots of trees, rocks, bushes etc. to a depth of 1.0 Mtrs and to a width of 0.3 Mtrs. Laying of cables is not included in this schedule.	Mtrs	34.65	63000	2182950.00
2	10_104	Removing/breaking of existing RCC slabs on the Passenger Platform, trenching to a depth of 0.6m to accommodate the additional cables, replacing the slabs removed after the cables are laid and replastering with cement mortar, refilling the trench by ramming and consolidating it as per the instructions of KRIDE Representatives at site. (Laying of cables is not included in this schedule).[Cement, river sand and all other miscellaneous materials required for the work shall be supplied by the Contractor].	Mtrs.	169.95	200	33990.00
3	10_105	Excavation of trench along route of existing cable duct, opening the slabs to accommodate additional cable laying, REPOSITIONING the slabs removed after the cables are laid and PLASTERING with cement mortar, and refilling the trench by ramming and consolidating it as per the instructions of KRIDE Representatives at site.(Laying of cables is not included in this schedule.)[Cement, river sand and all other miscellaneous materials required for the work shall be supplied by the Contractor].	Mtrs.	116.70	200	23340.00
4	10_106	Excavation of trench to a depth of 1 Mtr. for track crossing of cables, laying of DWC/ RCC pipes with collar/coupling, refilling of trench by ramming and consolidating it as per the instructions of KRIDE representative at site. During excavation of trench it has to be ensured that the excavated soil does not mix with the ballast available. The depth of 1m trench shall be from the bottom of sleepers for track crossings. Laying of cables is not included in this schedule.(Supply of DWC/RCC pipes with couplers/ collars is not included in this schedule).	Mtrs.	208.35	700	145845.00
5	10_107	Excavation of trench to a depth of 1 Mtr. for road crossing of cables, laying of DWC/ RCC pipes with collar/ coupling, refilling of trench by ramming and consolidating it and resurfacing it to the original position. Laying of cables is not included in this schedule.(Supply of DWC/RCC pipes with couplers/ collars is not included in this schedule).	Mtrs.	270.83	300	81249.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
6	10_108	Provision of GI pipes (50/100mm dia) for cable laying with offset at both ends and with couplings over RCC Bridges/ Drainage/ Culverts with concrete masonry supports of size 300mm x 300 mm x 300 mm at an interval of 2m. The ends of the pipes shall be closed with brick masonry abutments work so that no cable is exposed, The work shall be carried out as per the instructions of KRIDE representative at site. (Supply of GI pipes with couplings and laying of cables is not included in this schedule). [Stone jelly of size 20/25mm, bricks, sand, cement and all other miscellaneous materials required for the work shall be supplied by the Contractor]	Mtrs.	181.95	500	90975.00
7	10_109	Provision of GI pipes-(50/100mm dia) for cable laying with offset at both ends and with couplings over girder bridges by fixing on suitable MS Clamps at an interval of 2 Mtrs. The ends of the pipes shall be closed with brick masonry abutments work so that no cable is exposed, The work shall be carried out as per the instructions of KRIDE representative at site. (Supply of GI pipes with couplings and laying of cables is not included in this schedule). [MS angles, flats, bolts and nuts for manufacturing fixing clamps, bricks, river sand , cement and all other miscellaneous required for the work shall be supplied by the Contractor].	Mtrs.	215.25	250	53813.00
8	10_110	Provision of GI pipes (50/100mm dia) for cable laying in hard rocky area with off sets at both ends duly supported by concrete blocks of size 300mm x 300 mm x 300 mm at an interval of 2m. The ends of the pipes shall be closed with brick masonry abutments work so that no cable is exposed, The work shall be carried out as per the instructions of KRIDE representative at site. (Supply of GI pipes with couplings and laying of cables is not included in this schedule).[Stone jelly of size 20/25mm, bricks, sand, cement and all other miscellaneous materials required for the work shall be supplied by the Contractor].	Mtrs.	168.08	500	84040.00
9	10_111	Laying of signaling/power/telecommunication cables as per cable plan in cable trenches, masonry ducts, RCC Pipes, DWC pipes, GI Pipes etc. (Supply of cables is not included in this schedule).	Mtrs.	9.83	120000	1179600.00
10	10_115	Refilling of cable trench 1m depth by 0.3m width throughout, with earth after laying of cables, and consolidating the trench by ramming and leveling.	Mtrs.	8.33	63000	524790.00
11	10_118	Supply of RCC cable markers as per drawing No.CSTE/CN/OFC/1. The lettering on the cable marker shall be "SIG" / "TELE" / "OFC" as per the instructions of KRIDE representative at site.	Nos.	166.29	1050	174605.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
12	10_119	Digging of pit to a depth of 800mm of size 300mmX300mm, casting of concrete foundation of size 300mmX300mmX300mm and Placing of RCC cable markers on top of the foundation and refilling the pit and consolidating it by ramming. The cable markers shall be provided at an interval of 20 Mtrs. within station limits and 50 Mtrs. outside station limits throughout the cable route, diversions and also at every track/road crossing.	Nos.	121.43	1050	127502.00
13	10_120	Excavation of cable coil pit to a size of 1.5mx1.5m and depth as instructed by KRIDE representative at site, for coiling the cables in rear of relay rooms/ AFTC huts, apparatus cases etc. The work includes coiling the underground cables, and placing closely one layer of country bricks of size approx. 220mm x 100mm x 60mm breadth wise above the cables to cover all the cables in the cable pit, closing and consolidating the pit by ramming and leveling. [Country bricks of size 220mmx100mmx60mm (approximately) shall be supplied by the Contractor].	cum	513.00	100	51300.00
14	10_121	Supply of Double walled corrugated pipe - 103.5mm inner dia & 120mm outer dia conforming to specification No. IS 14930(Part 2): 2001 with one coupler for every 6m of pipe as specified in Vol.II of the Tender document.	Mtrs.	263.20	1000	263200.00
15	10_122	Supply of GI pipes - 50mm dia -3.65mm thick as specified in Vol.II of the Tender document.	Mtrs.	343.20	750	257400.00
16	10_123	Supply of GI pipes - 100mm dia-4.5mm thick as specified in Vol.II of the Tender document	Mtrs.	838.80	500	419400.00
17	10_201	Excavation of pit, casting concrete foundation and erection of apparatus case full size as per Drg. No.SG/CN/02/6 and fixing of 2 Nos. of 'E' type locks, one for the front door and another for the back door, fixing of one hard wood shelf plank 37mm thick and painting the apparatus case inside and outside with one coat of red-oxide and two coats of aluminium paints.(Supply of apparatus case is not included in this schedule).[Foundation bolts & nuts, 'E' type locks, cement, river sand, stone jelly of size 20/25 mm, hardwood plank of 37mm thick, paints, varnish, fixing bolts & nuts and all other miscellaneous materials required for the work shall be supplied by the Contractor]	Nos.	9875.30	100	987530.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
18	10_202	Excavation of pit, casting concrete foundation and erection of apparatus case half size as per Drg, No.SG/CN/02/7, fixing one 'E' type lock for the front door and latching arrangement for the back door, and fixing of one hardwood shelf plank 37mm thick and painting the apparatus case inside and outside with one coat of red-oxide and two coats of aluminium paints.(Supply of apparatus case is not included in this schedule). [Foundation bolts and nuts, cement, 'E' type locks, river sand, stone jelly of size 20/25mm, 37mm hard wood planks, latching arrangements, paints, varnish, fixing bolts & nuts and all other miscellaneous materials required for the work shall be supplied by the Contractor]	Nos.	6966.60	70	487662.00
19	10_208	Excavation of pit in and around the existing location boxes very carefully without damaging the working cables and shifting and turning the location boxes to clear of the infringement as instructed by the KRIDE representative at site. The work includes ensuring the safety of the signaling system, releasing the cable coils to give access for shifting/turning the location boxes. Necessary masonry work and earth work in and around the location boxes to the required level shall be done as instructed by the KRIDE representative at site. If the existing earth connections to the location boxes are disturbed, the earth wires shall be properly re-connected. [All materials required for the work shall be supplied by the Contractor].				
		a. Shifting of apparatus case (full)	Nos.	2895.00	10	28950.00
		b. Shifting of apparatus case (half)	Nos.	1916.25	5	9581.00
20	10_209	Termination of new main/tail cables on the existing terminals/ fuse blocks in apparatus cases/ battery boxes/ CT boxes/ cable termination racks as per approved circuit diagram. The terminal particulars are to be repainted /corrected on the doors of apparatus cases/ battery boxes/ cable termination boxes and FTOT index board as instructed by KRIDE representative at site. This work includes closing the opening created for entry of new cables in the apparatus cases with masonry brick work and sealing the bottom of the apparatus cases/ cable termination racks with cable compound. [Paints, wire PVC 3/0.75mm and 16/0.2mm copper, sealing compound, bricks, cement, river sand and all other required miscellaneous materials shall be supplied by the contractor].	Per Terminal Block	39.78	1000	39780.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
21	10_210	Termination of main, tail, Signaling and power cables and internal wiring on terminal/ fuse blocks in new apparatus cases, cable termination boxes and in gate Lodges excluding cable termination rack at relay room. The work includes fixing of all new cables by teakwood clamp on teakwood base plank, fixing of Phynolic synthetic industrial fibre base fine weave cotton fibre board 6mm thick for terminal board to suit each apparatus case, varnishing all teakwood items, fixing of terminals/ fuse blocks on the terminal board, drilling of necessary holes, termination of cables, wiring, identification of cables using aluminium tags with letters punched neatly, as per approved circuit diagram and cable plan, painting of particulars on sleeves and also on the inner side of the doors of apparatus cases. After terminations are over, the side openings of apparatus case foundation shall be closed with brick work, cement plastered, the inter-space filled with river sand up to base level and the bottom surface shall be sealed with sealing compound. (Supply of PBT terminals and Fuse blocks is not covered in this schedule).[Cement, teakwood cable clamp 50mm x 50mm, base planks 100mm x 25mm, Phynolic synthetic industrial fibre base fine weave cotton fibre sheet - 6mm thick to IS specification 2036 - 1995 - Type F5, PVC/Nylon sleeves, varnish, paints, bolts, nuts and washers, Non- deteriorating type of fuses of various capacities, Aluminium cable tags, sealing compound, country bricks 220mm x 100mm x 60mm, copper bus bars, brass screw, river sand, wire PVC3/0.75mm copper and other miscellaneous materials shall be supplied by the Contractor].				
		a. Termination on 25/60mm PBT terminals (new location)(Phynolic sheet)	Per Terminal Block	93.16	25000	2329000.00
		b. Termination on PBT fuse block (new location) (Phynolic sheet)	Per Terminal Block	113.56	1000	113560.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
22	10_211	Termination of main, tail, Signaling and power cables and internal wiring by fixing additional terminals/ fuse blocks on the existing terminal boards of apparatus cases, cable termination boxes etc. The work includes fixing of all new cables by teakwood clamp on teakwood base plank, varnishing all teakwood items, fixing of terminals/ fuse blocks, on the existing terminal boards, drilling of necessary holes, termination of cables, wiring, identification of cables using aluminium tags with letters punched neatly, as per approved circuit diagram and cable plan, painting of particulars on sleeves and also on the inner side of the doors of apparatus cases. After terminations are over, the side openings of apparatus case foundation shall be closed with brick work, cement plastered, the inter-space filled with river sand up to base level and the bottom surface shall be sealed with sealing compound.(Supply of PBT terminals and Fuse blocks is not covered in this schedule).[Cement, teakwood cable clamp 50mm x 50mm, base planks 100mm x 25mm, PVC/Nylon sleeves, varnish, paints, bolts, nuts and washers, Non-deteriorating type of fuses of various capacities, Aluminium cable tags, sealing compound, country bricks 220mm x 100mm x 60mm, copper bus bars, brass screw, river sand, wire PVC3/0.75mm copper and other miscellaneous materials shall be supplied by the Contractor].				
		a. Termination of cables on 25/60mm PBT terminals (existing location)	Per Ter.Blo	81.68	600	49008.00
		b. Termination of cables on PBT fuse block (existing location)	Per Fuse	102.08	50	5104.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
23	10_212	Manufacture and supply of M.S. relay frames of suitable size to hold up to 4/ 8/ 12/ 20 relays /plug in type HMU as required by KRIDEs and fixing them in apparatus cases for all types of signal control circuits, LC gate control circuit and Point control circuits, fixing of plug boards, relays, resistors and electrolytic condensers on Phynolic synthetic industrial fibre base fine weave cotton fibre sheet - 6mm thick to IS specification 2036 - 1995 - Type F5, wiring and termination as per approved circuit diagram and painting the particulars. (Supply of all types of relays, plug boards, connectors, retaining clips and plug in type HMU is not covered in this schedule).[Wire PVC copper, 3/0.75mm and 16/0.2mm copper, Phynolic synthetic industrial fibre base fine weave cotton fibre sheet - 6mm thick to IS specification 2036 - 1995 - Type F5, for fixing resistors and condensers, MS flats 25mm x 6mm brass bolts and nuts, paints, soldering materials, resistors, condensers and all other miscellaneous materials required for the work shall be supplied by the contractor].				
		a. Wiring of Signal/ point/ LC control circuit (up to 4 relays/Plug in type HMU)	Set	2673.25	20	53465.00
		b. Wiring of Signal/ Point/ LC control circuit (up to 8 relays/plug in type HMU)	Set	4739.60	20	94792.00
		c. Wiring of Signal/ Point/ LC control circuit (up to 12 relays/plug in type HMU)	Set	6137.85	15	92068.00
		d. Wiring of Signal/ Point/ LC control circuit (up to 20 relays/Plug in type HMU)	Set	7349.95	5	36750.00
24	10_213	Painting of existing apparatus cases without disturbing the terminations and equipments inside. The work involves scraping of old paint, applying one coat of Red oxide and two coats of Aluminium paint on the inside and outside the apparatus cases, and painting of termination and equipment particulars on the doors of the apparatus cases, as instructed by KRIDE representative at site.[Aluminium paint, red-oxide and all other miscellaneous materials required for the work shall be supplied by the Contractor].				
		a. Painting of existing apparatus case - Full size	Nos.	1278.75	25	31969.00
		b. Painting of existing apparatus case - Half size	Nos.	1223.25	15	18349.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
25	10_214	Fixing and wiring of platform repeaters. The work involves fixing of platform repeater using suitable fixing arrangements at places indicated, wiring the same and painting as per the instructions of KRIDE representative at site. The signal shall be connected to the apparatus case using cables neatly clamped. The work also includes provision of one EWS lock.(Laying of cable is not included in the scope of this work.) (Supply of repeater signals and cables is not included in this schedule). [Wire PVC 3/0.75mm copper, paint, EWS lock and all other miscellaneous materials required for the work shall be supplied by the Contractor].	Nos.	3687.30	4	14749.00
26	10_215	Painting of existing colour light Signals as per standard practice. The work involves scraping of old paint, applying one coat of Red oxide and two coats of Aluminium/ enamel paint on the Signals - complete as instructed by KRIDE representative at site.[Aluminium paint, red-oxide and all other miscellaneous materials required for the work shall be supplied by the Contractor].	Nos.	1320.00	20	26400.00
27	10_216	Alterations to painted termination/ wiring particulars of functions in the existing apparatus cases, cable termination boxes, etc., on the PVC/ nylon sleeves and painting of new nomenclature on the existing signaling gadgets. This work includes carrying out alterations of particulars on the inner side of the doors of apparatus cases, re-numbering of apparatus cases and cable termination boxes. [Paints and all other miscellaneous materials required for the work shall be supplied by the Contractor].				
		a. Alteration to painting particulars (apparatus case - Full size)	Nos.	884.85	20	17697.00
		b. Alteration to painting particulars (apparatus case - half size)	Nos.	464.10	10	4641.00
28	10_217	Filling earth around location boxes/signal foundations for a width of 0.5m on all sides, up to a level 150mm below the foundation top. This work includes consolidation of earth by watering and ramming. The earth shall be taken from KRIDE premises as instructed by KRIDE representative at site.	cum	125.02	100	12502.00
29	10_218	Excavation of pit, casting concrete foundation as per Drg.No.SG/CN/02/9 using metallic templates, for erection of colour light signals up to 4 aspects. [Foundation bolts, cement, river sand, stone jelly of size 20/25mm dia and all other miscellaneous materials required for the work shall be supplied by the Contractor].	Nos.	5008.20	100	500820.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
30	10_219	Erection of surface base, signal pole, mounting of colour light signal up to 4 aspects complete on Signal pole/ Off-set bracket, (for LED/ filament bulbs) with lenses, triple pole lamp holder, filament switching units, CLS transformer, current regulators (whichever is applicable), fixing of ladder with platform complete and concreting of ladder shoe, fixing of number plates, marker board, lens guard, fixing of speed limit board wherever necessary, termination of tail cables, wiring of signal unit with PVC wire 3/0.75mm copper, provision of EWS locks, and painting of one coat of red oxide and two coats of aluminium/ enamel paints. When the aspect is fixed on Offset bracket using 'U' bolts and nuts, a through bolt shall be provided by drilling a hole in the signal pole to prevent the offset bracket from sliding down. (Supply of surface base, Offset bracket, CLS pole, CLS aspects complete, ladder with shoes and platform, Speed limit board, LED aspects, current regulators, lamp holders, lamps, filament switching unit and CLS transformer is not covered in this schedule). ['U' bolts and nuts, through bolts and nuts, cement, stone jelly 20/25mm dia, river sand, Signal Collar Rings, wire PVC 3/0.75mm copper, lens-guard, all fixing bolts and nuts, lead wool, paints PVC/Nylon sleeves, enameled number plates. enameled marker boards, EWS locks, and all other miscellaneous materials for the work shall be supplied by the Contractor].	Nos.	5501.20	100	550120.00
31	10_220	Excavation of pit and casting concrete foundation as per Drg, No.SG/CN/02/10 using metallic templates, for erection of ground type colour light shunt signal. [Foundation bolts and nuts, cement, river sand, stone jelly of size 20/25mm and all other miscellaneous materials for the work shall be supplied by the Contractor].	Nos.	2518.55	15	37778.00
32	10_221	Erection of Ground type shunt signal complete including surface base, signal pole, LED aspects/lenses, bulbs with holders (whichever is applicable), fixing of lens guards, number plate, termination of tail cables, wiring of signal unit with PVC wire 3/0.75mm copper, provision of EWS locks and painting of one coat of red oxide and two coats of Aluminium/ enamel paint (Supply of Ground type shunt signal complete.including surface base, signal pole, LED aspects,holder, bulbs, and lenses is not covered in this schedule).[Wire PVC 3/0.75mm copper, lens guards, EWS locks, Enameled number plates, bolts and nuts, lead wool, paints and all other miscellaneous materials shall be supplied by the Contractor].	Nos.	2097.00	15	31455.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
33	10_222	Fixing of Offset brackets using 'U' bolts and nuts, erection of Post type shunt Signals, termination of tail cables and wiring using wire PVC 3/0.75mm copper, provision of EWS lock and painting of one coat of red- oxide and two coats of aluminium/ enameled paint. The work also includes drilling suitable holes on the CLS post and provision of a through bolt with nut to prevent the Off-set bracket from slipping down. (Supply of Post type Shunt Signals, LED aspects and Off set brackets is not covered in this schedule).['U' bolts and nuts, through bolts with nut, wire PVC 3/0.75mm copper, EWS lock, Enameled number plates, wire mesh, PVC/Nylon sleeves, paints and all other miscellaneous materials shall be supplied by the contractor]	Nos.	1613.25	8	12906.00
34	10_223	Fixing Multi lamp/ Stencil type route indicators - complete, termination of tail cables, wiring as per approved circuit diagram using wire PVC 3/0.75mm & 16/0.2mm copper, provision of EWS - required Nos., and painting. (Supply of route indicators is not covered in this schedule) [Fixing bolts and nuts, EWS locks wires PVC 3/0.75mm & 16/0.2mm copper, wire mesh, PVC/Nylon sleeves, paints and all other miscellaneous materials shall be supplied by the Contractor].				
		a. Fixing and wiring of Multi lamp route indicator	Nos.	2763.00	1	2763.00
35	10_224	Fixing of junction type route indicators - 1 way to 6 ways - complete/ fixing of additional limb to the existing route indicators, termination of tail cables, wiring as per approved circuits diagram using wire PVC 3/0.75mm copper, provision of required No of EWS locks, wire mesh, and painting.(Supply of junction type Route Indicators - complete and additional limb is not covered in this schedule).[3/0.75mm wire PVC, fixing bolts and nuts, EWS locks, wire mesh, PVC/Nylon sleeves, paints and all other miscellaneous materials shall be supplied by the Contractor].				
		a. Fixing and wiring of direction type route indicator - 1 way	Nos.	1539.75	6	9239.00
		b. Fixing and wiring of direction type route indicator - 2 way	Nos.	1824.00	7	12768.00
		c. Fixing and wiring of direction type route indicator - 3 way	Nos.	2108.25	4	8433.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
36	10_225	Fixing of Offset brackets using 'U' bolts and nuts,erection of Calling On Signals/ 'A' marker lights,termination of tail cables and wiring using wire PVC 3/0.75mm copper, provision of EWS lock, number plates/ marker boards and painting. The work also includes drilling suitable holes on the CLS post and provision of a through bolt with nut to prevent the Off- set bracket from slipping down.(Supply of Calling On Signal/ 'A' marker light, LED aspects/holders & bulbs and Off set brackets is not covered in this schedule). ['U' bolts and nuts, through bolts with nut, wire PVC 3/0.75mm copper, EWS lock, Enameled number plates, wire mesh, PVC/Nylon sleeves, paints and all other miscellaneous materials shall be supplied by the contractor].	Nos.	1427.25	15	21409.00
37	10_227	Excavation of pit in and around the existing signals very carefully without causing damage to the working cables and shifting the Signals along with the concrete foundations for approximately 1m to a nearby position so as to clear the infringement from the nearest track centre as instructed by KRIDE representative at site.The existing cable coils shall be released carefully so as to give access for shifting. Necessary masonry work and earth work shall be carried out in and around.the signals after shifting as instructed by KRIDE representative at site. [All materials required for the work shall be supplied by the Contractor].	Nos.	2591.25	5	12956.00
38	10_228	Removal of existing CLS units, fixing of new CLS units with LED aspects/ lamps, holders etc., up to four aspects, directly or using off set brackets duly drilling holes on the signal poles, provision of EWS locks wherever necessary, termination of tail cables and wiring using wire PVC3/0.75mm copper and painting of aspect. The new tail cables shall be taken through the signal poles and the unwanted cables duly released. (Supply of CLS unit with LED aspects/ lamps holders, CLS transformers is not included in this schedule.) [EWS locks, Wire PVC 3/0.75mm copper lenses guard, wire netting arrangements, paints and all other miscellaneous materials shall be supplied by the Contractor].	Nos.	5999.25	3	17998.00
39	10_229	Manufacture and supply of Enameled Number plates as per drawing No.TY/08/2008 with fixing arrangements and fixing them on the existing Signals as per the instructions of KRIDE representative at site.[Enameled number plates with fixing arrangements with bolts and nuts shall be supplied by the Contractor].	Nos.	339.00	50	16950.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
40	10_230	Supply and provision of Screening arrangement for Signals in RE area as per standard practice. The work comprises of providing MS angle frame and wire mesh in order to avoid close proximity of OHE wires. The work also includes provision of earthing wire using 4 SWG GI wires from the screening arrangement up to surface base as per the instructions of KRIDE representative at site.[All materials required for this work shall be supplied by the Contractor].	Nos.	1016.60	20	20332.00
41	10_231	Provision of DC Single/ Double rail track circuit to suit RE/ Non-RE areas as per approved signaling plan using Plug-in type track relays. This work includes provision of double bonding, and parallel jumpers, provision of bond wire clips, provision of track lead connections using 2c X 2.5 sq.mm cable, provision of TLD boxes 2 Nos. at Relay end, 2 Nos. at Feed end and 2 No's for parallel jumpers as necessary to suit layouts, for each Track Circuit, and termination of jumpers and tail cables in track lead junction boxes, installation of relays, track feed battery chargers to charge up to 4 cells, track feed resistance, 'B' type choke' and secondary cells - 80 AH capacity in apparatus cases and wiring with wire PVC 3/0.75mm copper. The work also includes painting of track Circuit No. with Feed end/ Relay end details on the TLD boxes. The work also includes provision of insulations for gauge tie plates and nose crossing plates wherever required.(Provision of rail joint insulation is not covered in this schedule.) (Uninsulated gauge type plate and nose crossing plate will be supplied by KRIDEs. Supply of track feed battery charger, 'B' type choke, track relays, un-charged secondary cells (2V - 80AH), TLD boxes with stumps, 2cX2.5 sq.mm cable, is not covered in this schedule).[track feed resistance, Gauge tie plate and nose crossing plate insulations, PVC/Nylon bushes for TLD boxes, PVC sleeves, all types of fixing bolts and nuts with spring and flat washers, teakwood stand for fixing track feed resistance, GI bond wire 8 SWG, Channel bond pins, bond wire clips, paints and all other miscellaneous materials shall be supplied by the contractor. Secondary cells-80 AH capacity shall be charged by the contractor through reputed charging agencies].				
		a. Provision of track circuit in (point zone)	Nos.	4818.65	10	48187.00
		b. Provision of track circuit in (other than point zone)	Nos.	3862.40	10	38624.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
42	10_232	Alteration to existing DC Track Circuits to suit RE/Non RE standard as per approved signaling plan. This work includes provision of double bonding and parallel jumpers, provision of bond wire clips, wherever required, shifting of relay end and feed end equipments and re-wiring them, provision of track lead connections wherever necessary using 2c x 2.5 sq.mm cable, provision of TLD boxes and termination of jumpers and tail cables in track lead junction boxes, shifting of Track feed/Track relay set wherever required and wiring with PVC 3/0.75mm copper wire. (Supply of TLD boxes, 2c x 2.5 sq.mm cable and TLD boxes with stumps is not covered in the schedule. Existing Track relays, Track Feed Resistance, Track feed battery chargers, 'B' type Chokes and Charged secondary Cells shall be used for this work). [Wire PVC 3/0.75mm, PVC/ Nylon bushes for TLD boxes, PVC sleeves, all types of bolts and nuts with spring and flat washers, teakwood stand for fixing track feed resistance, GI bond wire 8 SWG, Channel bond pins, bond wire clips, paints and all other miscellaneous materials shall be supplied by the Contractor].				
		a. Alteration to existing track circuits at feed end	Nos.	2289.00	10	22890.00
		b. Alteration to existing track circuits at relay end	Nos.	2127.00	10	21270.00
43	10_234	Provision of earth electrodes as per drawing No.SG/SN/02/13 and earthing of metallic sheath and armour of all cables in all apparatus cases, relay room, equipment room, SM's room for block and control, and earthing of all equipments in apparatus cases, power room, relay rack, cable termination rack, control panel, signals, lever frames with MS flat 35mm X 6mm/19c cable (MS flat for closer by areas and MS flat/19c cable combination for farther areas) as per the instructions of KRIDE representative at site. The work includes painting of earth resistance value on the earth pit. (Supply of 19C cable is not covered in the scope of this schedule). [MS flat for earthing 35mm X 6mm, cement, GI earth electrodes, common salt, charcoal, country bricks, river sand, soldering materials and all other miscellaneous materials required for the work shall be supplied by the Contractor].	Nos.	1799.00	80	143920.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
44	10_236	Installation of combined type point machine - IRS type and connecting all ground connections including wiring and termination in point machine and interconnections between point machine and CT box through PVC hose pipe with 3/0.75mm and 7/1.40mm copper wire and painting. This work includes provision of insulation to stretcher bars, throw bar lug and "D" bracket wherever required, cutting of notches on the point machines covers to suit crank handle configuration.(Combined type point machine with ground connection, uninsulated stretcher bar, throw bar lug and 'D' brackets will be supplied by KRIDEs.[All types of insulations connected to point work, coal bengal, all type of bolts and nuts, washers spring/flat wire PVC 7/1.4mm copper, PVC hope pipe, paints, PVC/nylon sleeves and all other miscellaneous materials required for the work shall be supplied by the Contractor].	Nos.	8856.15	52	460520.00
45	10_238	Supply of Colour light Signal pole 140mm dia, 4.6m/3.6m tall with necessary inspection as per specification/ drawing/ description enclosed in this document.				
		a. Supply of colour light Signal pole (4.6m)	Nos.	3318.00	20	66360.00
		b. Supply of colour light Signal pole (3.6m)	Nos.	2974.00	80	237920.00
46	10_239	Supply of surface base to suit CLS Signal pole 140mm dia with necessary inspection as per specification/ drawing/ description enclosed in this document.	Nos.	4118.00	100	411800.00
47	10_240	Supply of ladder with platform and shoes to suit CLS pole 4.6m/ 3.6m tall, with necessary inspection as per specification/ drawing/ description enclosed in this document.				
		a. Supply of ladder with platform and shoes for 4.6m CLS pole	Nos.	3203.00	20	64060.00
		b. Supply of ladder with platform and shoes for 3.6m CLS pole	Nos.	3089.00	80	247120.00
48	10_241	Supply of post type shunt signal - complete with hood etc., with necessary inspection as per specification/ drawing/ description enclosed in this document.	Nos.	2860.00	8	22880.00
49	10_242	Supply of Ground type shunt signal - complete with surface base, signal pole, hood etc., with necessary inspection as per specification/ drawing/ description enclosed in this document.	Nos.	4118.00	15	61770.00
50	10_243	Supply of Colour Light Signal Multi Unit type - complete for 4/ 3/ 2 aspect with mounting socket, with necessary inspection as per specification/ drawing/ description enclosed in this document.				
		a. Supply of colour light Signal unit - 4 aspect	Nos.	12584.00	4	50336.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
		b. Supply of colour light Signal unit - 3 aspect	Nos.	10296.00	34	350064.00
		c. Supply of colour light Signal unit - 2 aspect	Nos.	8580.00	62	531960.00
51	10_244	Supply of Junction type route indicator – 5 unit arm –1/ 2/ 3/ 4/ 5/ 6 way with mounting sockets, with necessary inspection as per specification/ drawing/ description enclosed in this document.				
		a. Supply of Junction type route indicator - 1 way	Nos.	10868.00	6	65208.00
		b. Supply of Junction type route indicator - 2 way	Nos.	14300.00	7	100100.00
		c. Supply of Junction type route indicator - 3 way	Nos.	17732.00	4	70928.00
52	10_245	Supply of Calling On Signal / 'A' marker light -complete with necessary inspection as per specification/ drawing/ description enclosed in this document.				
		a. Supply of Calling On Signal	Nos.	2059.00	15	30885.00
53	10_246	Supply of Off-set brackets - large/ small made of cast iron with necessary inspection as per specification/ drawing/ description enclosed in this document.				
		a. Supply of Off-set bracket (large)	Nos.	2059.00	9	18531.00
		b. Supply of Off-set bracket (small)	Nos.	1487.00	18	26766.00
54	10_248	Supply of track lead junction box - FRP type with 4 terminals and stumps with necessary inspection as per specification/ drawing/ description enclosed in this document.	Nos.	1030.00	80	82400.00
55	10_249	Supply of PBT terminals 25mm/ 60mm centre and PBT Fuse blocks with necessary inspection as per specification/ drawing/ description enclosed in this document.				
		a. Supply of PBT terminal - 25mm centre	Nos.	44.00	25000	1100000.00
		b. Supply of PBT terminal - 60mm centre	Nos.	60.00	4000	240000.00
56	10_250	Supply of Low maintenance secondary cells of the following capacities with necessary inspection as per specification/ drawing/ description enclosed in this document.				
		a. Supply of secondary cells-2V-80AH capacity	Nos.	2077.00	60	124620.00
57	10_251	Supply of apparatus cases (full/ half/ quarter size) to suit Southern KRIDE standard with necessary inspection as per specification/ drawing/ description enclosed in this document:				
		a. Supply of apparatus case - Full size	Nos.	12012.00	100	1201200.00
		b. Supply of apparatus case - Half size	Nos.	8580.00	70	600600.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
58	10_252	Supply of electronic time delay units (120/60 sec.s) with plug boards, connectors and retaining clips with necessary inspection as per specification/ drawing/ description enclosed in this document.	Nos.	2213.00	14	30982.00
59	10_253	Supply of lamp proving relays for LED aspects with plug boards, connectors and retaining clips with necessary inspection as per specification/ drawing/ description enclosed in this document.	Nos.	3591.00	105	377055.00
60	10_254	Supply of QBCA1 - heavy duty contact relays with necessary inspection as per specification/ drawing/ description enclosed in this document.	Nos	4140.00	30	124200.00
61	10_255	Supply of QTA2 - track relays with plug boards,connectors and retaining clips with necessary inspection as per specification/ drawing/ description enclosed in this document.	Nos	2524.00	20	50480.00
62	10_256	Supply of QSPA1 type relays with plug boards,connectors and retaining clips with necessary inspection as per specification/ drawing/ description enclosed in this document.	Nos	3897.00	20	77940.00
63	10_257	Supply of Electric key transmitter - rotary type of required ward Nos. with keys, with necessary inspection as per specification/ drawing/ description enclosed in this document.	Nos	4279.00	30	128370.00
64	10_259	Supply of 'A' type foundation made of cast iron as per Drg No.CWM.00902, and as per specification/ drawing/ description enclosed in this document, with necessary inspection.	Nos	5491.00	20	109820.00
65	10_261	Supply of 'B' type choke as per description enclosed in this document.	specific ation/ Nos.	2076.00	20	41520.00
66	10_314	Installation of charged secondary cells of the following capacities in apparatus cases, connecting them with strips, wiring with wire PVC 3/0.75mm copper and termination. This work also includes charging of cells through reputed agencies. The details of the batteries shall be written on the inside of the doors of the apparatus cases. (Supply of secondary cells is not included in this schedule). [Wire PVC 3/0.75mm copper, connecting strips, paint and all other miscellaneous materials required for the work shall be supplied by the Contractor].				
		Installation of 2V-40/80AH cell in apparatus case	per cell	265.72	60	15943.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
67	10_335	Supply and installation of 4 wire DTMF based way station equipment complete as per RDSO specification No.IRS.TC-60/93 and 4 wire control telephone with audio visual indication and reset button fitted on telephone conforming to specification No.IRS-TC-38/97 or latest. This work also includes supply and wiring of power supply arrangements for way station equipment conforming to specification IRS.TC.72/97. or latest [All the materials required for the work shall be supplied by the Contractor].	Set	8215.00	3	24645.00
68	10_336	Supply and provision of Rubber mat of not less than 6mm thick and with an insulation to withstand 650VAC, on the floor of relay room etc at places as indicated by KRIDE representative at site.	sft	78.30	300	23490.00
69	10_337	Provision of signaling arrangement during Non-Interlocked working of Signals and Points, such as erection and wiring of temporary relay racks and wiring of relays, SM's slide instruments, wiring alterations in the cable termination rack, apparatus cases, signals, Control panel etc, as per the instructions of KRIDE representative at site.(Supply of relay rack, relays, and SM slide instrument is not included in this schedule).[All other miscellaneous materials required for the work shall be supplied by the Contractor].	per	18178.95	4	72716.00
70	10_338	Provision of PA system and Magneto telephone communication at stations/ tents as per the instructions of KRIDE representative at site. The PA system and magneto telephones will be returned to the contractor after the completion of NI working. Signalling cables available may be used for the communication.(Hiring of PA system equipments and magneto telephones shall be done by the Contractor) [All other miscellaneous materials required for the work shall be supplied by the Contractor].	per Tent per day	885.00	20	17700.00
71	10_403	Excavation of pit, concreting 'A' type foundation and fixing ground lever frames single/double as per Drg.No.SG/CN/02/11 complete with ground connection. The work includes concreting of 'A' type foundations and fixing of HP lock and connecting the ground lever frame with the HP lock using MS rod as instructed by KRIDE representative at site. (Supply of ground lever frames, hand plunger locks and 'A' type foundations is not covered in this schedule). [Cement, river sand, stone jelly of size 20/25mm, fixing bolts and nuts with washers and all other miscellaneous materials shall be supplied by the Contractor].	Nos.	4531.35	20	90627.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
72	10_405	Interlocking of level crossing gate with Lifting Barrier: This work consists cutting of notches on the drum of the winch, , fixing and levelling of trestles, rod roller assembly, levelling and concreting of 'A' type foundations, fixing of rod diversion cranks, vertical cranks, running of rods (app. 30mtrs.) and connecting them to lever tail at one end and boom locking arrangement at the other end, and painting as per standard practice. The work also includes fixing of wiring of one limit switch for each boom as per the instructions of KRIDE representative at site.(Supply of HP locks, rods, 'A' type foundations, trestles, segments, rod roller assembly complete and cranks is not covered in this schedule).[Cement, river sand, stone jelly of size 20/25mm dia, coal bengal, paints, all types of bolts & nuts and all other miscellaneous materials shall be supplied by the Contractor].	Nos.	12370.05	7	86590.00
73	10_406	Casting concrete foundation of size 900mmX900mmX900mm for pedestal, 400mmX400mmX600mm for meeting post, fixing of lifting barrier boom,contact makers, termination of cables, wiring and painting as per the instructions of KRIDE representative at site. (Supply of pedestals, meeting posts, contact maker, electric lifting barriers, rail posts, cranks and 'A' type foundation is not covered in this schedule).[Concreting materials, bolts and nuts, wire PVC 3/0.75mm copper and all other miscellaneous materials required for the work shall be supplied by the Contractor].	per boom	11003.25	14	154046.00
74	10_407	Provision of boom locking arrangement for both the lifting barrier which involves running of about 30m to 50m of rodding with a spacing of 2m interval between trestles with rod roller segments, fixing of about 8 Nos. of cranks on 'A' type foundation/ MS plates and concreting of 'A' bases to a size of 1mX0.6mX0.5m as instructed by KRIDE representative at site. Solid joints/ insulated joints shall be provided wherever required. The work also includes running of rods by track crossings/ road crossings wherever required.(Supply of MS rods, cranks, trestles', segments,rollers etc., is not covered in this schedule).[All other materials required for the work shall be supplied by the Contractor].	per LC	6552.65	7	45869.00
75	10_408	Fixing and wiring of Two Nos. of Electronic Gate Warning equipment for each level crossing gate, one on each road warning signal, amplifier in the apparatus case with wire PVC 3/0.75mm and 16/0.2mm copper, and painting. [All wiring, fixing and painting materials shall be supplied by Contractor].	Set.	2427.75	7	16994.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
76	10_412	Supply and installation of teakwood glass fronted box of size 300mm x 600mm x 75mm with hooks to keep various keys with description engraved on the tags.[TW Glass fronted box of size 300mmx600mmx 75mm with built in lock, hooks, engraved tags and all other miscellaneous materials required for the work shall be supplied by the Contractor].	Nos.	4057.00	6	24342.00
77	10_414	Fixing of EKT instrument with (or) without crank handle or on suitable fixtures at station/apparatus case, provision of economiser push switch with locking facility, wiring with wire PVC 16/0.2mm copper, provision of teakwood terminal box covered with decolum along with locking facility and painting.(Supply of electric key transmitter and crank handles is not covered in this schedule).[wire PVC 16/0.2mm copper, wire wound resistance, decolum covered terminal box with locking facility by using 25mm thick teakwood, bolts and nuts, paints,push switches, padlocks and other miscellaneous materials required for this work shall be supplied by the contractor]	Nos.	2943.75	31	91256.00
78	10_415	Casting concrete foundation and erection and painting of boards with 'LEGEND' such as "Draw close if signal is at on" at the required places as per the Signalling plan. The work involves concreting of rail post to a size of 600mm x 600mm x 900mm, and fixing the board to the rail using MS clamps, bolts and nuts.(Supply of boards is not covered in this schedule.Rails of different lengths will be supplied by KRIDEs and the Contractor has to cut them to the required lengths) [Stone jelly of size 20/25mm dia, river sand, cement,M.S.flats, fixing bolts and nuts, paint and all other miscellaneous materials required for the work shall be supplied by the Contractor]	Nos.	2159.00	10	21590.00
79	10_416	Painting, erection and concreting of Goods warning boards on rails as per the Signalling plan. The work includes manufacturing of clamps and fixing the board to the rails, supply and fixing of scotch lite reflectors and concreting the rail post to a size of 600mm x600mm x 900mm.(Supply of goods warning boards is not covered in this schedule. Rails of different lengths will be supplied by KRIDEs and the Contractor has to cut them to the required lengths).[Stone jelly of size 20/25mm dia, river sand, cement, M.S.flats, scotch lite strips (14 Nos) for each board, fixing bolts and nuts, paint and all other miscellaneous materials shall be supplied by the Contractor]	Nos.	2929.95	0	

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
80	10_417	Supply and installation of magneto telephone handle type and supply and wiring of Ni-cad power pack 4V-2.2AH with charger to work on 110VAC, at the station house, LC Gate and top points.[Magneto telephone handle type with Ni-cad power pack 4V-2.2AH with charger to work on 110VAC, wire PVC 16/0.2mm copper, and all other miscellaneous materials shall be supplied by the Contractor.]	Nos.	6178.00	20	123560.00
81	10_419	Installation and wiring of existing Way station equipment DTMF and control telephones. The work involves fixing the released way station equipment on the wall at an appropriate place in consultation with KRIDE representative at site, wiring and interconnecting the same with test panel, control telephones and batteries.(Supply of way station equipment, control telephones and batteries is not included in this schedule). [Wire PVC 3/0.75mm & 16/0.2mm copper, MS clamps for fixing arrangements, PVC tubes 25mm dia for interconnections and all other miscellaneous items required for the work shall be supplied by the Contractor].	Nos.	4333.50	3	13001.00
82	10_422	Painting of existing boards like LEGEND boards, warning boards, STOP boards etc., as per standard practice and as per the instructions of KRIDE representative at site.(Supply of boards is not included in this schedule).[Paint and all other miscellaneous materials required for the work shall be supplied by the Contractor].	Nos.	682.50	5	3413.00
83	10_426	Supply of 2 pin socket - 5A with switch, fixing the same on the hardwood plank available and extending the 110VAC using wire PVC 3/0.75mm copper, in all the apparatus cases, as per the instructions of KRIDE representative at site. [2 pin socket - 5A with switch, wire PVC 3/0.75mm copper and all other miscellaneous materials required for the work shall be supplied by the Contractor].	Nos.	398.00	60	23880.00
84	10_427	Testing and commissioning the entire signalling installations jointly with the KRIDE representative at site at the stations/ LC gates covered under various schedules of the Contract, and ensuring that all the signalling gears are installed and adjusted as per the existing rules. The work also involves supply of required number of bound registers with good quality papers with all updated details of cable meggering, relays, batteries, block joints, route cancellation, relay room key entries, block instrument key, earth resistance etc., and handing over to KRIDEs.(Supply of 'As made' is not covered in this schedule).				
		Testing and commissioning of LC gates	per LC	8128.50	7	56900.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
85	10_501	Releasing of existing relay racks/ cable termination racks along with all the terminals, fuse blocks, relays,with jacks, holding clips etc., 50 way boards,terminals, connecting wires, cables etc., carefully without causing any damage, accounting and stacking them neatly at a place as instructed by KRIDE representative at site. After releasing, the floor shall be levelled and cement plastered.	Per rack	1068.75	25	26719.00
86	10_502	Releasing of existing Route Indicators of different types including tail cables, carefully without causing any damage, accounting and stacking them neatly at a place as instructed by KRIDE representative at site.	Nos.	833.25	8	6666.00
87	10_503	Breaking of concrete and releasing of STOP board/Warning board/ LEGEND boards along with rails, accounting and stacking them neatly at a place as instructed by KRIDE representative at site. Also the resultant pits shall be re-surfaced and consolidating by ramming and levelling.	Nos.	854.25	20	17085.00
88	10_507	Releasing of existing apparatus cases (Full/ Half/Quarter size) without damage after releasing the shelf planks, Terminal blocks, Fuse Blocks, Terminal Boards, Relays of all types EKTs, Secondary Cells, power equipments, 'E' type locks, etc., and breaking the concrete foundation. After releasing, the resultant pits are to be closed and consolidated by ramming and levelling. The released materials shall be accounted and stacked at a place as instructed by KRIDE representative at site.	Nos.	1625.25	120	195030.00
89	10_508	Breaking of concrete and releasing the existing cable termination boxes, after releasing the base plank,Terminal blocks, Fuse Blocks, Terminal Boards, cut rails, pipes, etc., closing the resultant pits and consolidating it by ramming and levelling. The released materials shall be accounted and stacked neatly at a place as instructed by KRIDE representative at site.	Nos.	1083.75	30	32513.00
90	10_509	Releasing of existing SM's control panel including base plank, and other gadgets connected very carefully without causing any damage to the panel, accounting and stacking them neatly at a place as instructed by KRIDE representative at site. The resultant pit in the flooring shall be removed of all cable bits, levelled and cement plastered.	Set	2841.75	2	5684.00
91	10_510	Dismantling and releasing of existing Colour light Signals complete (upto 4 aspects) with or without Route Indicators, calling on signals, shunt signals etc., carefully without any damage to the gadgets,accounting and stacking them neatly at a place as instructed by KRIDE representative at site. The work includes breaking the concrete foundation,closing the resultant pit and resurfacing it by ramming and levelling.	Nos.	1666.50	25	41663.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
92	10_511	Dismantling and releasing of existing Point machines (all types) including ground connections and other accessories available complete without any damage to the gadgets, accounting and stacking them neatly at a place as instructed by KRIDE representative at site.	Nos.	1458.75	20	29175.00
93	10_512	Dismantling and releasing of ground lever frame along with all connected gadgets like lever locks, 'E' type locks, HP locks, etc., accounting and stacking them neatly at a place as instructed by KRIDE representative at site. The work also involves breaking and removal of concrete foundation and the resultant pit shall be filled and consolidated by ramming and levelling.	Set.	3000.00	7	21000.00
94	10_513	Releasing of Secondary cells and battery stands available in the battery room along with connecting strips, wires and terminal boxes carefully without causing any damage to the batteries, accounting and stacking them neatly at a place as instructed by KRIDE representative at site. After releasing any holes in the walls/ flooring shall be filled with cement mortar and plastered.	Set	2916.75	3	8750.00
95	10_514	Releasing of existing Block Instruments (all types),Block counters, batteries, block filter, block bell equipment etc., carefully without any damage,accounting and stacking them neatly at a place as instructed by KRIDE representative at site.	Nos.	958.50	8	7668.00
96	10_515	Releasing of point rods with rod roller trestles, complete assembly. This includes releasing of all cranks, compensators and 'A' type concrete foundation on the rod run. The resultant pits are to be covered with earth and consolidated by ramming and levelling.				
		a. Releasing of tressles 1/2 way	Nos.	46.65	10	467.00
		b. Releasing of tressles 3/4 way	Nos.	63.30	10	633.00
		c. Releasing of point roddings	Per Rod/Mtr.	7.95	50	398.00
		d. Releasing of 'A' type foundations	Nos.	341.70	10	3417.00
97	10_516	Releasing of all the S & T gadgets at LC gates like SM slide instruments, illuminated diagram board,block counter, termination box, telephones, emergency key box, etc and concerned wiring,accounting and stacking them neatly at a place as instructed by KRIDE representative at site. After releasing any holes on the walls/ floor are to be filled with cement mortar and plastered.	Set	5166.00	7	36162.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
98	10_517	Releasing of existing ground type shunt signals along with surface base, signal post etc carefully without any damage, accounting and stacking them neatly at a place as instructed by KRIDE representative at site. The work also includes breaking and removal of concrete foundation and refilling of the resultant pit by ramming and levelling.	Nos.	1187.25	10	11873.00
99	10_518	Releasing of existing TLD boxes with stumps and terminals after releasing all the bond wires. The released materials shall be accounted and stacked neatly at a place as instructed by KRIDE representative at site.	Nos.	86.10	120	10332.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
100	10_519	Releasing of all power equipments including equipment stands, terminal boards, power panel etc., in the power room carefully without causing any damage to the equipments after disconnecting all the supply wires. The released equipments shall be accounted and stacked at a place as instructed by KRIDE representative at site. After releasing any holes in the walls/ flooring shall be filled with cement mortar and plastered.	Set	6832.50	3	20498.00
101	10_520	Releasing of existing control equipments - complete including way station equipments, telephones, power supply for way station equipment and telephones, along with all wiring, accounting and stacking them neatly at a place as instructed by KRIDE representative at site.	Set.	3249.75	3	9749.00
102	10_521	Transportation of Signalling materials by road as per the instructions of KRIDE representative at site. The work also includes loading and unloading of the materials.				
		Transportation more than 100 Kms.	per ton.KM	7.52	15000	112800.00
103	10_522	Engaging mechanical excavators like JCB or other machineries for regarding and levelling the formation, dismantling any infringing structures, clearing and removing debris etc., with all leads and lifts etc., complete and as per the instruction of KRIDE representative at site.	per hour	650.00	100	65000.00
Total for Schedule A (103 items)						20354613.00
Tenderer's / Contractor's Percentage (Above/Below/At par) in figure						
Tenderer's / Contractor's Percentage (Above / Below / At par) in Word						
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**Seal & Signature of the Bidder**

**Name of Work** : - Signaling outdoor works at Yesvantpur bye pass, Lottegolahalli, Hebbal and Banaswadi with MSDAC, Integrated power supply and interlocking of LC Gates in connection with doubling of YESVANTPUR-BAIYAPPANAHALLI section of Bangalore Division

**SCHEDULE "B"**

SL.NO		DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
1	1a	Non-Deteriorating type of fuse holders and fuse links of following rating. (a) Fuse Holder 20A capacity. IRS Spec.S.75/91 (IRS-S78/Tentative) or latest.	NOS	158.33	600	94998.00
	1b	Non-Deteriorating type of fuse holders and fuse links of following rating. (b) Fuse Link 20 Amps IRS Spec.S.78/92 or latest.	NOS	22.57	100	2257.00
	1c	Non-Deteriorating type of fuse holders and fuse links of following rating. (c) Fuse Link 10 Amps IRS Spec.S.78/92 or latest.	NOS	20.75	200	4150.00
	1d	Non-Deteriorating type of fuse holders and fuse links of following rating. (c) Fuse Link 2 Amps IRS Spec.S.78/92 or latest	NOS	17.67	300	5301.00
2		Relay Rack universal type as per Drg.No.SK/SC/CN/51/94 with MS Frame of suit 'Q' series relays scaffolding, POWER COATED with stainless steel nuts and bolts for fixing the racks and cable ladder made out of MS angle 65mm x 65mm x 6mm for fixing the rack. Supporting angles, frame mounting triangle base with J bolts and insulation of required number complete to suit QNI/K-50 prewired tag block. (a) 1 Way.	NOS	5294.00	7	37058.00
3		Cable termination racks size 880mm x 2 meters made out of 50mm x 50mm x 6mm thick MS angle Power Coated with stainless steel nuts and bolts for fixing the racks with suitable holes for hylem sheet complete as per standard practice with tripod bases and reel insulators. Cable ladder of 400mm x 2000mm be provided at both sides with angle size 40mm x 4mm x 5mm with supporting flate of size 25mm x 5mm (for K rack and P rack).	NOS	5308.00	15	79620.00
4		Basic material to construct Unit Maintenance Free Earth as per RDSO Spec. No.RDSO/SPN/197/2008 and as per schedule specification.	SET	17767.86	30	533036.00
5		Basic material to construct Unit Maintenance Free Ring Earth with Four Pits for achieving less than one Ohm as per RDSO Spec.No.RDSO/SPN/197/2008 or latest and as per Specification.	SET	60000.00	14	840000.00

SL.NO	DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
6	35 sq mm Multi strand single Core PVC insulated copper cable as per IS:694 for connecting main earth electrode to MEEB in the equipment room in duplicate.	M	348.00	500	174000.00
7	PVC wire coils of size 10 sq mm multi strand (Green-100%) each coil of 100 mtrs. length as per IRS Spec. 76/89. Amdt 3 or latest.	NOS	9750.00	6	58500.00
8	Steel Alamairah (Mode: Godrej Store well/slimline 4S).	NOS	17720.00	3	53160.00
9	Navtal locks Godrej make 75mm with 2 Keys.	NOS	500.00	6	3000.00
10	Track Feed Battery charger as per RDSO Spec. IRS:S-89-2013 ver. 1.0 or latest.	NOS	4820.00	20	96400.00
11	Flex printing with sun board fixing of various drawing with colour (power board diag, relay index chart, station rule diagram, battery history, DG set history etc.,).	SFT	350.00	300	105000.00
12	Printed and bounded registers including maintenance registers for SSDAC, point machine, track circuit etc., (100 Pages each of 75 gms paper).	NOS	170.00	200	34000.00
13	Earth Leakage detector 12 channel (110V DC, 24V DC, 12V DC, etc.,) as per RDSO Spec. No.256/2002 or latest with 6 digital counter.	NOS	102400.00	3	307200.00
14	10 pair CT box with Wago terminals of Phonix make or similar.	NOS	2100.00	10	21000.00
15	20 pair CT box with Wago terminals of Phonix make or similar.	NOS	3233.33	10	32333.00
16	Step ladder aluminum made of BATHLA make App.5 feet height.	NOS	7115.00	3	21345.00
17	Supply of permanently solid lubricated HDPE Telecom pipe of size 40/33mm as per Spec. TEC. GR No.G/CDS-08/01 Dec.99 or latest.	KM	69500.00	15	1042500.00
18	Supply of joint kit conforming to RDSO Spec. No.IRS-TC 77/2006 Revision or latest for quad cable.	NOS	3034.50	50	151725.00
19	Supply of RFID Electronic marker for S&T underground cables with programmable memory for saving the user specific data inside the RFID Electronic marker locator during locating (10 CM diameter with floating coil to keep detection circuit always horizontal for better detection) which can be barrier up to a depth of 5 ft.	NOS	2688.00	200	537600.00
20	Supply of soil lubricated HDPE/PVC duct (pipe) of dia 110mm, thickness 6mm with end plug sealing arrangement as per Spec. No.IS 4983.	M	526.40	3000	1579200.00

SL.NO		DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
21		Preparation of station working rules, CRS papers etc as practice in Railways for yards/LC Gate/IBH	per application	15688.00	11	172568.00
Total for Schedule B (21 items)						5985951.00
Tenderer's / Contractor's Percentage (Above/Below/At par) in figure						
Tenderer's / Contractor's Percentage (Above / Below / At par) in Word						
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**Name of Work** : - Signaling outdoor works at Yesvantpur bye pass, Lottegolahalli, Hebbal and Banaswadi with MSDAC, Integrated power supply and interlocking of LC Gates in connection with doubling of YESVANTPUR-BAIYAPPANAHALLI section of Bangalore Division

**SCHEDULE "C"**

SL.NO		DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
1	1a	Erection of relay rack with scaffolding suitably concreting tri-pod bases and reel insulators with 'J' bolts and nuts. Tripod and other supporting are to be painted in 2 coats with enamel. (a) One Way.	NOS	325.00	7	2275.00
	1b	Erection of relay rack with scaffolding suitably concreting tri-pod bases and reel insulators with 'J' bolts and nuts. Tripod and other supporting are to be painted in 2 coats with enamel. (a) CT Rack.	NOS	3000.00	15	45000.00
2		Fixing relay bases on relay frames erected in the relay room wiring of all types of relays by drawing various sizes of wires/multi core cable, fixing of condensers, resistance, 6 way/1 way terminals, ND type fuses, LED indications with push button type switch etc., and wiring duly slandering the same as per the approved circuit diagram, testing point to point before soldering and after soldering, bunching and lacing as per technical specification. This work includes wiring of contacts for data logger and terminating them in the tag block.	1PER RELAY	166.50	100	16650.00
3		Provision of 2 machine cut grooves in parallel to a separation of 8 cms each to depth of 150mm in the platform surfaced/tiled floor for laying cable.	MTR	461.25	100	46125.00
4		Installation of single earth pit as per RDSO specification No.RDSO/SPN/197/2008 or latest and as per technical specification.	SET	8442.86	30	253286.00
5		Installation of Ring Earth Pit as per RDSO specification No.RDSO/SPN/197/2008 or latest and as per technical specification.	SET	30000.00	14	420000.00
6	6a	Generator, foundation and installation. Excavation of pit, casting concrete foundations as per Drg. No.SG/Proj/SK/DG/01/08 for installation of DG set as per the direction of KRIDE Engineer.	NOS	11550.00	3	34650.00
	6b	Generator, 1st service of the DG set (2 Nos) as per the manufacture's instruction.	LS	1713.00	3	5139.00
7		Digging of cable trench to a depth of not less than 30cm in rocky terrain, concreting the trench with 150mm thick concrete in the ratio 1:2:4 and after proper curing ,back filling with excavated soil.	RMT	157.75	1000	157750.00

SCHEDULE "C"						
SL.NO		DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
8		Strengthening of foundation of signals, Full/Half location boxes, by carrying out the earth work around the foundation, ramming of the earth, carrying out masonry work from bottom of earth work using country stones and cement masonry to prevent the earth from slipping down the bank.	NOS	3175.00	50	158750.00
9		Excavation of pit, erection of cable termination boxes on angle and concreting as per Drg. No.SG/CN/02/8, drilling of suitable holes in the box, fixing of 2 Nos. of GI pipes 32mm dia and 300mm long at the bottom with clamp nuts - 12 mm thick, one at the inner side and another at the outer side for each pipe for cable throughing and one GI pipe 150mm long 32mm dia for drawal of jumper wires for Point machines etc., fixing of hardwood plank 37mm thick on the bottom, provision of one EWS lock, and painting the boxes inside and outside with one coat of red-oxide and two coats of aluminum paints.CT. boxes, .[Cement, river sand, stone jelly of size 20/25mm, paint, varnish , GI Pipes 32mm dia - 300mm long - 2 Nos and 150mm long - 1 No., clamp nuts - 12mm thick - 2 Nos. for each pipe, fixing bolts and nuts with washers, EWS locks, paints and all other miscellaneous materials shall be supplied by the Contractor].	NOS	3625.00	60	217500.00
10		Installation, testing and commissioning of earth leakage detector 12 channel.	NOS	27067.00	3	81201.00
11		Fixing of 10 pair CT box with wago terminals of phnonix make or batter and termination of cable at the station/ LC gates etc., This includes fixing of quad/PIJF cables and CT box on the wall.	NOS	1833.33	10	18333.00
12		Fixing of 20 pair CT box with wago terminals of phnonix make or batter and termination of cable at the station/ LC gates etc., This includes fixing of quad/PIJF cables and CT box on the wall.	NOS	2100.00	10	21000.00
13		Releasing of Diesel Generators in the existing room along with all other gadgets without causing any damages.	NOS	5333.33	6	32000.00

SCHEDULE "C"						
SL.NO		DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
14		Provision of normal joint of Heat Shrinkable type complete for 6 quad cable. After the jointing the through cable has to be tested for insulation resistance and loop resistance in presents of KRIDE Engineer and in case of any defects the jointing has to be re-done free of cost by the contractor.[Heat Shrinkable jointing kit conforming to RDSO specification No.IRS-TC 77/2006 covered in the supply portion has to be used for this purpose. The Contractor should supply all other small items free of cost which are required for making a joint.Only gas blower to be used for blowing].	NOS	2433.14	50	121657.00
Total for Schedule C (14 items)						1631316.00
Tenderer's / Contractor's Percentage (Above/Below/At par) in figure						
Tenderer's / Contractor's Percentage (Above / Below / At par) in Word						
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**Seal & Signature of the Bidder**

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**SCHEDULE "D"**

SL.NO	DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
1	Supply and fixing of retro reflective type CALLING ON/STOP/BSLB/Un-insulated trolley prohibited board as per practice & SEM	NOS	4853.67	30	145610.00
2	Supply and fixing of Crank Handle box/emergency key box made of teak wood with glass fronted door as per drawing 03/91. Polishing on all exposed surface and for with EKT inside the box. Micro push switch of L&T make with 2NO+2NC contacts and veeder counter non reset type and wire them as per the approved circuit diagram. Clamp and terminate the cable in the cable termination box in ASM office and in the Relay room. Bunching and lacing with lacing thread and interlock the EKT key with Crank handle by nickle coated dog chain/welded. The box should have hinges and pad locking arrangements with one No.40mm Navtal lock duplicate keys and key chain with label. (All materials except EKT are to be supplied by the contractor).	NOS	4640.00	10	46400.00
3	Fabrication and fixing of MS frames to suit Q series relays to accommodate 6 nos in each set duly drilling required holes for relay bases (all materials such as frames, bolts, nut and washers to be supplied by contractor)	NOS	305.00	50	15250.00
4	Supply and provision of power supply change over arrangement at SM room. CLS panel of size 800 x 500 x 275mm powder coated of MS sheet thickness 1.6mm as per RDSO specification No. TI/SPC/PSI/CLC/0020.	NOS	45730.00	3	137190.00

SCHEDULE "D"						
SL.NO		DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
5		Supply and fixing of PVC casing and capping/PVC pipe of minimum 25 mm size of higher as per requirement at site on the wall/floor etc., using bends, coupler and T joints and flexible pipe wherever necessary with fixture in the OFC room from equipment rack to common termination and from OFC room to SM room/reservation office/data logger/FOIS room etc., (All required materials for fixing to be arranged by the contractor),	MTR	41.68	300	12504.00
6		Preparation of Cable Route Plan, Cable Core Plan, Cable Termination Rack Particulars, Location Box Particulars, Power Supply Diagram, Track Circuit Bonding Diagram and/or any other drawing on AutoCAD in A2/A3/A4, etc. size (as per instructions of Engineer in-charge). Initially Contractor shall submit 2 sets of 'AS PLANNED' documents complete for approval of KRIDE/Railways. One set is returned either duly approved for making a fair copy or for re-submission for approval after incorporating the changes as required by KRIDE/railways. After preliminary approval, execution of work shall be carried out at site. After Completion of work, 2 sets of 'AS MADE' Check Prints are submitted for Administrative approval. KRIDE/Railways will return one set to the contractor duly approved with alterations/corrections if any. The contractor shall incorporate KRIDE/Railways alterations/corrections in the tracings without any deviation and submit all tracings complete in all respect along with its soft copies in USB Pen Drive and 6 sets of final completion drawings in properly bound booklets. [For Centralized Electronic Interlocking Stations/Small	Station	98035.00	4	392140.00

SCHEDULE "D"						
SL.NO	DESCRIPTION OF ITEMS		UNIT	RATE	QUANTITY	AMOUNT
7		Termination of main, tail, signalling and power cables and internal wiring on terminal/fuse block in cable termination rack at relay room. The work includes fixing of all new cables by teak wood clamp on teak wood base plank, fixing of phynolic synthetic industrial fibre base fine weave cotton fibre board 6mm thick for terminal board, varnishing all teak wood items, fixing of terminals/fuse blocks on the terminal board , drilling of necessary holes, termination of cables wiring identification of cables using aluminum tags with letters punched neatly as per approved circuit diagram and cable plan, painting of particulars on sleeves, After terminations are over cable entry at the bottom shall be closed with , cement plastered the inter space filled with river sand up to base level and the bottom surface shall be sealed with sealing compound. Cable armour to be soldered to earth. (Supply of cable termination racks is not included in this schedule).[All bolts and nuts with washers cement sand stone jelly teak wood base, paints and all other miscellaneous materials required for the work shall be supplied by contractor).(a) Termination o 25/60mm PBT terminals	PER TERMIN	112.80	9000	1015200.00
8		Supply installation testing and commissioning of copper plate earthing system complete with provision of (i) Copper plate 300 x 300 x 3mm, (ii) Earth pit 8 to 10 ft. depth filled up with charcoal 10 Kgs and salt 25 Kgs in layers, (iii) Water funnel on GI pipe of length 8 ft., (iv) Cast iron top plate 12 inch x 12 inch, (v) Drawing of copper - earth from earth t location with 25mm x 3mm copper strip for termination (All miscellaneous materials to be supplied by the contractor).	NOS	15702.30	40	628092.00

SCHEDULE "D"						
SL.NO	DESCRIPTION OF ITEMS		UNIT	RATE	QUANTITY	AMOUNT
9		Supply and Installation of Pre-wired Crank Handle Cum Key Lock Relay Box (of MS Sheet) along with LEDs, with approved type push buttons, Wago or similar Disconnecting type Terminal Blocks including DIN rail etc., as per tentative drawing enclosed. Installation, fixing and wiring of boxes for Key Lock Relays to be carried with Contractor's wiring and fixing material. The work shall be carried as per the instructions of site engineer.	nos	34673.00	3	104019.00
10		Supply installation testing wiring and commissioning of complete Integrated power supply systems(SMPS based) with battery set 300AH, hydrometer suitable for EI/PI/RR1 and including charging of batteries, supply of battery wires, fabrication and fixing of fuses/terminations on power distribution panel.	set	1126900.00	3	3380700.00
11		Supply installation testing wiring and commissioning of complete Integrated power supply systems(SMPS based) with battery set 200AH, hydrometer suitable for suitable for midsection LC gate/IBH/auto huts and including charging of batteries, supply of battery wires, fabrication and fixing of fuses/terminations on power distribution panel.	set	899160.00	7	6294120.00
12		Track Crossing by Horizontal boring method based on the RDSO report No.BS-105. This also includes insertion of HDPE duct (pipe) of 110mm dia in the bore drilled. (Supply of HDPE duct (pipe) is not included).	MTR	1774.58	3000	5323740.00

SCHEDULE "D"						
SL.NO		DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
13		Supply and installation of De-ioniser plant (Aqua-Ion Model No. ACAMB 4 Bed Type).	nos	43374.00	1	43374.00
Total for Schedule D (13 Items)						17538339.00
Tenderer's / Contractor's Percentage (Above/Below/At par) in figure						
Tenderer's / Contractor's Percentage (Above / Below / At par) in Word						
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**SCHEDULE "H"**

SL.NO	DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
1	Supply of Adjustable Track Feed Resistance, Disc type, 30 Ohm, with phenolic moulded base, as per Drg.No.SA-20166/M(Adv.) or latest	nos	295.00	15	4425.00
2	Supply of 20 pair Krone box with modules and mount assembly wall mounting type powder coated with surge and lighting arrester and locking facility.	NOS	1545.00	10	15450.00
3	Supply of Telecom termination panel with WAGO type disconnecting terminals blocks of size 1500mm x 500mm x 200mm thickness 1.6mm (16 SWG) 150 numbers of disconnecting terminal block with accessories. (The box should be divided in to two compartments 500mm from TOP with door arrangements including locking and bottom 1000mm closed fully with screws WAGO terminals 280-870 suitable for cable dimensions maximum of 2.5 sq mm. Provision of easy and ensuring aesthetics.	NOS	38000.00	3	114000.00
4	Installation of 100/50/20 pair Krone box duly fixing the same on wall as directed by KRIDE representative.	NOS	550.00	3	1650.00
5	Fixing of Telecom Termination Panel and termination of cables on WAGO/KRONE connectors as per the instructions of the site Engineer.	NOS	4500.00	3	13500.00
6	Supply and Laying of PVC Warning Tape colour Orange, width of 250mm (10") by printing with black letters 'Indian Railway Signal/Telecom/OFC Cable' on both sides	km	42600.00	20	852000.00

SL.NO	DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
7	Supply and installation of wire insulator for wire operating level crossing, lifting barriers/ signals as per specification No.IRS: 541-74 flnsnection:	nos	2918.00	42	122556.00
8	Supply and installation of insulator of point rodding at function end and lever end and lever end as per instruction of site engineer.	nos	2624.00	15	39360.00
9	Supply of single phase air cooled silent DG set (CPCB compliant) of 10KVA	NOS	267300.00	3	801900.00
10	Supply and Placing of Polyolefin Cable channel of size, Width 240/340 mm, Height 155/230 internal/external, length 1 m produced of polyolefin with Fire protection class k-1 in accordance with DIN-53438 Part II for laying Signalling/Telecom cables, channel attachable to each other with malefemale swallow tail connectors and having suitable detachable cover	MTR	2521.00	10000	25210000.00
11	Excavation of cable trench in hard rocky areas/hard soil including clearing of roots of trees, rocks, bushes etc., to a depth of 0.6 mtrs., and to a width of 0.5 mtrs., and refilling of cable trench 0.6m depth by 0.5m with throughout, with earth after laying of cables, and consolidation the trench by ramming and leveling. Laying of cables is not included in this schedule.	MTR	80.00	500	40000.00
12	Supply and laying of Split DWC pipe of 120/103 mm dia, 2 meter long in already dug cable trenches. The unit of RMT means two split pipes of 1 Mtr each. Material shall be supplied as per specification RDSO/SPN/204/2011 or latest" {Per Unit-RMT}	per unit	284.00	30000	8520000.00

SL.NO	DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
13	Laying of PLB HDPE Duct, 40/33 mm Dia, in the trenches and in the protective works already provided including in HDD portion and supply pulling of Nylon rope through it at different places as per direction of engineering charge or site engineer.	km	10360.00	15	155400.00
14	Duct Integrity test for PLB HDPE Duct, 40/33 mm Dia, as per specification	km	1287.00	15	19305.00
15	Supply and Provision of Mid-Section OFC Joint including Splicing (24 Fibre) inside already prepared jointing pit. This does not include provision of Joint chamber, top plate and back filling. The joint Enclosure shall be as recommended in the Technical specification.	Nos.	10302	10	103020.00
16	Blowing of OFC cable(24F as per RDSO specn.TC 55-2006 Rev.1 with amendment 1.1) in already laid PLB HDPE Duct, 40/33mm Dia, by using Blowing machine, providing the sufficient loops in loop/joint chambers and other associated works.	KM	14793.00	15	221895.00
17	Supply Installation testing and commissioning of Multi section Digital Axle counter (MSDAC) as per RDSO specification no.RDSO/SPN/176/2013 version.3 with latest amendments. a) The tenderer shall design the scheme for provision of required number of Evaluator, track side junction Box, detection points etc. b) MSDAC application in the yard will be in place of track circuits with single detection and dual detection for Block working with SSBPAC (c) length of cable required for each track devised-5/10/15 mtrs.	Per DP	530000	95	50350000.00
18	Supply of essential 10% spare for MSDAC. Detailed cost and quantity wise break up of spares should be given.	Set	1163000	2	2326000.00
19	Design of axle counter circuit, indoor installation, testing and commissioning of Multi section digital, axle counter	per Stn	135000	3	405000.00

SL.NO		DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
20		Outdoor equipment installation, testing and commissioning of Multi section digital,axle counter	Per DP	15000	95	1425000.00
21		Tool set for wheel sensor mounting and maintenance of MSDAC consisting of torque wrinch, ratchet, testing plate, measuring tape, scew driver, hand gloves & multi meter fluke115	Nos	105000	2	210000.00
Total for Schedule H (21 items)						90950461.00
Tenderer's / Contractor's Percentage (Above/Below/At par) in figure						
Tenderer's / Contractor's Percentage (Above / Below / At par) in Word						
Please Ensure there are no over writings. If there is any discrepancy in figures and words , then word will be taken for consideration.						

**Seal & Signature of the Bidder**

**Name of Work** : - Signaling outdoor works at Yesvantpur bye pass, Lottegolahalli, Hebbal and Banaswadi with MSDAC, Integrated power supply and interlocking of LC Gates in connection with doubling of YESVANTPUR-BAIYAPPANAHALLI section of Bangalore Division

**SCHEDULE "J"**

SL.N O	DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
1	Supply of Outdoor signaling cable - 2 core X 2.5 sq.mm. in drum length of 1 km	Mtrs	77.60	4000	310400.00
2	Supply of Outdoor signaling cable - 12 core X 1.5 sq.mm. in drum length of 1 km	Mtrs	162.00	26000	4212000.00
3	Supply of Outdoor signaling cable 30 core x 1.5 sq.mm in drum length of 500 mtr	Mtrs	360.00	10000	3600000.00
4	Supply of Outdoor signaling cable 24 core x 1.5 sq.mm in drum length of 500 mtr	Mtrs	280.00	10000	2800000.00
5	Supply of Outdoor signaling cable - 19 core X 1.5 sq.mm. in drum length of 500Mtr	Mtrs	233.00	12000	2796000.00
6	Supply of Aluminium Conductor Power cable 2 Core X 25 sq.mm.	Mtrs	77.00	20000	1540000.00
7	Supply of Aluminium Conductor Power cable 2 Core X 35 sq.mm.	Mtrs	99.90	8000	799200.00
8	Supply of Underground Jelly filled 0.9mm die , 6 Quad cable	Mtrs	213.00	20000	4260000.00
9	Supply Tele cable 10 pair 0.63mm PIJF	Mtrs	68.64	3000	205920.00
10	Supply of 24 fibre armoured Optic Fibre Cable	Mtrs	66.00	15000	990000.00
11	Supply of LED Signal Unit for RED aspect integrated type	Nos	8452.00	50	422600.00
12	Supply of LED Signal Unit for YELLOW aspect integrated type	Nos	8452.00	65	549380.00

SCHEDULE "J"					
SL.N O	DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
13	Supply of LED Signal Unit for GREEN aspect integrated type	Nos	9380.00	60	562800.00
14	Supply of calling on LED 110V AC	Nos	6699.00	10	66990.00
15	Supply of Junction type route indicator LED 110VAC	Nos	5880.00	45	264600.00
16	Supply of shunt signal LED 110V AC	Nos	5880.00	30	176400.00
17	Electrical point operating machine IRS Type 220 mm throw with lock & detector slides cable termination box and clamp lock arrangement with ground connection for thick web switches	Nos	172369.00	32	5515808.00
18	Electrical point operating machine IRS Type 143 mm throw with lock & detector slides cable termination box and clamp lock arrangement with ground connection	Nos	58465.00	20	1169300.00
19	Supply of Relay QN1 8F/8B configuration	Nos	4200.00	400	1680000.00
20	Supply of key lock Check relay	nos	11210.00	18	201780.00
21	Supply of Relay QNA1 8F/8B configuration	Nos	4170.00	400	1668000.00
22	E-Type lock	nos	907.00	42	38094.00
23	Supply of Data Logger - Remote Terminal Unit in 64 digital and 16 analog inputs	nos	261219.00	7	1828533.00
Total for Schedule J (23 items)					35657805.00
Tenderer's / Contractor's Percentage (Above/Below/At par) in figure					
Tenderer's / Contractor's Percentage (Above / Below / At par) in Word					
Please Ensure there are no over writings. If there is any discrepancy in figures and words , then word will be taken for consideration.					

**Seal & Signature of the Bidder**

**Name of Work :** - Signaling outdoor works at Yesvantpur bye pass, Lottegolahalli, Hebbal and Banaswadi with MSDAC, Integrated power supply and interlocking of LC Gates in connection with doubling of YESVANTPUR-BAIYAPPANAHALLI section of Bangalore Division

**SCHEDULE "K" - Item of miscellaneous works**

SI No.	Description of Item	Unit	Qty	Rate	Amount
1	a. Providing Toyota Innova Crysta / Toyota Corolla Altis / Honda Civic or similar approved road vehicle(s) as per relevant special conditions	per month	18	54000.00	972000.00
	b. Providing Toyota Yaris G CVT / Honda City 2020 / Hyundai Verna 1.6 CRDI SX(O) / Skoda Rapid 1.5 TDI CR Ambition AT or similar approved road vehicle(s)	per month	18	48000.00	864000.00
	c. Providing Maruti Swift DZIRE / Toyota Etios or similar approved road vehicle(s)	per month	18	40000.00	720000.00
2	Extra payment for providing any of the vehicles mentioned in item no. 1(a) /1(b)/1(c) as per the criteria/ stipulations/specifications/conditions mentioned therein including the notes and in the ASC, with Driver(s) cum Attendant(s) beyond 12 hours a day	Vehicle Hours	432	150.00	64800.00
3	Extra payment for extra distance run, over and above 3000 km per month on certification by the user official				0.00
	a. For the class/type of the vehicle mentioned in item no. 1(a)	Vehicle KM	720	15.00	10800.00
	b. For the class/type of the vehicle mentioned in item no. 1(b)	Vehicle KM	720	13.00	9360.00
	c. For the class/type of the vehicle mentioned in item no. 1(c)	Vehicle KM	720	12.00	8640.00
4	Extra payment for extra days of run, over and above 26 days per month on certification by the user official				0.00
	a. For the class of the vehicle mentioned in item no. 1 (a) with all conditions therein	Vehicle day	72	2100	151200.00
	b. For the class of the vehicle mentioned in item no. 1 (b) with all conditions therein	Vehicle day	72	1900	136800.00
	c. For the class of the vehicle mentioned in item no. 1 (c) with all conditions therein	Vehicle day	72	1600	115200.00

SCHEDULE "K" - Item of miscellaneous works					
SI No.	Description of Item	Unit	Qty	Rate	Amount
5	Extra payment for extra distance run, over and above 3000 km per month on certification by the user official	Vehicle KM	4000	2.5	10000.00
Total for Schedule K ( 5 Items)					3062800.00
Tenderer's / Contractor's Percentage (Above/Below/At par) in figure					
Tenderer's / Contractor's Percentage (Above / Below / At par) in Word					
Please Ensure there are no over writings. If there is any discrepancy in figures and words , then word will be taken for consideration.					

**Seal & Signature of the Bidder**

**NAME OF WORK** : Signalling Outdoor works at Baiyappanahalli A panel, Bellandur and Heelalige with MSDAC, Integrated power Supply and interlocking of LC Gates in connection with doubling of BAIYAPPANAHALLI-HOSUR section of Bangalore Division

### SUMMARY OF BILLS OF QUANTITIES

Particulars	Department Value (Rs.)
<b>SCHEDULE - A</b>	<b>16718235.00</b>
<b>SCHEDULE - B</b>	<b>5627794.00</b>
<b>SCHEDULE - C</b>	<b>1766266.00</b>
<b>SCHEDULE - D</b>	<b>17967300.00</b>
<b>SCHEDULE - H</b>	<b>63281191.00</b>
<b>SCHEDULE - J</b>	<b>36451795.00</b>
<b>SCHEDULE - K</b>	<b>3062800.00</b>
<b>Total</b>	<b>144875381.00</b>

<b>NAME OF WORK</b> : Signalling Outdoor works at Baiyappanahalli A panel, Bellandur and Heelalige with MSDAC, Integrated power Supply and interlocking of LC Gates in connection with doubling of BAIYAPPANAHALLI-HOSUR section of Bangalore Division						
<b>SCHEDULE "A"</b>						
<b>SL. NO</b>	<b>SOR No.</b>	<b>Description of work</b>	<b>Unit</b>	<b>Rate</b>	<b>QUANTITY</b>	<b>AMOUNT</b>
1	10_101	Excavation of cable trench in all kinds of soil except hard rocky areas including clearing of roots of trees, rocks, bushes etc. to a depth of 1.0 Mtrs and to a width of 0.3 Mtrs. Laying of cables is not included in this schedule.	Mtrs	34.65	54500	1888425.00
2	10_104	Removing/breaking of existing RCC slabs on the Passenger Platform, trenching to a depth of 0.6m to accommodate the additional cables, replacing the slabs removed after the cables are laid and replastering with cement mortar, refilling the trench by ramming and consolidating it as per the instructions of KRIDE Representatives at site. (Laying of cables is not included in this schedule).[Cement, river sand and all other miscellaneous materials required for the work shall be supplied by the Contractor].	Mtrs.	169.95	100	16995.00
3	10_106	Excavation of trench to a depth of 1 Mtr. for track crossing of cables, laying of DWC/ RCC pipes with collar/coupling, refilling of trench by ramming and consolidating it as per the instructions of KRIDE representative at site. During excavation of trench it has to be ensured that the excavated soil does not mix with the ballast available. The depth of 1m trench shall be from the bottom of sleepers for track crossings. Laying of cables is not included in this schedule.(Supply of DWC/RCC pipes with couplers/ collars is not included in this schedule).	Mtrs.	208.35	370	77090.00
4	10_107	Excavation of trench to a depth of 1 Mtr. for road crossing of cables, laying of DWC/ RCC pipes with collar/ coupling, refilling of trench by ramming and consolidating it and resurfacing it to the original position. Laying of cables is not included in this schedule.(Supply of DWC/RCC pipes with couplers/ collars is not included in this schedule).	Mtrs.	270.83	220	59583.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
5	10_108	Provision of GI pipes (50/100mm dia) for cable laying with offset at both ends and with couplings over RCC Bridges/ Drainage/ Culverts with concrete masonry supports of size 300mm x 300 mm x 300 mm at an interval of 2m. The ends of the pipes shall be closed with brick masonry abutments work so that no cable is exposed, The work shall be carried out as per the instructions of KRIDE representative at site. (Supply of GI pipes with couplings and laying of cables is not included in this schedule). [Stone jelly of size 20/25mm, bricks, sand, cement and all other miscellaneous materials required for the work shall be supplied by the Contractor].	Mtrs.	181.95	325	59134.00
6	10_109	Provision of GI pipes-(50/100mm dia) for cable laying with offset at both ends and with couplings over girder bridges by fixing on suitable MS Clamps at an interval of 2 Mtrs. The ends of the pipes shall be closed with brick masonry abutments work so that no cable is exposed, The work shall be carried out as per the instructions of KRIDE representative at site. (Supply of GI pipes with couplings and laying of cables is not included in this schedule). [MS angles, flats, bolts and nuts for manufacturing fixing clamps, bricks, river sand , cement and all other miscellaneous required for the work shall be supplied by the Contractor].	Mtrs.	215.25	325	69956.00
7	10_110	Provision of GI pipes (50/100mm dia) for cable laying in hard rocky area with off sets at both ends duly supported by concrete blocks of size 300mm x 300 mm x 300 mm at an interval of 2m. The ends of the pipes shall be closed with brick masonry abutments work so that no cable is exposed, The work shall be carried out as per the instructions of KRIDE representative at site. (Supply of GI pipes with couplings and laying of cables is not included in this schedule).[Stone jelly of size 20/25mm, bricks, sand, cement and all other miscellaneous materials required for the work shall be supplied by the Contractor].	Mtrs.	168.08	500	84040.00
8	10_111	Laying of signaling/power/telecommunication cables as per cable plan in cable trenches, masonry ducts, RCC Pipes, DWC pipes, GI Pipes etc. (Supply of cables is not included in this schedule).	Mtrs.	9.83	170000	1671100.00
9	10_115	Refilling of cable trench 1m depth by 0.3m width throughout, with earth after laying of cables, and consolidating the trench by ramming and leveling.	Mtrs.	8.33	51500	428995.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
10	10_118	Supply of RCC cable markers as per drawing No.CSTE/CN/OFC/1. The lettering on the cable marker shall be "SIG" / "TELE" / "OFC" as per the instructions of KRIDE representative at site.	Nos.	166.29	1350	224492.00
11	10_119	Digging of pit to a depth of 800mm of size 300mmX300mm, casting of concrete foundation of size 300mmX300mmX300mm and Placing of RCC cable markers on top of the foundation and refilling the pit and consolidating it by ramming. The cable markers shall be provided at an interval of 20 Mtrs. within station limits and 50 Mtrs. outside station limits throughout the cable route, diversions and also at every track/road crossing.	Nos.	121.43	1350	163931.00
12	10_120	Excavation of cable coil pit to a size of 1.5mx1.5m and depth as instructed by KRIDE representative at site, for coiling the cables in rear of relay rooms/ AFTC huts, apparatus cases etc. The work includes coiling the underground cables, and placing closely one layer of country bricks of size approx. 220mm x 100mm x 60mm breadth wise above the cables to cover all the cables in the cable pit, closing and consolidating the pit by ramming and leveling. [Country bricks of size 220mmx100mmx60mm (approximately) shall be supplied by the Contractor].	cum	513.00	50	25650.00
13	10_121	Supply of Double walled corrugated pipe - 103.5mm inner dia & 120mm outer dia conforming to specification No. IS 14930(Part 2): 2001 with one coupler for every 6m of pipe as specified in Vol.II of the Tender document.	Mtrs.	263.20	590	155288.00
14	10_122	Supply of GI pipes - 50mm dia -3.65mm thick as specified in Vol.II of the Tender document.	Mtrs.	343.20	450	154440.00
15	10_123	Supply of GI pipes - 100mm dia-4.5mm thick as specified in Vol.II of the Tender document	Mtrs.	838.80	700	587160.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
16	10_201	Excavation of pit, casting concrete foundation and erection of apparatus case full size as per Drg. No.SG/CN/02/6 and fixing of 2 Nos. of 'E' type locks, one for the front door and another for the back door, fixing of one hard wood shelf plank 37mm thick and painting the apparatus case inside and outside with one coat of red-oxide and two coats of aluminium paints.(Supply of apparatus case is not included in this schedule).[Foundation bolts & nuts, 'E' type locks, cement, river sand, stone jelly of size 20/25 mm, hardwood plank of 37mm thick, paints, varnish, fixing bolts & nuts and all other miscellaneous materials required for the work shall be supplied by the Contractor.]	Nos.	9875.30	70	691271.00
17	10_202	Excavation of pit, casting concrete foundation and erection of apparatus case half size as per Drg, No.SG/CN/02/7, fixing one 'E' type lock for the front door and latching arrangement for the back door, and fixing of one hardwood shelf plank 37mm thick and painting the apparatus case inside and outside with one coat of red-oxide and two coats of aluminium paints.(Supply of apparatus case is not included in this schedule). [Foundation bolts and nuts, cement, 'E' type locks, river sand, stone jelly of size 20/25mm, 37mm hard wood planks, latching arrangements, paints, varnish, fixing bolts & nuts and all other miscellaneous materials required for the work shall be supplied by the Contractor]	Nos.	6966.60	70	487662.00
18	10_208	Excavation of pit in and around the existing location boxes very carefully without damaging the working cables and shifting and turning the location boxes to clear of the infringement as instructed by the KRIDE representative at site. The work includes ensuring the safety of the signaling system, releasing the cable coils to give access for shifting/turning the location boxes. Necessary masonry work and earth work in and around the location boxes to the required level shall be done as instructed by the KRIDE representative at site. If the existing earth connections to the location boxes are disturbed, the earth wires shall be properly re-connected. [All materials required for the work shall be supplied by the Contractor].				

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
		a. Shifting of apparatus case (full)	Nos.	2895.00	5	14475.00
		b. Shifting of apparatus case (half)	Nos.	1916.25	5	9581.00
		c. Shifting of apparatus case (Quarter)	Nos.	1583.25	5	7916.00
19	10_209	Termination of new main/tail cables on the existing terminals/ fuse blocks in apparatus cases/ battery boxes/ CT boxes/ cable termination racks as per approved circuit diagram. The terminal particulars are to be repainted /corrected on the doors of apparatus cases/ battery boxes/ cable termination boxes and FTOT index board as instructed by KRIDE representative at site. This work includes closing the opening created for entry of new cables in the apparatus cases with masonry brick work and sealing the bottom of the apparatus cases/ cable termination racks with cable compound. [Paints, wire PVC 3/0.75mm and 16/0.2mm copper, sealing compound, bricks, cement, river sand and all other required miscellaneous materials shall be supplied by the contractor].	Per Terminal Block	39.78	500	19890.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
20	10_210	Termination of main, tail, Signaling and power cables and internal wiring on terminal/ fuse blocks in new apparatus cases, cable termination boxes and in gate Lodges excluding cable termination rack at relay room. The work includes fixing of all new cables by teakwood clamp on teakwood base plank, fixing of Phynolic synthetic industrial fibre base fine weave cotton fibre board 6mm thick for terminal board to suit each apparatus case, varnishing all teakwood items, fixing of terminals/ fuse blocks on the terminal board, drilling of necessary holes, termination of cables, wiring, identification of cables using aluminium tags with letters punched neatly, as per approved circuit diagram and cable plan, painting of particulars on sleeves and also on the inner side of the doors of apparatus cases. After terminations are over, the side openings of apparatus case foundation shall be closed with brick work, cement plastered, the inter-space filled with river sand up to base level and the bottom surface shall be sealed with sealing compound. (Supply of PBT terminals and Fuse blocks is not covered in this schedule).[Cement, teakwood cable clamp 50mm x 50mm, base planks 100mm x 25mm, Phynolic synthetic industrial fibre base fine weave cotton fibre sheet - 6mm thick to IS specification 2036 - 1995 - Type F5, PVC/Nylon sleeves, varnish, paints, bolts, nuts and washers, Non- deteriorating type of fuses of various capacities, Aluminium cable tags, sealing compound, country bricks 220mm x 100mm x 60mm, copper bus bars, brass screw, river sand, wire PVC3/0.75mm copper and other miscellaneous materials shall be supplied by the Contractor].				
		a. Termination on 25/60mm PBT terminals (new location)(Phynolic sheet)	Per Terminal Block	93.16	16000	1490560.00
		b. Termination on PBT fuse block (new location) (Phynolic sheet)	Per Terminal Block	113.56	600	68136.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
21	10_211	Termination of main, tail, Signaling and power cables and internal wiring by fixing additional terminals/ fuse blocks on the existing terminal boards of apparatus cases, cable termination boxes etc. The work includes fixing of all new cables by teakwood clamp on teakwood base plank, varnishing all teakwood items, fixing of terminals/ fuse blocks, on the existing terminal boards, drilling of necessary holes, termination of cables, wiring, identification of cables using aluminium tags with letters punched neatly, as per approved circuit diagram and cable plan, painting of particulars on sleeves and also on the inner side of the doors of apparatus cases. After terminations are over, the side openings of apparatus case foundation shall be closed with brick work, cement plastered, the inter-space filled with river sand up to base level and the bottom surface shall be sealed with sealing compound.(Supply of PBT terminals and Fuse blocks is not covered in this schedule).[Cement, teakwood cable clamp 50mm x 50mm, base planks 100mm x 25mm, PVC/Nylon sleeves, varnish, paints, bolts, nuts and washers, Non-deteriorating type of fuses of various capacities, Aluminium cable tags, sealing compound, country bricks 220mm x 100mm x 60mm, copper bus bars, brass screw, river sand, wire PVC3/0.75mm copper and other miscellaneous materials shall be supplied by the Contractor].				
		a. Termination of cables on 25/60mm PBT terminals (existing location)	Per Ter.Bloc	81.68	500	40840.00
		b. Termination of cables on PBT fuse block (existing location)	Per Fuse	102.08	50	5104.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
22	10_212	Manufacture and supply of M.S. relay frames of suitable size to hold up to 4/ 8/ 12/ 20 relays /plug in type HMU as required by KRIDEs and fixing them in apparatus cases for all types of signal control circuits, LC gate control circuit and Point control circuits, fixing of plug boards, relays, resistors and electrolytic condensers on Phynolic synthetic industrial fibre base fine weave cotton fibre sheet - 6mm thick to IS specification 2036 - 1995 - Type F5, wiring and termination as per approved circuit diagram and painting the particulars. (Supply of all types of relays, plug boards, connectors, retaining clips and plug in type HMU is not covered in this schedule).[Wire PVC copper, 3/0.75mm and 16/0.2mm copper, Phynolic synthetic industrial fibre base fine weave cotton fibre sheet - 6mm thick to IS specification 2036 - 1995 - Type F5, for fixing resistors and condensers, MS flats 25mm x 6mm brass bolts and nuts, paints, soldering materials, resistors, condensers and all other miscellaneous materials required for the work shall be supplied by the contractor].				
		a. Wiring of Signal/ point/ LC control circuit (up to 4 relays/Plug in type HMU)	Set	2673.25	10	26733.00
		b. Wiring of Signal/ Point/ LC control circuit (up to 8 relays/plug in type HMU)	Set	4739.60	15	71094.00
		c. Wiring of Signal/ Point/ LC control circuit (up to 12 relays/plug in type HMU)	Set	6137.85	10	61379.00
		d. Wiring of Signal/ Point/ LC control circuit (up to 20 relays/Plug in type HMU)	Set	7349.95	15	110249.00
23	10_214	Fixing and wiring of platform repeaters. The work involves fixing of platform repeater using suitable fixing arrangements at places indicated, wiring the same and painting as per the instructions of KRIDE representative at site. The signal shall be connected to the apparatus case using cables neatly clamped. The work also includes provision of one EWS lock.(Laying of cable is not included in the scope of this work.) (Supply of repeater signals and cables is not included in this schedule). [Wire PVC 3/0.75mm copper, paint, EWS lock and all other miscellaneous materials required for the work shall be supplied by the Contractor].	Nos.	3687.30	3	11062.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
24	10_217	Filling earth around location boxes/signal foundations for a width of 0.5m on all sides, up to a level 150mm below the foundation top. This work includes consolidation of earth by watering and ramming. The earth shall be taken from railway premises as instructed by KRIDE representative at site.	cum	125.02	50	6251.00
25	10_218	Excavation of pit, casting concrete foundation as per Drg.No.SG/CN/02/9 using metallic templates, for erection of colour light signals up to 4 aspects. [Foundation bolts, cement, river sand, stone jelly of size 20/25mm dia and all other miscellaneous materials required for the work shall be supplied by the Contractor].	Nos.	5008.20	80	400656.00
26	10_219	Erection of surface base, signal pole, mounting of colour light signal up to 4 aspects complete on Signal pole/ Off-set bracket, (for LED/ filament bulbs) with lenses, triple pole lamp holder, filament switching units, CLS transformer, current regulators (whichever is applicable), fixing of ladder with platform complete and concreting of ladder shoe, fixing of number plates, marker board, lens guard, fixing of speed limit board wherever necessary, termination of tail cables, wiring of signal unit with PVC wire 3/0.75mm copper, provision of EWS locks, and painting of one coat of red oxide and two coats of aluminium/ enamel paints. When the aspect is fixed on Offset bracket using 'U' bolts and nuts, a through bolt shall be provided by drilling a hole in the signal pole to prevent the offset bracket from sliding down. (Supply of surface base, Offset bracket, CLS pole, CLS aspects complete, ladder with shoes and platform, Speed limit board, LED aspects, current regulators, lamp holders, lamps, filament switching unit and CLS transformer is not covered in this schedule). ['U' bolts and nuts, through bolts and nuts, cement, stone jelly 20/25mm dia, river sand, Signal Collar Rings, wire PVC 3/0.75mm copper, lens-guard, all fixing bolts and nuts, lead wool, paints PVC/Nylon sleeves, enameled number plates. enameled marker boards, EWS locks, and all other miscellaneous materials for the work shall be supplied by the Contractor].	Nos.	5501.20	80	440096.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
27	10_220	Excavation of pit and casting concrete foundation as per Drg, No.SG/CN/02/10 using metallic templates, for erection of ground type colour light shunt signal. [Foundation bolts and nuts, cement, river sand, stone jelly of size 20/25mm and all other miscellaneous materials for the work shall be supplied by the Contractor].	Nos.	2518.55	8	20148.00
28	10_221	Erection of Ground type shunt signal complete including surface base, signal pole, LED aspects/lenses, bulbs with holders (whichever is applicable), fixing of lens guards, number plate, termination of tail cables, wiring of signal unit with PVC wire 3/0.75mm copper, provision of EWS locks and painting of one coat of red oxide and two coats of Aluminium/ enamel paint (Supply of Ground type shunt signal complete.including surface base, signal pole, LED aspects,holder, bulbs, and lenses is not covered in this schedule).[Wire PVC 3/0.75mm copper, lens guards, EWS locks, Enameled number plates, bolts and nuts, lead wool, paints and all other miscellaneous materials shall be supplied by the Contractor]	Nos.	2097.00	8	16776.00
29	10_222	Fixing of Offset brackets using 'U' bolts and nuts,erection of Post type shunt Signals, termination of tail cables and wiring using wire PVC 3/0.75mm copper, provision of EWS lock and painting of one coat of red- oxide and two coats of aluminium/ enameled paint. The work also includes drilling suitable holes on the CLS post and provision of a through bolt with nut to prevent the Off-set bracket from slipping down. (Supply of Post type Shunt Signals, LED aspects and Off set brackets is not covered in this schedule).['U' bolts and nuts, through bolts with nut, wire PVC 3/0.75mm copper, EWS lock, Enameled number plates, wire mesh, PVC/Nylon sleeves, paints and all other miscellaneous materials shall be supplied by the contractor].	Nos.	1613.25	2	3227.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
30	10_224	Fixing of junction type route indicators - 1 way to 6 ways - complete/ fixing of additional limb to the existing route indicators, termination of tail cables, wiring as per approved circuits diagram using wire PVC 3/0.75mm copper, provision of required No of EWS locks, wire mesh, and painting.(Supply of junction type Route Indicators - complete and additional limb is not covered in this schedule).[3/0.75mm wire PVC, fixing bolts and nuts, EWS locks, wire mesh, PVC/Nylon sleeves, paints and all other miscellaneous materials shall be supplied by the Contractor].				
		a. Fixing and wiring of direction type route indicator - 1 way	Nos.	1539.75	4	6159.00
		b. Fixing and wiring of direction type route indicator - 2 way	Nos.	1824.00	4	7296.00
		c. Fixing and wiring of direction type route indicator - 3 way	Nos.	2108.25	2	4217.00
31	10_225	Fixing of Offset brackets using 'U' bolts and nuts,erection of Calling On Signals/ 'A' marker lights,termination of tail cables and wiring using wire PVC 3/0.75mm copper, provision of EWS lock, number plates/ marker boards and painting. The work also includes drilling suitable holes on the CLS post and provision of a through bolt with nut to prevent the Off- set bracket from slipping down.(Supply of Calling On Signal/ 'A' marker light, LED aspects/holders & bulbs and Off set brackets is not covered in this schedule). ['U' bolts and nuts, through bolts with nut, wire PVC 3/0.75mm copper, EWS lock, Enameled number plates, wire mesh, PVC/Nylon sleeves, paints and all other miscellaneous materials shall be supplied by the contractor].	Nos.	1427.25	8	11418.00
32	10_227	Excavation of pit in and around the existing signals very carefully without causing damage to the working cables and shifting the Signals along with the concrete foundations for approximately 1m to a nearby position so as to clear the infringement from the nearest track centre as instructed by KRIDE representative at site.The existing cable coils shall be released carefully so as to give access for shifting. Necessary masonry work and earth work shall be carried out in and around.the signals after shifting as instructed by KRIDE representative at site. [All materials required for the work shall be supplied by the Contractor].	Nos.	2591.25	5	12956.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
33	10_229	Manufacture and supply of Enameled Number plates as per drawing No.TY/08/2008 with fixing arrangements and fixing them on the existing Signals as per the instructions of KRIDE representative at site.[Enameled number plates with fixing arrangements with bolts and nuts shall be supplied by the Contractor].	Nos.	339.00	20	6780.00
34	10_230	Supply and provision of Screening arrangement for Signals in RE area as per standard practice. The work comprises of providing MS angle frame and wire mesh in order to avoid close proximity of OHE wires. The work also includes provision of earthing wire using 4 SWG GI wires from the screening arrangement up to surface base as per the instructions of KRIDE representative at site.[All materials required for this work shall be supplied by the Contractor].	Nos.	1016.60	10	10166.00
35	10_231	Provision of DC Single/ Double rail track circuit to suit RE/ Non-RE areas as per approved signaling plan using Plug-in type track relays. This work includes provision of double bonding, and parallel jumpers, provision of bond wire clips, provision of track lead connections using 2c X 2.5 sq.mm cable, provision of TLD boxes 2 Nos. at Relay end, 2 Nos. at Feed end and 2 No's for parallel jumpers as necessary to suit layouts, for each Track Circuit, and termination of jumpers and tail cables in track lead junction boxes, installation of relays, track feed battery chargers to charge up to 4 cells, track feed resistance, 'B' type choke' and secondary cells - 80 AH capacity in apparatus cases and wiring with wire PVC 3/0.75mm copper. The work also includes painting of track Circuit No. with Feed end/ Relay end details on the TLD boxes. The work also includes provision of insulations for gauge tie plates and nose crossing plates wherever required.(Provision of rail joint insulation is not covered in this schedule.) Supply of track feed battery charger, 'B' type choke, track relays, un-charged secondary cells (2V - 80AH), TLD boxes with stumps, 2cX2.5 sq.mm cable, is not covered in this schedule).[track feed resistance, Gauge tie plate and nose crossing plate insulations, PVC/Nylon bushes for TLD boxes, PVC sleeves, all types of fixing bolts and nuts with spring and flat washers, teakwood stand for fixing track feed resistance, GI bond wire 8 SWG, Channel bond pins, bond wire clips, paints and all other miscellaneous materials shall be supplied by the contractor. Secondary cells-80 AH capacity shall be charged by the contractor through reputed charging agencies].				
		a. Provision of track circuit in (point zone)	Nos.	4818.65	10	48187.00
		b. Provision of track circuit in (other than point zone)	Nos.	3862.40	10	38624.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
36	10_234	Provision of earth electrodes as per drawing No.SG/SN/02/13 and earthing of metallic sheath and armour of all cables in all apparatus cases, relay room, equipment room, SM's room for block and control, and earthing of all equipments in apparatus cases, power room, relay rack, cable termination rack, control panel, signals, lever frames with MS flat 35mm X 6mm/19c cable (MS flat for closer by areas and MS flat/19c cable combination for farther areas) as per the instructions of K-RIDE representative at site. The work includes painting of earth resistance value on the earth pit.(Supply of 19C cable is not covered in the scope of this schedule).[MS flat for earthing 35mm X 6mm, cement, GI earth electrodes, common salt, charcoal, country bricks,river sand, soldering materials and all other miscellaneous materials required for the work shall be supplied by the Contractor]	Nos.	1799.00	40	71960.00
37	10_236	Installation of combined type point machine - IRS type and connecting all ground connections including wiring and termination in point machine and interconnections between point machine and CT box through PVC hose pipe with 3/0.75mm and 7/1.40mm copper wire and painting. This work includes provision of insulation to stretcher bars, throw bar lug and "D" bracket wherever required, cutting of notches on the point machines covers to suit crank handle configuration.[All types of insulations connected to point work, coal bengal, all type of bolts and nuts, washers spring/flat wire PVC 7/1.4mm copper, PVC hope pipe, paints, PVC/nylon sleeves and all other miscellaneous materials required for the work shall be supplied by the Contractor].	Nos.	8856.15	32	283397.00
38	10_238	Supply of Colour light Signal pole 140mm dia, 4.6m/3.6m tall with necessary inspection as per specification/ drawing/ description enclosed in this document.				
		a. Supply of colour light Signal pole (4.6m)	Nos.	3318.00	15	49770.00
		b. Supply of colour light Signal pole (3.6m)	Nos.	2974.00	65	193310.00
39	10_239	Supply of surface base to suit CLS Signal pole 140mm dia with necessary inspection as per specification/ drawing/ description enclosed in this document.	Nos.	4118.00	80	329440.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
40	10_240	Supply of ladder with platform and shoes to suit CLS pole 4.6m/ 3.6m tall, with necessary inspection as per specification/ drawing/ description enclosed in this document.				
		a. Supply of ladder with platform and shoes for 4.6m CLS pole	Nos.	3203.00	15	48045.00
		b. Supply of ladder with platform and shoes for 3.6m CLS pole	Nos.	3089.00	65	200785.00
41	10_241	Supply of post type shunt signal - complete with hood etc., with necessary inspection as per specification/ drawing/ description enclosed in this document.	Nos.	2860.00	2	5720.00
42	10_242	Supply of Ground type shunt signal - complete with surface base, signal pole, hood etc., with necessary inspection as per specification/ drawing/ description enclosed in this document.	Nos.	4118.00	8	32944.00
43	10_243	Supply of Colour Light Signal Multi Unit type - complete for 4/ 3/ 2 aspect with mounting socket, with necessary inspection as per specification/ drawing/ description enclosed in this document.				
		a. Supply of colour light Signal unit - 4 aspect	Nos.	12584.00	4	50336.00
		b. Supply of colour light Signal unit - 3 aspect	Nos.	10296.00	34	350064.00
		c. Supply of colour light Signal unit - 2 aspect	Nos.	8580.00	42	360360.00
44	10_244	Supply of Junction type route indicator – 5 unit arm –1/ 2/ 3/ 4/ 5/ 6 way with mounting sockets, with necessary inspection as per specification/ drawing/ description enclosed in this document.				
		a. Supply of Junction type route indicator - 1 way	Nos.	10868.00	4	43472.00
		b. Supply of Junction type route indicator - 2 way	Nos.	14300.00	4	57200.00
		c. Supply of Junction type route indicator - 3 way	Nos.	17732.00	2	35464.00
45	10_245	Supply of Calling On Signal / 'A' marker light -complete with necessary inspection as per specification/ drawing/ description enclosed in this document.				
		a. Supply of Calling On Signal	Nos.	2059.00	8	16472.00
46	10_246	Supply of Off-set brackets - large/ small made of cast iron with necessary inspection as per specification/ drawing/ description enclosed in this document.				
		a. Supply of Off-set bracket (large)	Nos.	2059.00	8	16472.00
		b. Supply of Off-set bracket (small)	Nos.	1487.00	8	11896.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
47	10_248	Supply of track lead junction box - FRP type with 4 terminals and stumps with necessary inspection as per specification/ drawing/ description enclosed in this document.	Nos.	1030.00	80	82400.00
48	10_249	Supply of PBT terminals 25mm/ 60mm centre and PBT Fuse blocks with necessary inspection as per specification/ drawing/ description enclosed in this document.				
		a. Supply of PBT terminal - 25mm centre	Nos.	44.00	18500	814000.00
		b. Supply of PBT terminal - 60mm centre	Nos.	60.00	2500	150000.00
49	10_250	Supply of Low maintenance secondary cells of the following capacities with necessary inspection as per specification/ drawing/ description enclosed in this document.				
		Supply of secondary cells-2V-80AH capacity	Nos.	2077.00	60	124620.00
50	10_251	Supply of apparatus cases (full/ half/ quarter size) to suit Southern Railway standard with necessary inspection as per specification/ drawing/ description enclosed in this document:				
		a. Supply of apparatus case - Full size	Nos.	12012.00	70	840840.00
		b. Supply of apparatus case - Half size	Nos.	8580.00	70	600600.00
51	10_252	Supply of electronic time delay units (120/60 sec.s) with plug boards, connectors and retaining clips with necessary inspection as per specification/ drawing/ description enclosed in this document.	Nos.	2213.00	14	30982.00
52	10_253	Supply of lamp proving relays for LED aspects with plug boards, connectors and retaining clips with necessary inspection as per specification/ drawing/ description enclosed in this document.	Nos.	3591.00	105	377055.00
53	10_254	Supply of QBCA1 - heavy duty contact relays with necessary inspection as per specification/ drawing/ description enclosed in this document.	Nos	4140.00	24	99360.00
54	10_255	Supply of QTA2 - track relays with plug boards,connectors and retaining clips with necessary inspection as per specification/ drawing/ description enclosed in this document.	Nos	2524.00	20	50480.00
55	10_256	Supply of QSPA1 type relays with plug boards,connectors and retaining clips with necessary inspection as per specification/ drawing/ description enclosed in this document.	Nos	3897.00	20	77940.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
56	10_257	Supply of Electric key transmitter - rotary type of required ward Nos. with keys, with necessary inspection as per specification/ drawing/ description enclosed in this document.	Nos	4279.00	25	106975.00
57	10_259	Supply of 'A' type foundation made of cast iron as per Drg No.CWM.00902, and as per specification/ drawing/ description enclosed in this document, with necessary inspection.	Nos	5491	20	109820.00
58	10_261	Supply of 'B' type choke as per description enclosed in this document.	specification/ Nos.	2076.00	20	41520.00
59	10_314	Installation of charged secondary cells of the following capacities in apparatus cases, connecting them with strips, wiring with wire PVC 3/0.75mm copper and termination. This work also includes charging of cells through reputed agencies. The details of the batteries shall be written on the inside of the doors of the apparatus cases. (Supply of secondary cells is not included in this schedule). [Wire PVC 3/0.75mm copper, connecting strips, paint and all other miscellaneous materials required for the work shall be supplied by the Contractor].				
		Installation of 2V-40/80AH cell in apparatus case	per cell	265.72	60	15943.00
60	10_335	Supply and installation of 4 wire DTMF based way station equipment complete as per RDSO specification No.IRS.TC-60/93 and 4 wire control telephone with audio visual indication and reset button fitted on telephone conforming to specification No.IRS-TC-38/97 or latest. This work also includes supply and wiring of power supply arrangements for way station equipment conforming to specification IRS.TC.72/97. or latest [All the materials required for the work shall be supplied by the Contractor].	Set	8215.00	3	24645.00
61	10_336	Supply and provision of Rubber mat of not less than 6mm thick and with an insulation to withstand 650VAC, on the floor of relay room etc at places as indicated by KRIDE representative at site.	sft	78.30	150	11745.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
62	10_337	Provision of signaling arrangement during Non-Interlocked working of Signals and Points, such as erection and wiring of temporary relay racks and wiring of relays, SM's slide instruments, wiring alterations in the cable termination rack, apparatus cases, signals, Control panel etc, as per the instructions of KRIDE representative at site.(Supply of relay rack, relays, and SM slide instrument is not included in this schedule).[All other miscellaneous materials required for the work shall be supplied by the Contractor].	per	18178.95	3	54537.00
63	10_338	Provision of PA system and Magneto telephone communication at stations/ tents as per the instructions of KRIDE representative at site. The PA system and magneto telephones will be returned to the contractor after the completion of NI working. Signalling cables available may be used for the communication.(Hiring of PA system equipments and magneto telephones shall be done by the Contractor) [All other miscellaneous materials required for the work shall be supplied by the Contractor].	per Tent per day	885.00	15	13275.00
64	10_405	Interlocking of level crossing gate with Lifting Barrier: This work consists cutting of notches on the drum of the winch, , fixing and levelling of trestles, rod roller assembly, levelling and concreting of 'A' type foundations, fixing of rod diversion cranks, vertical cranks, running of rods (app. 30mtrs.) and connecting them to lever tail at one end and boom locking arrangement at the other end, and painting as per standard practice. The work also includes fixing of wiring of one limit switch for each boom as per the instructions of KRIDE representative at site.(Supply of HP locks, rods, 'A' type foundations, trestles, segments, rod roller assembly complete and cranks is not covered in this schedule).[Cement, river sand, stone jelly of size 20/25mm dia, coal bengal, paints, all types of bolts & nuts and all other miscellaneous materials shall be supplied by the Contractor].	Nos.	12370.05	7	86590.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
65	10_406	Casting concrete foundation of size 900mmX900mmX900mm for pedestal, 400mmX400mmX600mm for meeting post, fixing of lifting barrier boom, contact makers, termination of cables, wiring and painting as per the instructions of KRIDE representative at site. (Supply of pedestals, meeting posts, contact maker, electric lifting barriers, rail posts, cranks and 'A' type foundation is not covered in this schedule).[Concreting materials, bolts and nuts, wire PVC 3/0.75mm copper and all other miscellaneous materials required for the work shall be supplied by the Contractor].	per boom	11003.25	14	154046.00
66	10_407	Provision of boom locking arrangement for both the lifting barrier which involves running of about 30m to 50m of rodding with a spacing of 2m interval between trestles with rod roller segments, fixing of about 8 Nos. of cranks on 'A' type foundation/ MS plates and concreting of 'A' bases to a size of 1mX0.6mX0.5m as instructed by KRIDE representative at site. Solid joints/ insulated joints shall be provided wherever required. The work also includes running of rods by track crossings/ road crossings wherever required.(Supply of MS rods, cranks, trestles', segments, rollers etc., is not covered in this schedule).[All other materials required for the work shall be supplied by the Contractor].	per LC	6552.65	7	45869.00
67	10_408	Fixing and wiring of Two Nos. of Electronic Gate Warning equipment for each level crossing gate, one on each road warning signal, amplifier in the apparatus case with wire PVC 3/0.75mm and 16/0.2mm copper, and painting. (Electronic Gate Warning Equipment and amplifier will be supplied by KRIDEs).[All wiring, fixing and painting materials shall be supplied by Contractor].	Set.	2427.75	7	16994.00
68	10_412	Supply and installation of teakwood glass fronted box of size 300mm x 600mm x 75mm with hooks to keep various keys with description engraved on the tags.[TW Glass fronted box of size 300mmx600mmx 75mm with built in lock, hooks, engraved tags and all other miscellaneous materials required for the work shall be supplied by the Contractor].	Nos.	4057.00	6	24342.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
69	10_414	Fixing of EKT instrument with (or) without crank handle or on suitable fixtures at station/apparatus case, provision of economiser push switch with locking facility, wiring with wire PVC 16/0.2mm copper, provision of teakwood terminal box covered with decolum along with locking facility and painting.(Supply of electric key transmitter and crank handles is not covered in this schedule).[wire PVC 16/0.2mm copper, wire wound resistance, decolum covered terminal box with locking facility by using 25mm thick teakwood, bolts and nuts, paints,push switches, padlocks and other miscellaneous materials required for this work shall be supplied by the contractor].	Nos.	2943.75	25	73594.00
70	10_415	Casting concrete foundation and erection and painting of boards with 'LEGEND' such as "Draw close if signal is at on" at the required places as per the Signalling plan. The work involves concreting of rail post to a size of 600mm x 600mm x 900mm, and fixing the board to the rail using MS clamps, bolts and nuts.(Supply of boards is not covered in this schedule. [Stone jelly of size 20/25mm dia, river sand, cement,M.S.flats, fixing bolts and nuts, paint and all other miscellaneous materials required for the work shall be supplied by the Contractor].	Nos.	2159.00	6	12954.00
71	10_417	Supply and installation of magneto telephone handle type and supply and wiring of Ni-cad power pack 4V-2.2AH with charger to work on 110VAC, at the station house, LC Gate and top points.[Magneto telephone handle type with Ni-cad power pack 4V-2.2AH with charger to work on 110VAC, wire PVC 16/0.2mm copper, and all other miscellaneous materials shall be supplied by the Contractor.]	Nos.	6178.00	15	92670.00
72	10_426	Supply of 2 pin socket - 5A with switch, fixing the same on the hardwood plank available and extending the 110VAC using wire PVC 3/0.75mm copper, in all the apparatus cases, as per the instructions of K-RIDE representative at site. [2 pin socket - 5A with switch, wire PVC 3/0.75mm copper and all other miscellaneous materials required for the work shall be supplied by the Contractor].	Nos.	398.00	60	23880.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
73	10_427	Testing and commissioning the entire signalling installations jointly with the KRIDE representative at site at the stations/ LC gates covered under various schedules of the Contract, and ensuring that all the signalling gears are installed and adjusted as per the existing rules. The work also involves supply of required number of bound registers with good quality papers with all updated details of cable meggering, relays, batteries, block joints, route cancellation, relay room key entries, block instrument key, earth resistance etc., and handing over to KRIDEs.(Supply of 'As makes' is not covered in this schedule).				
		Testing and commissioning of LC gates	per LC	8128.50	7	56900.00
74	10_501	Releasing of existing relay racks/ cable termination racks along with all the terminals, fuse blocks, relays,with jacks, holding clips etc., 50 way boards,terminals, connecting wires, cables etc., carefully without causing any damage, accounting and stacking them neatly at a place as instructed by KRIDE representative at site. After releasing, the floor shall be levelled and cement plastered.	Per rack	1068.75	24	25650.00
75	10_502	Releasing of existing Route Indicators of different types including tail cables, carefully without causing any damage, accounting and stacking them neatly at a place as instructed by KRIDE representative at site.	Nos.	833.25	6	5000.00
76	10_503	Breaking of concrete and releasing of STOP board/Warning board/ LEGEND boards along with rails, accounting and stacking them neatly at a place as instructed by KRIDE representative at site. Also the resultant pits shall be re-surfaced and consolidating by ramming and levelling.	Nos.	854.25	6	5126.00
77	10_507	Releasing of existing apparatus cases (Full/ Half/Quarter size) without damage after releasing the shelf planks, Terminal blocks, Fuse Blocks, Terminal Boards, Relays of all types EKTs, Secondary Cells, power equipments, 'E' type locks, etc., and breaking the concrete foundation. After releasing, the resultant pits are to be closed and consolidated by ramming and levelling. The released materials shall be accounted and stacked at a place as instructed by KRIDE representative at site.	Nos.	1625.25	100	162525.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
78	10_508	Breaking of concrete and releasing the existing cable termination boxes, after releasing the base plank, Terminal blocks, Fuse Blocks, Terminal Boards, cut rails, pipes, etc., closing the resultant pits and consolidating it by ramming and levelling. The released materials shall be accounted and stacked neatly at a place as instructed by KRIDE representative at site.	Nos.	1083.75	20	21675.00
79	10_509	Releasing of existing SM's control panel including base plank, and other gadgets connected very carefully without causing any damage to the panel, accounting and stacking them neatly at a place as instructed by KRIDE representative at site. The resultant pit in the flooring shall be removed of all cable bits, levelled and cement plastered.	Set	2841.75	3	8525.00
80	10_510	Dismantling and releasing of existing Colour light Signals complete (upto 4 aspects) with or without Route Indicators, calling on signals, shunt signals etc., carefully without any damage to the gadgets, accounting and stacking them neatly at a place as instructed by KRIDE representative at site. The work includes breaking the concrete foundation, closing the resultant pit and resurfacing it by ramming and levelling.	Nos.	1666.50	25	41663.00
81	10_511	Dismantling and releasing of existing Point machines (all types) including ground connections and other accessories available complete without any damage to the gadgets, accounting and stacking them neatly at a place as instructed by KRIDE representative at site.	Nos.	1458.75	12	17505.00
82	10_513	Releasing of Secondary cells and battery stands available in the battery room along with connecting strips, wires and terminal boxes carefully without causing any damage to the batteries, accounting and stacking them neatly at a place as instructed by KRIDE representative at site. After releasing any holes in the walls/ flooring shall be filled with cement mortar and plastered.	Set	2916.75	3	8750.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
83	10_514	Releasing of existing Block Instruments (all types),Block counters, batteries, block filter, block bell equipment etc., carefully without any damage,accounting and stacking them neatly at a place as instructed by KRIDE representative at site.	Nos.	958.50	6	5751.00
84	10_516	Releasing of all the S & T gadgets at LC gates like SM slide instruments, illuminated diagram board,block counter, termination box, telephones, emergency key box, etc and concerned wiring,accounting and stacking them neatly at a place as instructed by KRIDE representative at site. After releasing any holes on the walls/ floor are to be filled with cement mortar and plastered.	Set	5166.00	7	36162.00
85	10_517	Releasing of existing ground type shunt signals along with surface base, signal post etc carefully without any damage, accounting and stacking them neatly at a place as instructed by KRIDE representative at site. The work also includes breaking and removal of concrete foundation and refilling of the resultant pit by ramming and levelling.	Nos.	1187.25	2	2375.00
86	10_518	Releasing of existing TLD boxes with stumps and terminals after releasing all the bond wires. The released materials shall be accounted and stacked neatly at a place as instructed by KRIDE representative at site.	Nos.	86.10	100	8610.00
87	10_519	Releasing of all power equipments including equipment stands, terminal boards, power panel etc., in the power room carefully without causing any damage to the equipments after disconnecting all the supply wires. The released equipments shall be accounted and stacked at a place as instructed by KRIDE representative at site. After releasing any holes in the walls/ flooring shall be filled with cement mortar and plastered.	Set	6832.50	3	20498.00
88	10_520	Releasing of existing control equipments - complete including way station equipments, telephones, power supply for way station equipment and telephones, along with all wiring, accounting and stacking them neatly at a place as instructed by KRIDE representative at site.	Set.	3249.75	3	9749.00
89	10_521	Transportation of Signalling materials by road as per the instructions of K-RIDE representative at site. The work also includes loading and unloading of the materials.				

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
		Transportation more than 100 Kms.	per ton.KM	7.52	15000	112800.00
90	10_522	Engaging mechanical excavators like JCB or other machineries for regarding and levelling the formation, dismantling any infringing structures, clearing and removing debris etc., with all leads and lifts etc., complete and as per the instruction of KRIDE representative at site.	per hour	650.00	60	39000.00
Total for Schedule A (90 items)						16718235.00
Tenderer's / Contractor's Percentage (Above/Below/At par) in figure						
Tenderer's / Contractor's Percentage (Above / Below / At par) in Word						
Please Ensure there are no over writings. If there is any discrepancy in figures and words , then word will be taken for consideration.						

**Seal & Signature of the Bidder**

<b>NAME OF WORK</b> : Signalling Outdoor works at Baiyappanahalli A panel, Bellandur and Heelalige with MSDAC, Integrated power Supply and interlocking of LC Gates in connection with doubling of BAIYAPPANAHALLI-HOSUR section of Bangalore Division						
<b>SCHEDULE "B"</b>						
SL.NO		DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
1	1a	Non-Deteriorating type of fuse holders and fuse links of following rating. (a) Fuse Holder 20A capacity. IRS Spec.S.75/91 (IRS-S78/Tentative) or latest.	NOS	158.33	1000	158330.00
	1b	Non-Deteriorating type of fuse holders and fuse links of following rating. (b) Fuse Link 20 Amps IRS Spec.S.78/92 or latest.	NOS	22.57	150	3386.00
	1c	Non-Deteriorating type of fuse holders and fuse links of following rating. (c) Fuse Link 10 Amps IRS Spec.S.78/92 or latest.	NOS	20.75	250	5188.00
	1d	Non-Deteriorating type of fuse holders and fuse links of following rating. (c) Fuse Link 2 Amps IRS Spec.S.78/92 or latest	NOS	17.67	600	10602.00
2		Relay Rack universal type as per Drg.No.SK/SC/CN/51/94 with MS Frame of suit 'Q' series relays scaffolding, POWER COATED with stainless steel nuts and bolts for fixing the racks and cable ladder made out of MS angle 65mm x 65mm x 6mm for fixing the rack. Supporting angles, frame mounting triangle base with J bolts and insulation of required number complete to suit QNI/K-50 prewired tag block. (a) 1 Way.	NOS	5294.00	7	37058.00

SL.NO	DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
3	Cable termination racks size 880mm x 2 meters made out of 50mm x 50mm x 6mm thick MS angle Power Coated with stainless steel nuts and bolts for fixing the racks with suitable holes for hylem sheet complete as per standard practice with tripod bases and reel insulators. Cable ladder of 400mm x 2000mm be provided at both sides with angle size 40mm x 4mm x 5mm with supporting flate of size 25mm x 5mm (for K rack and P rack).	NOS	5308.00	12	63696.00
4	Basic material to construct Unit Maintenance Free Earth as per RDSO Spec. No.RDSO/SPN/197/2008 and as per schedule specification.	SET	17767.86	30	533036.00
5	Basic material to construct Unit Maintenance Free Ring Earth with Four Pits for achieving less than one Ohm as per RDSO Spec.No.RDSO/SPN/197/2008 or latest and as per Specification.	SET	60000.00	14	840000.00
6	35 sq mm Multi strand single Core PVC insulated copper cable as per IS:694 for connecting main earth electrode to MEEB in the equipment room in duplicate.	Mtrs.	348.00	500	174000.00
7	PVC wire coils of size 10 sq mm multi strand (Green -100%) each coil of 100 mtrs. length as per IRS Spec. 76/89. Amdt 3 or latest.	NOS	9750.00	4	39000.00
8	Steel Alamairah (Mode: Godrej Store well/slimline 4S).	NOS	17720.00	3	53160.00
9	Navtal locks Godrej make 75mm with 2 Keys.	NOS	500.00	6	3000.00
10	Track Feed Battery charger as per RDSO Spec. IRS:S-89-2013 ver. 1.0 or latest.	NOS	4820.00	20	96400.00
11	Flex printing with sun board fixing of various drawing with colour (power board diag, relay index chart, station rule diagram, battery history, DG set history etc.,).	SFT	350.00	300	105000.00

SL.NO	DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
12	Printed and bounded registers including maintenance registers for SSDAC, point machine, track circuit etc., (100 Pages each of 75 gms paper).	NOS	170.00	200	34000.00
13	Earth Leakage detector 12 channel (110V DC, 24V DC, 12V DC, etc.,) as per RDSO Spec. No.256/2002 or latest with 6 digital counter.	NOS	102400.00	3	307200.00
14	10 pair CT box with Wago terminals of Phonix make or similar.	NOS	2100.00	10	21000.00
15	20 pair CT box with Wago terminals of Phonix make or similar.	NOS	3233.33	10	32333.00
16	Step ladder aluminum made of BATHLA make App.5 feet height.	NOS	7115.00	3	21345.00
17	Supply of permanently solid lubricated HDPE Telecom pipe of size 40/33mm as per Spec. TEC. GR No.G/CDS-08/01 Dec.99 or latest.	KM	69500.00	10	695000.00
18	Supply of joint kit conforming to RDSO Spec. No.IRS-TC 77/2006 Revision or latest for quad cable.	NOS	3034.50	40	121380.00
19	Supply of RFID Electronic marker for S&T underground cables with programmable memory for saving the user specific data inside the RFID Electronic marker locator during locating (10 CM diameter with floating coil to keep detection circuit always horizontal for better detection) which can be barrier up to a depth of 5 ft.	NOS	2688.00	200	537600.00
20	Supply of soil lubricated HDPE/PVC duct (pipe) of dia 110mm, thickness 6mm with end plug sealing arrangement as per Spec. No.IS 4983.	Mtrs.	526.40	3000	1579200.00

SL.NO		DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
21		Preparation of station working rules, CRS papers etc as practice in Railways for yards/LC Gate/IBH	Per applicati on	15688.00	10	156880.00
Total for Schedule B (21 items)						5627794.00
Tenderer's / Contractor's Percentage (Above/Below/At par) in figure						
Tenderer's / Contractor's Percentage (Above / Below / At par) in Word						
Please Ensure there are no over writings. If there is any discrepancy in figures and words , then word will be taken for consideration.						

**Seal & Signature of the Bidder**

**NAME OF WORK :** Signalling Outdoor works at Baiyappanahalli A panel, Bellandur and Heelalige with MSDAC, Integrated power Supply and interlocking of LC Gates in connection with doubling of BAIYAPPANAHALLI-HOSUR section of Bangalore Division

**SCHEDULE "C"**

SL.NO		DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
1	1a	Erection of relay rack with scaffolding suitably concreting tri-pod bases and reel insulators with 'J' bolts and nuts. Tripod and other supporting are to be painted in 2 coats with enamel. (a) One Way.	NOS	325.00	7	2275.00
	1b	Erection of relay rack with scaffolding suitably concreting tri-pod bases and reel insulators with 'J' bolts and nuts. Tripod and other supporting are to be painted in 2 coats with enamel. (a) CT Rack.	NOS	3000.00	10	30000.00
2		Fixing relay bases on relay frames erected in the relay room wiring of all types of relays by drawing various sizes of wires/multi core cable, fixing of condensers, resistance, 6 way/1 way terminals, ND type fuses, LED indications with push button type switch etc., and wiring duly slandering the same as per the approved circuit diagram, testing point to point before soldering and after soldering, bunching and lacing as per technical specification. This work includes wiring of contacts for data logger and terminating them in the tag block.	1PER RELAY	166.50	100	16650.00
3		Provision of 2 machine cut grooves in parallel to a separation of 8 cms each to depth of 150mm in the platform surfaced/tiled floor for laying cable.	MTR	461.25	80	36900.00
4		Installation of single earth pit as per RDSO specification No.RDSO/SPN/197/2008 or latest and as per technical specification.	SET	8442.86	30	253286.00

SCHEDULE "C"						
SL.NO	DESCRIPTION OF ITEMS		UNIT	RATE	QUANTITY	AMOUNT
5		Installation of Ring Earth Pit as per RDSO specification No.RDSO/SPN/197/2008 or latest and as per technical specification.	SET	30000.00	14	420000.00
6	6a	Generator, foundation and installation. Excavation of pit, casting concrete foundations as per Drg. No.SG/Proj/SK/DG/01/08 for installation of DG set as per the direction of KRIDE Engineer.	NOS	11550.00	3	34650.00
	6b	Generator, foundation and installation. 1st service of the DG set (2 Nos) as per the manufacture's instruction.	LS	1713.00	3	5139.00
7		Digging of cable trench to a depth of not less than 30cm in rocky terrain, concreting the trench with 150mm thick concrete in the ratio 1:2:4 and after proper curing ,back filling with excavated soil.	RMT	157.75	1000	157750.00
8		Strengthening of foundation of signals, Full/Half location boxes, by carrying out the earth work around the foundation, ramming of the earth, carrying out masonry work from bottom of earth work using country stones and cement masonry to prevent the earth from slipping down the bank.	NOS	3175.00	135	428625.00

SCHEDULE "C"						
SL.NO	DESCRIPTION OF ITEMS		UNIT	RATE	QUANTITY	AMOUNT
9	Excavation of pit, erection of cable termination boxes on angle and concreting as per Drg. No.SG/CN/02/8, drilling of suitable holes in the box, fixing of 2 Nos. of GI pipes 32mm dia and 300mm long at the bottom with clamp nuts - 12 mm thick, one at the inner side and another at the outer side for each pipe for cable throughing and one GI pipe 150mm long 32mm dia for drawal of jumper wires for Point machines etc., fixing of hardwood plank 37mm thick on the bottom, provision of one EWS lock, and painting the boxes inside and outside with one coat of red-oxide and two coats of aluminum paints.CT. boxes, [Cement, river sand, stone jelly of size 20/25mm, paint, varnish , GI Pipes 32mm dia - 300mm long - 2 Nos and 150mm long - 1 No., clamp nuts - 12mm thick - 2 Nos. for each pipe, fixing bolts and nuts with washers, EWS locks, paints and all other miscellaneous materials shall be supplied by the Contractor].		NOS	3625.00	40	145000.00
10	Installation, testing and commissioning of earth leakage detector 12 channel.		NOS	27067.00	3	81201.00
11	Fixing of 10 pair CT box with wago terminals of phnonix make or batter and termination of cable at the station/ LC gates etc., This includes fixing of quad/PIJF cables and CT box on the wall.		NOS	1833.33	3	5500.00
12	Fixing of 20 pair CT box with wago terminals of phnonix make or batter and termination of cable at the station/ LC gates etc., This includes fixing of quad/PIJF cables and CT box on the wall.		NOS	2100.00	3	6300.00
13	Releasing of Diesel Generators in the existing room along with all other gadgets without causing any damages.		NOS	5333.33	4	21333.00

SCHEDULE "C"						
SL.NO		DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
14		Provision of normal joint of Heat Shrinkable type complete for 6 quad cable. After the jointing the through cable has to be tested for insulation resistance and loop resistance in presents of KRIDE Engineer and in case of any defects the jointing has to be re-done free of cost by the contractor.[Heat Shrinkable jointing kit conforming to RDSO specification No.IRS-TC 77/2006 covered in the supply portion has to be used for this purpose. The Contractor should supply all other small items free of cost which are required for making a joint.Only gas blower to be used for blowing].	NOS	2433.14	50	121657.00
Total for Schedule C (14 items)						1766266.00
Tenderer's / Contractor's Percentage (Above/Below/At par) in figure						
Tenderer's / Contractor's Percentage (Above / Below / At par) in Word						
Please Ensure there are no over writings. If there is any discrepancy in figures and words , then word will be taken for consideration.						

**Seal & Signature of the Bidder**

<b>NAME OF WORK</b> : Signalling Outdoor works at Baiyappanahalli A panel, Bellandur and Heelalige with MSDAC, Integrated power Supply and interlocking of LC Gates in connection with doubling of BAIYAPPANAHALLI-HOSUR section of Bangalore Division					
<b>SCHEDULE "D"</b>					
<b>SL.NO</b>	<b>DESCRIPTION OF ITEMS</b>	<b>UNIT</b>	<b>RATE</b>	<b>QUANTITY</b>	<b>AMOUNT</b>
1	Supply and fixing of retro reflective type CALLING ON/STOP/BSLB/Un-insulated trolley phohibited board as per practice & SEM.	NOS	4853.67	20	97073.00
2	Supply and fixing of Crank Handle box/emergency key box made of teak wood with glass fronted door as per drawing 03/91. Polishing on all exposed surface and for with EKT inside the box. Micro push switch of L&T make with 2NO+2NC contacts and veeder counter non reset type and wire them as per the approved circuit diagram. Clamp and terminate the cable in the cable termination box in ASM office and in the Relay room. Bunching and lacing with lacing thread ad interlock the EKT key with Crank handle by nickle coated dog chain/welded. The box should have hinges and pad locking arrangements with one No.40mm Navtal lock duplicate keys and key chain with label. (All materials except EKT are to be supplied by the contractor).	NOS	4640.00	10	46400.00
3	Fabrication and fixing of MS frames to suit Q series relays to accommodate 6 nos in each set duly drilling required holes for relay bases (all materials such as frames, bolts, nut and washers to be supplied by contractor)	NOS	305.00	50	15250.00

SCHEDULE "D"					
SL.N O	DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
4	Supply and provision of power supply change over arrangement at SM room. CLS panel of size 800 x 500 x 275mm powder coated of MS sheet thickness 1.6mm as per RDSO specification No. TI/SPC/PSI/CLC/0020.	NOS	45730.00	3	137190.00
5	Supply and fixing of PVC casing and capping/PVC pipe of minimum 25 mm size of higher as per requirement at site on the wall/floor etc., using bends, coupler and T joints and flexible pipe wherever necessary with fixture in the OFC room from equipment rack to common termination and from OFC room to SM room/reservation office/data logger/FOIS room etc., (All required materials for fixing to be arranged by the contractor).	MTR	41.68	100	4168.00
6	Preparation of Cable Route Plan, Cable Core Plan, Cable Termination Rack Particulars, Location Box Particulars, Power Supply Diagram, Track Circuit Bonding Diagram and/or any other drawing on AutoCAD in A2/A3/ A4, etc. size (as per instructions of Engineer in-charge). Initially Contractor shall submit 2 sets of 'AS PLANNED' documents complete for approval of KRIDE/Railways. One set is returned either duly approved for making a fair copy or for re-submission for approval after incorporating the changes as required by KRIDE/railways. After preliminary approval, execution of work shall be carried out at site. After Completion of work, 2 sets of 'AS MADE' Check Prints are submitted for Administrative approval. KRIDE/Railways will return one set to the contractor duly approved with alterations/corrections if any. The contractor shall incorporate KRIDE/Railways alterations/corrections in the tracings without any deviation and submit all tracings complete in all respect along with its soft copies in USB Pen Drive and 6 sets of final completion drawings in properly bound booklets. [For Centralized Electronic Interlocking Stations/Small Stations]	Station	98035.00	3	294105.00

SCHEDULE "D"					
SL.NO	DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
7	Termination of main, tail, signalling and power cables and internal wiring on terminal/fuse block in cable termination rack at relay room. The work includes fixing of all new cables by teak wood clamp on teak wood base plank, fixing of phynolic synthetic industrial fibre base fine weave cotton fibre board 6mm thick for terminal board, varnishing all teak wood items, fixing of terminals/fuse blocks on the terminal board, drilling of necessary holes, termination of cables wiring identification of cables using aluminum tags with letters punched neatly as per approved circuit diagram and cable plan, painting of particulars on sleeves, After terminations are over cable entry at the bottom shall be closed with, cement plastered the inter space filled with river sand up to base level and the bottom surface shall be sealed with sealing compound. Cable armour to be soldered to earth. (Supply of cable termination racks is not included in this schedule).[All bolts and nuts with washers cement sand stone jelly teak wood base, paints and all other miscellaneous materials required for the work shall be supplied by contractor).(a) Termination o 25/60mm PBT terminals	PER TERMIN	112.80	10000	1128000.00
8	Supply installation testing and commissioning of copper plate earthing system complete with provision of (i) Copper plate 300 x 300 x 3mm, (ii) Earth pit 8 to 10 ft. depth filled up with charcoal 10 Kgs and salt 25 Kgs in layers, (iii) Water funnel on GI pipe of length 8 ft., (iv) Cast iron top plate 12 inch x 12 inch, (v) Drawing of copper - earth from earth t location with 25mm x 3mm copper strip for termination (All miscellaneous materials to be supplied by the contractor).	NOS	15702.30	70	1099161.00
9	Supply and installation of Pre-wired Crank Handle Cum Key Lock Relay Box (or MS Sheet) along with LEDs, with approved type push buttons, Wago or similar Disconnecting type Terminal Blocks including DIN rail etc., as per tentative drawing enclosed. Installation, fixing and wiring of boxes for Key Lock Relays to be carried with Contractor's wiring and fixing material. The work shall be carried as per the instructions of site engineer.	nos	34673.00	3	104019.00

SCHEDULE "D"					
SL.N O	DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
10	Supply installation testing wiring and commissioning of complete Integrated power supply systems(SMPS based) with battery set 300AH, hydrometer suitable for EI/PI/RRRI and including charging of batteries, supply of battery wires, fabrication and fixing of fuses/terminations on power distribution panel.	set	1126900.00	3	3380700.00
11	Supply installation testing wiring and commissioning of complete Integrated power supply systems(SMPS based) with battery set 200AH, hydrometer suitable for suitable for midsection LC gate/IBH/auto huts and including charging of batteries, supply of battery wires, fabrication and fixing of fuses/terminations on power distribution panel.	set	899160.00	7	6294120.00
12	Track Crossing by Horizontal boring method based on the RDSO report No.BS-105. This also includes insertion of HDPE duct (pipe)_ of 110mm dia in the bore drilled. (Supply of HDPE duct (pipe) is not included).	MTR	1774.58	3000	5323740.00
13	Supply and installation of De-ioniser plant (Aqua-Ion Model No. ACAMB 4 Bed Type).	NOS	43374.00	1	43374.00
Total for Schedule D (13 items)					17967300.00
Tenderer's / Contractor's Percentage (Above/Below/At par) in figure					
Tenderer's / Contractor's Percentage (Above / Below / At par) in Word					
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Seal & Signature of the Bidder

<b>NAME OF WORK</b> : Signalling Outdoor works at Baiyappanahalli A panel, Bellandur and Heelalige with MSDAC, Integrated power Supply and interlocking of LC Gates in connection with doubling of BAIYAPPANAHALLI-HOSUR section of Bangalore Division					
<b>SCHEDULE "H"</b>					
<b>SL.NO</b>	<b>DESCRIPTION OF ITEMS</b>	<b>UNIT</b>	<b>RATE</b>	<b>QUANTITY</b>	<b>AMOUNT</b>
1	Supply of Adjustable Track Feed Resistance, Disc type, 30 Ohm, with phenolic moulded base, as per Drg.No.SA-20166/M(Adv.) or latest	NOS	295.00	20	5900.00
2	Supply of 20 pair Krone box with modules and mount assembly wall mounting type powder coated with surge and lighting arrester and locking facility.	NOS	1545.00	3	4635.00
3	Supply of Telecom termination panel with WAGO type disconnecting terminals blocks of size 1500mm x 500mm x 200mm thickness 1.6mm (16 SWG) 150 numbers of disconnecting terminal block with accessories. (The box should be divided in to two compartments 500mm from TOP with door arrangements including locking and bottom 1000mm closed fully with screws WAGO terminals 280-870 suitable for cable dimensions maximum of 2.5 sq mm. Provision of easy and ensuring aesthetics.	NOS	38000.00	3	114000.00
4	Installation of 100/50/20 pair Krone box duly fixing the same on wall as directed by KRIDE representative.	NOS	550.00	3	1650.00
5	Fixing of Telecom Termination Panel and termination of cables on WAGO/KRONE connectors as per the instructions of the site Engineer.	NOS	4500.00	3	13500.00
6	Supply and Laying of PVC Warning Tape colour Orange, width of 250mm (10") by printing with black letters 'Indian Railway Signal/Telecom/OFC Cable' on both sides	km	42600.00	20	852000.00

SL.NO	DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
7	Supply and installation of wire insulator for wire operating level crossing, lifting barriers/ signals as per specification No.IRS: 541-74 flnsnection:	NOS	2918.00	42	122556.00
8	Supply and installation of insulator of point rodding at function end and lever end and lever end as per instruction of site engineer.	NOS	2624.00	15	39360.00
9	Supply of single phase air cooled silent DG set (CPCB compliant) of 10KVA	NOS	267300.00	3	801900.00
10	Supply and Placing of Polyolefin Cable channel of size, Width 240/340 mm, Height 155/230 internal/external, length 1 m produced of polyolefin with Fire protection class k-1 in accordance with DIN-53438 Part II for laying Signalling/Telecom cables, channel attachable to each other with malefemale swallow tail connectors and having suitable detachable cover	MTR	2521.00	6000	15126000.00
11	Excavation of cable trench in hard rocky areas/hard soil including clearing of roots of trees, rocks, bushes etc., to a depth of 0.6 mtrs., and to a width of 0.5 mtrs., and refilling of cable trench 0.6m depth by 0.5m with throughout, with earth after laying of cables, and consolidation the trench by ramming and leveling. Laying of cables is not included in this schedule.	MTR	80.00	500	40000.00
12	Supply and laying of Split DWC pipe of 120/103 mm dia, 2 meter long in already dug cable trenches. The unit of RMT means two split pipes of 1 Mtr each. Material shall be supplied as per specification RDSO/SPN/204/2011 or latest" {Per Unit-RMT}	per unit	284.00	16000	4544000.00

SL.N O	DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
13	Laying of PLB HDPE Duct, 40/33 mm Dia, in the trenches and in the protective works already provided including in HDD portion and supply pulling of Nylon rope through it at different places as per direction of engineering charge or site engineer.	km	10360.00	14	145040.00
14	Duct Integrity test for PLB HDPE Duct, 40/33 mm Dia, as per specification	km	1287.00	14	18018.00
15	Supply and Provision of Mid-Section OFC Joint including Splicing (24 Fibre) inside already prepared jointing pit. This does not include provision of Joint chamber, top plate and back filling. The joint Enclosure shall be as recommended in the Technical specification.	Nos.	10302.00	15	154530.00
16	Blowing of OFC cable(24F as per RDSO specn.TC 55-2006 Rev.1 with amendment 1.1) in already laid PLB HDPE Duct, 40/33mm Dia, by using Blowing machine, providing the sufficient loops in loop/joint chambers and other associated works.	KM	14793.00	14	207102.00
17	Supply Installation testing and commissioning of Multi section Digital Axle counter (MSDAC) as per RDSO specification no.RDSO/SPN/176/2013 version.3 with latest amendments. a) The tenderer shall design the scheme for provision of required number of Evaluator, track side junction Box, detection points etc. b) MSDAC application in the yard will be in place of track circuits with single detection and dual detection for Block working with SSBPAC (c) length of cable required for each track devised-5/10/15 mtrs.	per DP	530000.00	70	37100000.00
18	Supply of essential 10% spare for MSDAC. Detailed cost and quantity wise break up of spares should be given.	Set	1163000.00	2	2326000.00
19	Design of axle counter circuit, indoor installation, testing and commissioning of Multi section digital,axle counter	per Stn	135000.00	3	405000.00

SL.N O	DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
20	Outdoor equipment installation, testing and commissioning of Multi section digital,axle counter	Per DP	15000.00	70	1050000.00
21	Tool set for wheel sensor mounting and maintenance of MSDAC consisting of torque wrinch, ratchet, testing plate, measuring tape, scew driver, hand gloves & multi meter fluke115	Nos	105000.00	2	210000.00
Total for Schedule H (21 items)					63281191.00
Tenderer's / Contractor's Percentage (Above/Below/At par) in figure					
Tenderer's / Contractor's Percentage (Above / Below / At par) in Word					
Please Ensure there are no over writings. If there is any discrepency in figures and words , then word will be taken for consideration.					

**Seal & Signature of the Bidder**

**NAME OF WORK :** Signalling Outdoor works at Baiyappanahalli A panel, Bellandur and Heelalige with MSDAC, Integrated power Supply and interlocking of LC Gates in connection with doubling of BAIYAPPANAHALLI-HOSUR section of Bangalore Division

**SCHEDULE "J"**

SL.NO	DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
1	Supply of Outdoor signaling cable - 2 core X 2.5 sq.mm. in drum length of 1 km	Mtrs	77.60	4000	310400.00
2	Supply of Outdoor signaling cable - 12 core X 1.5 sq.mm. in drum length of 1 km	Mtrs	162.00	17000	2754000.00
3	Supply of Outdoor signaling cable 30 core x 1.5 sq.mm in drum length of 500Mtr	Mtrs	360.00	11000	3960000.00
4	Supply of Outdoor signaling cable 24 core x 1.5 sq.mm in drum length of 500Mtr	Mtrs	280.00	11000	3080000.00
5	Supply of Outdoor signaling cable - 19 core X 1.5 sq.mm. in drum length of 500Mtr	Mtrs	233.00	18000	4194000.00
6	Supply of Aluminium Conductor Power cable 2 Core X 25 sq.mm.	Mtrs	77.00	24000	1848000.00
7	Supply of Aluminium Conductor Power cable 2 Core X 35 sq.mm.	Mtrs	99.90	8000	799200.00
8	Supply of Underground Jelly filled 0.9mm die , 6 Quad cable	Mtrs	213.00	30000	6390000.00
9	Supply Tele cable 10 pair 0.63mm PIJF	Mtrs	68.64	1500	102960.00
10	Supply of 24 fibre armoured Optic Fibre Cable	Mtrs	66.00	14000	924000.00
11	Supply of LED Signal Unit for RED aspect integrated type	Nos	8452.00	50	422600.00
12	Supply of LED Signal Unit for YELLOW aspect integrated type	Nos	8452.00	65	549380.00

SCHEDULE "J"					
SL.NO	DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
13	Supply of LED Signal Unit for GREEN aspect integrated type	Nos	9380.00	60	562800.00
14	Supply of calling on LED 110V AC	Nos	6699.00	10	66990.00
15	Supply of Junction type route indicator LED 110VAC	Nos	5880.00	45	264600.00
16	Supply of shunt signal LED 110V AC	Nos	5880.00	30	176400.00
17	Electrical point operating machine IRS Type 220 mm throw with lock & detector slides cable termination box and clamp lock arrangement with ground connection for thick web switches	Nos	172369.00	22	3792118.00
18	Electrical point operating machine IRS Type 143 mm throw with lock & detector slides cable termination box and clamp lock arrangement with ground connection	Nos	58465.00	14	818510.00
19	Supply of Relay QN1 8F/8B configuration	Nos	4200.00	405	1701000.00
20	Supply of key lock Check relay	nos	11210.00	16	179360.00
21	Supply of Relay QNA1 8F/8B configuration	Nos	4170.00	405	1688850.00
22	E-Type lock	nos	907.00	42	38094.00
23	Supply of Data Logger - Remote Terminal Unit in 64 digital and 16 analog inputs	nos	261219.00	7	1828533.00
Total for Schedule J (23 items)					36451795.00
Tenderer's / Contractor's Percentage (Above/Below/At par) in figure					
Tenderer's / Contractor's Percentage (Above / Below / At par) in Word					
Please Ensure there are no over writings. If there is any discrepancy in figures and words , then word will be taken for consideration.					

Seal & Signature of the Bidder

**Name of Work** : - Signaling outdoor works at Yesvantpur bye pass, Lottegolahalli, Hebbal and Banaswadi with MSDAC, Integrated power supply and interlocking of LC Gates in connection with doubling of YESVANTPUR-BAIYAPPANAHALLI section of Bangalore Division

**SCHEDULE "K" - Item of miscellaneous works**

SI No.	Description of Item	Unit	Qty	Rate	Amount
1	a. Providing Toyota Innova Crysta / Toyota Corolla Altis / Honda Civic or similar approved road vehicle(s) as per relevant special conditions	per month	18	54000.00	972000.00
	b. Providing Toyota Yaris G CVT / Honda City 2020 / Hyundai Verna 1.6 CRDI SX(O) / Skoda Rapid 1.5 TDI CR Ambition AT or similar approved road vehicle(s)	per month	18	48000.00	864000.00
	c. Providing Maruti Swift DZIRE / Toyota Etios or similar approved road vehicle(s)	per month	18	40000.00	720000.00
2	Extra payment for providing any of the vehicles mentioned in item no. 1(a) /1(b)/1(c) as per the criteria/ stipulations/specifications/conditions mentioned therein including the notes and in the ASC, with Driver(s) cum Attendant(s) beyond 12 hours a day	Vehicle Hours	432	150.00	64800.00
3	<b>Extra</b> payment for extra distance run, over and above 3000 km per month on certification by the user official				
	a. For the class/type of the vehicle mentioned in item no. 1(a)	Vehicle KM	720	15.00	10800.00
	b. For the class/type of the vehicle mentioned in item no. 1(b)	Vehicle KM	720	13.00	9360.00
	c. For the class/type of the vehicle mentioned in item no. 1(c)	Vehicle KM	720	12.00	8640.00
4	Extra payment for extra days of run, over and above 26 days per month on certification by the user official				
	a. For the class of the vehicle mentioned in item no. 1 (a) with all conditions therein	Vehicle day	72	2100	151200.00
	b. For the class of the vehicle mentioned in item no. 1 (b) with all conditions therein	Vehicle day	72	1900	136800.00

SCHEDULE "K" - Item of miscellaneous works					
SI No.	Description of Item	Unit	Qty	Rate	Amount
	c. For the class of the vehicle mentioned in item no. 1 (c) with all conditions therein	Vehicle day	72	1600	115200.00
5	Extra payment for extra distance run, over and above 3000 km per month on certification by the user official	Vehicle KM	4000	2.5	10000.00
Total for Schedule K (5 items)					3062800.00
Tenderer's / Contractor's Percentage (Above/Below/At par) in figure					
Tenderer's / Contractor's Percentage (Above / Below / At par) in Word					
Please Ensure there are no over writings. If there is any discrepancy in figures and words , then word will be taken for consideration.					

**Seal & Signature of the Bidder**

**NAME OF WORK** : -Signalling outdoor works at Anekal Road, IBS, Maranayakanahalli and Hosur with MSDAC, Integrated power Supply and interlocking of LC Gates in connection with doubling of BAIYAPPANAHALLI-HOSUR section of Bangalore Division

### SUMMARY OF BILLS OF QUANTITIES

Particulars	Department Value (Rs.)
<b>SCHEDULE - A</b>	<b>15159430.00</b>
<b>SCHEDULE - B</b>	<b>4230157.00</b>
<b>SCHEDULE - C</b>	<b>1403834.00</b>
<b>SCHEDULE - D</b>	<b>10472411.00</b>
<b>SCHEDULE - H</b>	<b>47968349.00</b>
<b>SCHEDULE - J</b>	<b>29446440.00</b>
<b>SCHEDULE - K</b>	<b>3062800.00</b>
<b>Total</b>	<b>111743421.00</b>

<b>NAME OF WORK</b> : -Signalling outdoor works at Anekal Road, IBS, Maranayakanahalli and Hosur with MSDAC, Integrated power Supply and interlocking of LC Gates in connection with doubling of BAIYAPPANAHALLI-HOSUR section of Bangalore Division						
<b>SCHEDULE "A"</b>						
<b>SL. NO</b>	<b>SOR No.</b>	<b>Description of work</b>	<b>Unit</b>	<b>Rate</b>	<b>QUANTITY</b>	<b>AMOUNT</b>
1	10_101	Excavation of cable trench in all kinds of soil except hard rocky areas including clearing of roots of trees, rocks, bushes etc. to a depth of 1.0 Mtrs and to a width of 0.3 Mtrs. Laying of cables is not included in this schedule.	Mtrs	34.65	41000	1420650.00
2	10_104	Removing/breaking of existing RCC slabs on the Passenger Platform, trenching to a depth of 0.6m to accommodate the additional cables, replacing the slabs removed after the cables are laid and replastering with cement mortar, refilling the trench by ramming and consolidating it as per the instructions of KRIDE Representatives at site. (Laying of cables is not included in this schedule). [Cement, river sand and all other miscellaneous materials required for the work shall be supplied by the Contractor].	Mtrs.	169.95	150	25493.00
3	10_106	Excavation of trench to a depth of 1 Mtr. for track crossing of cables, laying of DWC/ RCC pipes with collar/coupling, refilling of trench by ramming and consolidating it as per the instructions of KRIDE representative at site. During excavation of trench it has to be ensured that the excavated soil does not mix with the ballast available. The depth of 1m trench shall be from the bottom of sleepers for track crossings. Laying of cables is not included in this schedule. (Supply of DWC/RCC pipes with couplers/ collars is not included in this schedule).	Mtrs.	208.35	390	81257.00
4	10_107	Excavation of trench to a depth of 1 Mtr. for road crossing of cables, laying of DWC/ RCC pipes with collar/ coupling, refilling of trench by ramming and consolidating it and resurfacing it to the original position. Laying of cables is not included in this schedule. (Supply of DWC/RCC pipes with couplers/ collars is not included in this schedule).	Mtrs.	270.83	190	51458.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
5	10_108	Provision of GI pipes (50/100mm dia) for cable laying with offset at both ends and with couplings over RCC Bridges/ Drainage/ Culverts with concrete masonry supports of size 300mm x 300 mm x 300 mm at an interval of 2m. The ends of the pipes shall be closed with brick masonry abutments work so that no cable is exposed, The work shall be carried out as per the instructions of KRIDE representative at site. (Supply of GI pipes with couplings and laying of cables is not included in this schedule). [Stone jelly of size 20/25mm, bricks, sand, cement and all other miscellaneous materials required for the work shall be supplied by the Contractor]	Mtrs.	181.95	300	54585.00
6	10_109	Provision of GI pipes-(50/100mm dia) for cable laying with offset at both ends and with couplings over girder bridges by fixing on suitable MS Clamps at an interval of 2 Mtrs. The ends of the pipes shall be closed with brick masonry abutments work so that no cable is exposed, The work shall be carried out as per the instructions of KRIDE representative at site. (Supply of GI pipes with couplings and laying of cables is not included in this schedule). [MS angles, flats, bolts and nuts for manufacturing fixing clamps, bricks, river sand , cement and all other miscellaneous required for the work shall be supplied by the Contractor].	Mtrs.	215.25	300	64575.00
7	10_110	Provision of GI pipes (50/100mm dia) for cable laying in hard rocky area with off sets at both ends duly supported by concrete blocks of size 300mm x 300 mm x 300 mm at an interval of 2m. The ends of the pipes shall be closed with brick masonry abutments work so that no cable is exposed, The work shall be carried out as per the instructions of KRIDE representative at site. (Supply of GI pipes with couplings and laying of cables is not included in this schedule).[Stone jelly of size 20/25mm, bricks, sand, cement and all other miscellaneous materials required for the work shall be supplied by the Contractor].	Mtrs.	168.08	400	67232.00
8	10_111	Laying of signaling/power/telecommunication cables as per cable plan in cable trenches, masonry ducts, RCC Pipes, DWC pipes, GI Pipes etc. (Supply of cables is not included in this schedule).	Mtrs.	9.83	180000	1769400.00
9	10_115	Refilling of cable trench 1m depth by 0.3m width throughout, with earth after laying of cables, and consolidating the trench by ramming and leveling.	Mtrs.	8.33	47500	395675.00
10	10_116	Refilling of cable trench 1m depth by 0.5m width throughout, with earth after laying of cables, and consolidating the trench by ramming and leveling.	Mtrs.	10.43	4000	41720.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
11	10_118	Supply of RCC cable markers as per drawing No.CSTE/CN/OFC/1. The lettering on the cable marker shall be "SIG" / "TELE" / "OFC" as per the instructions of KRIDE representative at site.	Nos.	166.29	900	149661.00
12	10_119	Digging of pit to a depth of 800mm of size 300mmX300mm, casting of concrete foundation of size 300mmX300mmX300mm and Placing of RCC cable markers on top of the foundation and refilling the pit and consolidating it by ramming. The cable markers shall be provided at an interval of 20 Mtrs. within station limits and 50 Mtrs. outside station limits throughout the cable route, diversions and also at every track/road crossing.	Nos.	121.43	900	109287.00
13	10_120	Excavation of cable coil pit to a size of 1.5mx1.5m and depth as instructed by KRIDE representative at site, for coiling the cables in rear of relay rooms/ AFTC huts, apparatus cases etc. The work includes coiling the underground cables, and placing closely one layer of country bricks of size approx. 220mm x 100mm x 60mm breadth wise above the cables to cover all the cables in the cable pit, closing and consolidating the pit by ramming and leveling. [Country bricks of size 220mmx100mmx60mm (approximately) shall be supplied by the Contractor].	cum	513.00	50	25650.00
14	10_121	Supply of Double walled corrugated pipe - 103.5mm inner dia & 120mm outer dia conforming to specification No. IS 14930(Part 2): 2001 with one coupler for every 6m of pipe as specified in Vol.II of the Tender document.	Mtrs.	263.20	530	139496.00
15	10_122	Supply of GI pipes - 50mm dia -3.65mm thick as specified in Vol.II of the Tender document.	Mtrs.	343.20	400	137280.00
16	10_123	Supply of GI pipes - 100mm dia-4.5mm thick as specified in Vol.II of the Tender document	Mtrs.	838.80	600	503280.00
17	10_201	Excavation of pit, casting concrete foundation and erection of apparatus case full size as per Drg. No.SG/CN/02/6 and fixing of 2 Nos. of 'E' type locks, one for the front door and another for the back door, fixing of one hard wood shelf plank 37mm thick and painting the apparatus case inside and outside with one coat of red-oxide and two coats of aluminium paints.(Supply of apparatus case is not included in this schedule).[Foundation bolts & nuts, 'E' type locks, cement, river sand, stone jelly of size 20/25 mm, hardwood plank of 37mm thick, paints, varnish, fixing bolts & nuts and all other miscellaneous materials required for the work shall be supplied by the Contractor.]	Nos.	9875.30	65	641895.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
18	10_202	Excavation of pit, casting concrete foundation and erection of apparatus case half size as per Drg, No.SG/CN/02/7, fixing one 'E' type lock for the front door and latching arrangement for the back door, and fixing of one hardwood shelf plank 37mm thick and painting the apparatus case inside and outside with one coat of red oxide and two coats of aluminium paints.(Supply of apparatus case is not included in this schedule). [Foundation bolts and nuts, cement, 'E' type locks, river sand, stone jelly of size 20/25mm, 37mm hard wood planks, latching arrangements, paints, varnish, fixing bolts & nuts and all other miscellaneous materials required for the work shall be supplied by the Contractor]	Nos.	6966.60	60	417996.00
19	10_208	Excavation of pit in and around the existing location boxes very carefully without damaging the working cables and shifting and turning the location boxes to clear of the infringement as instructed by the KRIDE representative at site. The work includes ensuring the safety of the signaling system, releasing the cable coils to give access for shifting/turning the location boxes. Necessary masonry work and earth work in and around the location boxes to the required level shall be done as instructed by the KRIDE representative at site. If the existing earth connections to the location boxes are disturbed, the earth wires shall be properly re-connected. [All materials required for the work shall be supplied by the Contractor].				
		a. Shifting of apparatus case (full)	Nos.	2895.00	5	14475.00
		b. Shifting of apparatus case (half)	Nos.	1916.25	5	9581.00
		c. Shifting of apparatus case (Quarter)	Nos.	1583.25	5	7916.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
20	10_209	Termination of new main/tail cables on the existing terminals/ fuse blocks in apparatus cases/ battery boxes/ CT boxes/ cable termination racks as per approved circuit diagram. The terminal particulars are to be repainted /corrected on the doors of apparatus cases/ battery boxes/ cable termination boxes and FTOT index board as instructed by KRIDE representative at site. This work includes closing the opening created for entry of new cables in the apparatus cases with masonry brick work and sealing the bottom of the apparatus cases/ cable termination racks with cable compound. [Paints, wire PVC 3/0.75mm and 16/0.2mm copper, sealing compound, bricks, cement, river sand and all other required miscellaneous materials shall be supplied by the contractor].	Per Terminal Block	39.78	1000	39780.00
21	10_210	Termination of main, tail, Signaling and power cables and internal wiring on terminal/ fuse blocks in new apparatus cases, cable termination boxes and in gate Lodges excluding cable termination rack at relay room. The work includes fixing of all new cables by teakwood clamp on teakwood base plank, fixing of Phynolic synthetic industrial fibre base fine weave cotton fibre board 6mm thick for terminal board to suit each apparatus case, varnishing all teakwood items, fixing of terminals/ fuse blocks on the terminal board, drilling of necessary holes, termination of cables, wiring, identification of cables using aluminium tags with letters punched neatly, as per approved circuit diagram and cable plan, painting of particulars on sleeves and also on the inner side of the doors of apparatus cases. After terminations are over, the side openings of apparatus case foundation shall be closed with brick work, cement plastered, the inter-space filled with river sand up to base level and the bottom surface shall be sealed with sealing compound. (Supply of PBT terminals and Fuse blocks is not covered in this schedule).[Cement, teakwood cable clamp 50mm x 50mm, base planks 100mm x 25mm, Phynolic synthetic industrial fibre base fine weave cotton fibre sheet - 6mm thick to IS specification 2036 - 1995 - Type F5, PVC/Nylon sleeves, varnish, paints, bolts, nuts and washers, Non- deteriorating type of fuses of various capacities, Aluminium cable tags, sealing compound, country bricks 220mm x 100mm x 60mm, copper bus bars, brass screw, river sand, wire PVC3/0.75mm copper and other miscellaneous materials shall be supplied by the Contractor].				

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
		a. Termination on 25/60mm PBT terminals (new location)(Phynolic sheet)	Per Terminal Block	93.16	15000	1397400.00
		b. Termination on PBT fuse block (new location) (Phynolic sheet)	Per Terminal Block	113.56	800	90848.00
22	10_211	Termination of main, tail, Signaling and power cables and internal wiring by fixing additional terminals/ fuse blocks on the existing terminal boards of apparatus cases, cable termination boxes etc. The work includes fixing of all new cables by teakwood clamp on teakwood base plank, varnishing all teakwood items, fixing of terminals/ fuse blocks, on the existing terminal boards, drilling of necessary holes, termination of cables, wiring, identification of cables using aluminium tags with letters punched neatly, as per approved circuit diagram and cable plan, painting of particulars on sleeves and also on the inner side of the doors of apparatus cases. After terminations are over, the side openings of apparatus case foundation shall be closed with brick work, cement plastered, the inter-space filled with river sand up to base level and the bottom surface shall be sealed with sealing compound.(Supply of PBT terminals and Fuse blocks is not covered in this schedule).[Cement, teakwood cable clamp 50mm x 50mm, base planks 100mm x 25mm, PVC/Nylon sleeves, varnish, paints, bolts, nuts and washers, Non-deteriorating type of fuses of various capacities, Aluminium cable tags, sealing compound, country bricks 220mm x 100mm x 60mm, copper bus bars, brass screw, river sand, wire PVC3/0.75mm copper and other miscellaneous materials shall be supplied by the Contractor].				
		a. Termination of cables on 25/60mm PBT terminals (existing location)	Per Ter.Block	81.68	4000	326720.00
		b. Termination of cables on PBT fuse block (existing location)	Per Fuse Block	102.08	300	30624.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
23	10_212	Manufacture and supply of M.S. relay frames of suitable size to hold up to 4/ 8/ 12/ 20 relays /plug in type HMU as required by KRIDEs and fixing them in apparatus cases for all types of signal control circuits, LC gate control circuit and Point control circuits, fixing of plug boards, relays, resistors and electrolytic condensers on Phynolic synthetic industrial fibre base fine weave cotton fibre sheet - 6mm thick to IS specification 2036 - 1995 - Type F5, wiring and termination as per approved circuit diagram and painting the particulars. (Supply of all types of relays, plug boards, connectors, retaining clips and plug in type HMU is not covered in this schedule).[Wire PVC copper, 3/0.75mm and 16/0.2mm copper, Phynolic synthetic industrial fibre base fine weave cotton fibre sheet - 6mm thick to IS specification 2036 - 1995 - Type F5, for fixing resistors and condensers, MS flats 25mm x 6mm brass bolts and nuts, paints, soldering materials, resistors, condensers and all other miscellaneous materials required for the work shall be supplied by the contractor].				
		a. Wiring of Signal/ point/ LC control circuit (up to 4 relays/Plug in type HMU)	Set	2673.25	12	32079.00
		b. Wiring of Signal/ Point/ LC control circuit (up to 8 relays/plug in type HMU)	Set	4739.60	15	71094.00
		c. Wiring of Signal/ Point/ LC control circuit (up to 12 relays/plug in type HMU)	Set	6137.85	12	73654.00
		d. Wiring of Signal/ Point/ LC control circuit (up to 20 relays/Plug in type HMU)	Set	7349.95	15	110249.00
24	10_213	Painting of existing apparatus cases without disturbing the terminations and equipments inside. The work involves scraping of old paint, applying one coat of Red oxide and two coats of Aluminium paint on the inside and outside the apparatus cases, and painting of termination and equipment particulars on the doors of the apparatus cases, as instructed by KRIDE representative at site.[Aluminium paint, red-oxide and all other miscellaneous materials required for the work shall be supplied by the Contractor].				
		a. Painting of existing apparatus case - Full size	Nos.	1278.75	30	38363.00
		b. Painting of existing apparatus case - Half size	Nos.	1223.25	10	12233.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
25	10_214	Fixing and wiring of platform repeaters. The work involves fixing of platform repeater using suitable fixing arrangements at places indicated, wiring the same and painting as per the instructions of KRIDE representative at site. The signal shall be connected to the apparatus case using cables neatly clamped. The work also includes provision of one EWS lock.(Laying of cable is not included in the scope of this work.) (Supply of repeater signals and cables is not included in this schedule). [Wire PVC 3/0.75mm copper, paint, EWS lock and all other miscellaneous materials required for the work shall be supplied by the Contractor].	Nos.	3687.30	3	11062.00
26	10_215	Painting of existing colour light Signals as per standard practice. The work involves scraping of old paint, applying one coat of Red oxide and two coats of Aluminium/ enamel paint on the Signals - complete as instructed by KRIDE representative at site.[Aluminium paint, red-oxide and all other miscellaneous materials required for the work shall be supplied by the Contractor].	Nos.	1320.00	10	13200.00
27	10_216	Alterations to painted termination/ wiring particulars of functions in the existing apparatus cases, cable termination boxes, etc., on the PVC/ nylon sleeves and painting of new nomenclature on the existing signaling gadgets. This work includes carrying out alterations of particulars on the inner side of the doors of apparatus cases, re-numbering of apparatus cases and cable termination boxes. [Paints and all other miscellaneous materials required for the work shall be supplied by the Contractor].				
		a. Alteration to painting particulars (apparatus case - Full size)	Nos.	884.85	30	26546.00
		b. Alteration to painting particulars (apparatus case - half size)	Nos.	464.10	15	6962.00
		c. Alteration to painting particulars (apparatus case- quarter size/ CT box)	Nos.	337.45	5	1687.00
28	10_217	Filling earth around location boxes/signal foundations for a width of 0.5m on all sides, up to a level 150mm below the foundation top. This work includes consolidation of earth by watering and ramming. The earth shall be taken from KRIDE premises as instructed by KRIDE representative at site.	cum	125.02	40	5001.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
29	10_218	Excavation of pit, casting concrete foundation as per Drg.No.SG/CN/02/9 using metallic templates, for erection of colour light signals up to 4 aspects. [Foundation bolts, cement, river sand, stone jelly of size 20/25mm dia and all other miscellaneous materials required for the work shall be supplied by the Contractor].	Nos.	5008.20	65	325533.00
30	10_219	Erection of surface base, signal pole, mounting of colour light signal up to 4 aspects complete on Signal pole/ Off-set bracket, (for LED/ filament bulbs) with lenses, triple pole lamp holder, filament switching units, CLS transformer, current regulators (whichever is applicable), fixing of ladder with platform complete and concreting of ladder shoe, fixing of number plates, marker board, lens guard, fixing of speed limit board wherever necessary, termination of tail cables, wiring of signal unit with PVC wire 3/0.75mm copper, provision of EWS locks, and painting of one coat of red oxide and two coats of aluminium/ enamel paints. When the aspect is fixed on Offset bracket using 'U' bolts and nuts, a through bolt shall be provided by drilling a hole in the signal pole to prevent the offset bracket from sliding down. (Supply of surface base, Offset bracket, CLS pole, CLS aspects complete, ladder with shoes and platform, Speed limit board, LED aspects, current regulators, lamp holders, lamps, filament switching unit and CLS transformer is not covered in this schedule). ['U' bolts and nuts, through bolts and nuts, cement, stone jelly 20/25mm dia, river sand, Signal Collar Rings, wire PVC 3/0.75mm copper, lens-guard, all fixing bolts and nuts, lead wool, paints PVC/Nylon sleeves, enameled number plates. enameled marker boards, EWS locks, and all other miscellaneous materials for the work shall be supplied by the Contractor].	Nos.	5501.20	65	357578.00
31	10_220	Excavation of pit and casting concrete foundation as per Drg, No.SG/CN/02/10 using metallic templates, for erection of ground type colour light shunt signal. [Foundation bolts and nuts, cement, river sand, stone jelly of size 20/25mm and all other miscellaneous materials for the work shall be supplied by the Contractor].	Nos.	2518.55	7	17630.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
32	10_221	Erection of Ground type shunt signal complete including surface base, signal pole, LED aspects/lenses, bulbs with holders (whichever is applicable), fixing of lens guards, number plate, termination of tail cables, wiring of signal unit with PVC wire 3/0.75mm copper, provision of EWS locks and painting of one coat of red oxide and two coats of Aluminium/ enamel paint (Supply of Ground type shunt signal complete.including surface base, signal pole, LED aspects,holder, bulbs, and lenses is not covered in this schedule).[Wire PVC 3/0.75mm copper, lens guards, EWS locks, Enameled number plates, bolts and nuts, lead wool, paints and all other miscellaneous materials shall be supplied by the Contractor]	Nos.	2097.00	7	14679.00
33	10_222	Fixing of Offset brackets using 'U' bolts and nuts,erection of Post type shunt Signals, termination of tail cables and wiring using wire PVC 3/0.75mm copper, provision of EWS lock and painting of one coat of red- oxide and two coats of aluminium/ enameled paint. The work also includes drilling suitable holes on the CLS post and provision of a through bolt with nut to prevent the Off-set bracket from slipping down. (Supply of Post type Shunt Signals, LED aspects and Off set brackets is not covered in this schedule).[U' bolts and nuts, through bolts with nut, wire PVC 3/0.75mm copper, EWS lock, Enameled number plates, wire mesh, PVC/Nylon sleeves, paints and all other miscellaneous materials shall be supplied by the contractor]	Nos.	1613.25	3	4840.00
34	10_224	Fixing of junction type route indicators - 1 way to 6 ways - complete/ fixing of additional limb to the existing route indicators, termination of tail cables, wiring as per approved circuits diagram using wire PVC 3/0.75mm copper, provision of required No of EWS locks, wire mesh, and painting.(Supply of junction type Route Indicators - complete and additional limb is not covered in this schedule).[3/0.75mm wire PVC, fixing bolts and nuts, EWS locks, wire mesh, PVC/Nylon sleeves, paints and all other miscellaneous materials shall be supplied by the Contractor].				
		a. Fixing and wiring of direction type route indicator - 1 way	Nos.	1539.75	3	4619.00
		b. Fixing and wiring of direction type route indicator - 2 way	Nos.	1824.00	3	5472.00
		c. Fixing and wiring of direction type route indicator - 3 way	Nos.	2108.25	3	6325.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
35	10_225	Fixing of Offset brackets using 'U' bolts and nuts, erection of Calling On Signals/ 'A' marker lights, termination of tail cables and wiring using wire PVC 3/0.75mm copper, provision of EWS lock, number plates/ marker boards and painting. The work also includes drilling suitable holes on the CLS post and provision of a through bolt with nut to prevent the Off- set bracket from slipping down. (Supply of Calling On Signal/ 'A' marker light, LED aspects/holders & bulbs and Off set brackets is not covered in this schedule). ['U' bolts and nuts, through bolts with nut, wire PVC 3/0.75mm copper, EWS lock, Enameled number plates, wire mesh, PVC/Nylon sleeves, paints and all other miscellaneous materials shall be supplied by the contractor].	Nos.	1427.25	8	11418.00
36	10_227	Excavation of pit in and around the existing signals very carefully without causing damage to the working cables and shifting the Signals along with the concrete foundations for approximately 1m to a nearby position so as to clear the infringement from the nearest track centre as instructed by KRIDE representative at site. The existing cable coils shall be released carefully so as to give access for shifting. Necessary masonry work and earth work shall be carried out in and around the signals after shifting as instructed by KRIDE representative at site. [All materials required for the work shall be supplied by the Contractor].	Nos.	2591.25	10	25913.00
37	10_228	Removal of existing CLS units, fixing of new CLS units with LED aspects/ lamps, holders etc., up to four aspects, directly or using off set brackets duly drilling holes on the signal poles, provision of EWS locks wherever necessary, termination of tail cables and wiring using wire PVC 3/0.75mm copper and painting of aspect. The new tail cables shall be taken through the signal poles and the unwanted cables duly released. (Supply of CLS unit with LED aspects/ lamps holders, CLS transformers is not included in this schedule.) [EWS locks, Wire PVC 3/0.75mm copper lenses guard, wire netting arrangements, paints and all other miscellaneous materials shall be supplied by the Contractor].	Nos.	5999.25	3	17998.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
38	10_229	Manufacture and supply of Enameled Number plates as per drawing No.TY/08/2008 with fixing arrangements and fixing them on the existing Signals as per the instructions of KRIDE representative at site.[Enameled number plates with fixing arrangements with bolts and nuts shall be supplied by the Contractor].	Nos.	339.00	60	20340.00
39	10_230	Supply and provision of Screening arrangement for Signals in RE area as per standard practice. The work comprises of providing MS angle frame and wire mesh in order to avoid close proximity of OHE wires. The work also includes provision of earthing wire using 4 SWG GI wires from the screening arrangement up to surface base as per the instructions of KRIDE representative at site.[All materials required for this work shall be supplied by the Contractor].	Nos.	1016.60	10	10166.00
40	10_231	Provision of DC Single/ Double rail track circuit to suit RE/ Non-RE areas as per approved signaling plan using Plug-in type track relays. This work includes provision of double bonding, and parallel jumpers, provision of bond wire clips, provision of track lead connections using 2c X 2.5 sq.mm cable, provision of TLD boxes 2 Nos. at Relay end, 2 Nos. at Feed end and 2 No's for parallel jumpers as necessary to suit layouts, for each Track Circuit, and termination of jumpers and tail cables in track lead junction boxes, installation of relays, track feed battery chargers to charge up to 4 cells, track feed resistance, 'B' type choke' and secondary cells - 80 AH capacity in apparatus cases and wiring with wire PVC 3/0.75mm copper. The work also includes painting of track Circuit No. with Feed end/ Relay end details on the TLD boxes. The work also includes provision of insulations for gauge tie plates and nose crossing plates wherever required.(Provision of rail joint insulation is not covered in this schedule.) (Uninsulated gauge type plate and nose crossing plate will be supplied by KRIDEs. Supply of track feed battery charger, 'B' type choke, track relays, un-charged secondary cells (2V - 80AH), TLD boxes with stumps, 2cX2.5 sq.mm cable, is not covered in this schedule).[track feed resistance, Gauge tie plate and nose crossing plate insulations, PVC/Nylon bushes for TLD boxes, PVC sleeves, all types of fixing bolts and nuts with spring and flat washers, teakwood stand for fixing track feed resistance, GI bond wire 8 SWG, Channel bond pins, bond wire clips, paints and all other miscellaneous materials shall be supplied by the contractor. Secondary cells-80 AH capacity shall be charged by the contractor through reputed charging agencies].				
		a. Provision of track circuit in (point zone)	Nos.	4818.65	10	48187.00
		b. Provision of track circuit in (other than point zone)	Nos.	3862.40	10	38624.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
41	10_232	Alteration to existing DC Track Circuits to suit RE/Non RE standard as per approved signaling plan. This work includes provision of double bonding and parallel jumpers, provision of bond wire clips, wherever required, shifting of relay end and feed end equipments and re-wiring them, provision of track lead connections wherever necessary using 2c x 2.5 sq.mm cable, provision of TLD boxes and termination of jumpers and tail cables in track lead junction boxes, shifting of Track feed/Track relay set wherever required and wiring with PVC 3/0.75mm copper wire. (Supply of TLD boxes, 2c x 2.5 sq.mm cable and TLD boxes with stumps is not covered in the schedule. Existing Track relays, Track Feed Resistance, Track feed battery chargers, 'B' type Chokes and Charged secondary Cells shall be used for this work). [Wire PVC 3/0.75mm, PVC/ Nylon bushes for TLD boxes, PVC sleeves, all types of bolts and nuts with spring and flat washers, teakwood stand for fixing track feed resistance, GI bond wire 8 SWG, Channel bond pins, bond wire clips, paints and all other miscellaneous materials shall be supplied by the Contractor].				0.00
		a. Alteration to existing track circuits at feed end	Nos.	2289.00	5	11445.00
		b. Alteration to existing track circuits at relay end	Nos.	2127.00	5	10635.00
42	10_234	Provision of earth electrodes as per drawing No.SG/SN/02/13 and earthing of metallic sheath and armour of all cables in all apparatus cases, relay room, equipment room, SM's room for block and control, and earthing of all equipments in apparatus cases, power room, relay rack, cable termination rack, control panel, signals, lever frames with MS flat 35mm X 6mm/19c cable (MS flat for closer by areas and MS flat/19c cable combination for farther areas) as per the instructions of KRIDE representative at site. The work includes painting of earth resistance value on the earth pit. (Supply of 19C cable is not covered in the scope of this schedule). [MS flat for earthing 35mm X 6mm, cement, GI earth electrodes, common salt, charcoal, country bricks, river sand, soldering materials and all other miscellaneous materials required for the work shall be supplied by the Contractor].	Nos.	1799.00	50	89950.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
43	10_236	Installation of combined type point machine - IRS type and connecting all ground connections including wiring and termination in point machine and interconnections between point machine and CT box through PVC hose pipe with 3/0.75mm and 7/1.40mm copper wire and painting. This work includes provision of insulation to stretcher bars, throw bar lug and "D" bracket wherever required, cutting of notches on the point machines covers to suit crank handle configuration.([All types of insulations connected to point work, coal bengal, all type of bolts and nuts, washers spring/flat wire PVC 7/1.4mm copper, PVC hope pipe, paints, PVC/nylon sleeves and all other miscellaneous materials required for the work shall be supplied by the Contractor].	Nos.	8856.15	32	283397.00
44	10_238	Supply of Colour light Signal pole 140mm dia, 4.6m/3.6m tall with necessary inspection as per specification/ drawing/ description enclosed in this document.				
		a. Supply of colour light Signal pole (4.6m)	Nos.	3318.00	25	82950.00
		b. Supply of colour light Signal pole (3.6m)	Nos.	2974.00	40	118960.00
45	10_239	Supply of surface base to suit CLS Signal pole 140mm dia with necessary inspection as per specification/ drawing/ description enclosed in this document.	Nos.	4118.00	65	267670.00
46	10_240	Supply of ladder with platform and shoes to suit CLS pole 4.6m/ 3.6m tall, with necessary inspection as per specification/ drawing/ description enclosed in this document.				
		a. Supply of ladder with platform and shoes for 4.6m CLS pole	Nos.	3203.00	25	80075.00
		b. Supply of ladder with platform and shoes for 3.6m CLS pole	Nos.	3089.00	40	123560.00
47	10_241	Supply of post type shunt signal - complete with hood etc., with necessary inspection as per specification/ drawing/ description enclosed in this document.	Nos.	2860.00	3	8580.00
48	10_242	Supply of Ground type shunt signal - complete with surface base, signal pole, hood etc., with necessary inspection as per specification/ drawing/ description enclosed in this document.	Nos.	4118.00	7	28826.00
49	10_243	Supply of Colour Light Signal Multi Unit type - complete for 4/ 3/ 2 aspect with mounting socket, with necessary inspection as per specification/ drawing/ description enclosed in this document.				
		a. Supply of colour light Signal unit - 4 aspect	Nos.	12584.00	4	50336.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
		b. Supply of colour light Signal unit - 3 aspect	Nos.	10296.00	25	257400.00
		c. Supply of colour light Signal unit - 2 aspect	Nos.	8580.00	36	308880.00
50	10_244	Supply of Junction type route indicator – 5 unit arm –1/ 2/ 3/ 4/ 5/ 6 way with mounting sockets, with necessary inspection as per specification/ drawing/ description enclosed in this document.				
		a. Supply of Junction type route indicator - 1 way	Nos.	10868.00	3	32604.00
		b. Supply of Junction type route indicator - 2 way	Nos.	14300.00	3	42900.00
		c. Supply of Junction type route indicator - 3 way	Nos.	17732.00	3	53196.00
51	10_245	Supply of Calling On Signal / 'A' marker light -complete with necessary inspection as per specification/ drawing/ description enclosed in this document.				
		a. Supply of Calling On Signal	Nos.	2059.00	8	16472.00
52	10_246	Supply of Off-set brackets - large/ small made of cast iron with necessary inspection as per specification/ drawing/ description enclosed in this document.				
		a. Supply of Off-set bracket (large)	Nos.	2059.00	6	12354.00
		b. Supply of Off-set bracket (small)	Nos.	1487.00	9	13383.00
53	10_248	Supply of track lead junction box - FRP type with 4 terminals and stumps with necessary inspection as per specification/ drawing/ description enclosed in this document.	Nos.	1030.00	80	82400.00
54	10_249	Supply of PBT terminals 25mm/ 60mm centre and PBT Fuse blocks with necessary inspection as per specification/ drawing/ description enclosed in this document.				
		a. Supply of PBT terminal - 25mm centre	Nos.	44.00	16000	704000.00
		b. Supply of PBT terminal - 60mm centre	Nos.	60.00	2000	120000.00
55	10_250	Supply of Low maintenance secondary cells of the following capacities with necessary inspection as per specification/ drawing/ description enclosed in this document.				
		Supply of secondary cells-2V-80AH capacity	Nos.	2077.00	60	124620.00
56	10_251	Supply of apparatus cases (full/ half/ quarter size) to suit Southern Railway standard with necessary inspection as per specification/ drawing/ description enclosed in this document:				
		a. Supply of apparatus case - Full size	Nos.	12012.00	65	780780.00
		b. Supply of apparatus case - Half size	Nos.	8580.00	60	514800.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
57	10_252	Supply of electronic time delay units (120/60 sec.s) with plug boards, connectors and retaining clips with necessary inspection as per specification/ drawing/ description enclosed in this document.	Nos.	2213.00	4	8852.00
58	10_253	Supply of lamp proving relays for LED aspects with plug boards, connectors and retaining clips with necessary inspection as per specification/ drawing/ description enclosed in this document.	Nos.	3591.00	60	215460.00
59	10_254	Supply of QBCA1 - heavy duty contact relays with necessary inspection as per specification/ drawing/ description enclosed in this document.	Nos	4140.00	20	82800.00
60	10_255	Supply of QTA2 - track relays with plug boards,connectors and retaining clips with necessary inspection as per specification/ drawing/ description enclosed in this document.	Nos	2524.00	20	50480.00
61	10_256	Supply of QSPA1 type relays with plug boards,connectors and retaining clips with necessary inspection as per specification/ drawing/ description enclosed in this document.	Nos	3897.00	20	77940.00
62	10_257	Supply of Electric key transmitter - rotary type of required ward Nos. with keys, with necessary inspection as per specification/ drawing/ description enclosed in this document.	Nos	4279.00	25	106975.00
63	10_261	Supply of 'B' type choke as per description enclosed in this document.	specification/ Nos.	2076.00	20	41520.00
64	10_314	Installation of charged secondary cells of the following capacities in apparatus cases, connecting them with strips, wiring with wire PVC 3/0.75mm copper and termination. This work also includes charging of cells through reputed agencies. The details of the batteries shall be written on the inside of the doors of the apparatus cases. (Supply of secondary cells is not included in this schedule). [Wire PVC 3/0.75mm copper, connecting strips, paint and all other miscellaneous materials required for the work shall be supplied by the Contractor].				
		a.Installation of 2V-40/80AH cell in apparatus case	per cell	265.72	195	51815.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
65	10_335	Supply and installation of 4 wire DTMF based way station equipment complete as per RDSO specification No.IRS.TC-60/93 and 4 wire control telephone with audio visual indication and reset button fitted on telephone conforming to specification No.IRS-TC-38/97 or latest. This work also includes supply and wiring of power supply arrangements for way station equipment conforming to specification IRS.TC.72/97. or latest [All the materials required for the work shall be supplied by the Contractor].	Set	8215.00	1	8215.00
66	10_336	Supply and provision of Rubber mat of not less than 6mm thick and with an insulation to withstand 650VAC, on the floor of relay room etc at places as indicated by KRIDE representative at site.	sft	78.30	150	11745.00
67	10_337	Provision of signaling arrangement during Non-Interlocked working of Signals and Points, such as erection and wiring of temporary relay racks and wiring of relays, SM's slide instruments, wiring alterations in the cable termination rack, apparatus cases, signals, Control panel etc, as per the instructions of KRIDE representative at site.(Supply of relay rack, relays, and SM slide instrument is not included in this schedule).[All other miscellaneous materials required for the work shall be supplied by the Contractor].	per	18178.95	3	54537.00
68	10_338	Provision of PA system and Magneto telephone communication at stations/ tents as per the instructions of KRIDE representative at site. The PA system and magneto telephones will be returned to the contractor after the completion of NI working. Signalling cables available may be used for the communication.(Hiring of PA system equipments and magneto telephones shall be done by the Contractor) [All other miscellaneous materials required for the work shall be supplied by the Contractor].	per Tent per day	885.00	20	17700.00
69	10_406	Casting concrete foundation of size 900mmX900mmX900mm for pedestal, 400mmX400mmX600mm for meeting post, fixing of lifting barrier boom,contact makers, termination of cables, wiring and painting as per the instructions of KRIDE representative at site. (Supply of pedestals, meeting posts, contact maker, electric lifting barriers, rail posts, cranks and 'A' type foundation is not covered in this schedule).[Concreting materials, bolts and nuts, wire PVC 3/0.75mm copper and all other miscellaneous materials required for the work shall be supplied by the Contractor].	per boom	11003.25	8	88026.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
70	10_408	Fixing and wiring of Two Nos. of Electronic Gate Warning equipment for each level crossing gate, one on each road warning signal, amplifier in the apparatus case with wire PVC 3/0.75mm and 16/0.2mm copper, and painting. .[All wiring, fixing and painting materials shall be supplied by Contractor].	Set.	2427.75	4	9711.00
71	10_412	Supply and installation of teakwood glass fronted box of size 300mm x 600mm x 75mm with hooks to keep various keys with description engraved on the tags.[TW Glass fronted box of size 300mmx600mmx 75mm with built in lock, hooks, engraved tags and all other miscellaneous materials required for the work shall be supplied by the Contractor].	Nos.	4057.00	2	8114.00
72	10_414	Fixing of EKT instrument with (or) without crank handle or on suitable fixtures at station/apparatus case, provision of economiser push switch with locking facility, wiring with wire PVC 16/0.2mm copper, provision of teakwood terminal box covered with decolum along with locking facility and painting.(Supply of electric key transmitter and crank handles is not covered in this schedule).[wire PVC 16/0.2mm copper, wire wound resistance, decolum covered terminal box with locking facility by using 25mm thick teakwood, bolts and nuts, paints,push switches, padlocks and other miscellaneous materials required for this work shall be supplied by the contractor]	Nos.	2943.75	25	73594.00
73	10_415	Casting concrete foundation and erection and painting of boards with 'LEGEND' such as "Draw close if signal is at on" at the required places as per the Signalling plan. The work involves concreting of rail post to a size of 600mm x 600mm x 900mm, and fixing the board to the rail using MS clamps, bolts and nuts.(Supply of boards is not covered in this schedule.) [Stone jelly of size 20/25mm dia, river sand, cement,M.S.flats, fixing bolts and nuts, paint and all other miscellaneous materials required for the work shall be supplied by the Contractor].	Nos.	2159.00	6	12954.00
74	10_417	Supply and installation of magneto telephone handle type and supply and wiring of Ni-cad power pack 4V-2.2AH with charger to work on 110VAC, at the station house, LC Gate and top points.[Magneto telephone handle type with Ni-cad power pack 4V-2.2AH with charger to work on 110VAC, wire PVC 16/0.2mm copper, and all other miscellaneous materials shall be supplied by the Contractor.]	Nos.	6178.00	12	74136.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
75	10_419	Installation and wiring of existing Way station equipment DTMF and control telephones. The work involves fixing the released way station equipment on the wall at an appropriate place in consultation with KRIDE representative at site, wiring and interconnecting the same with test panel, control telephones and batteries.(Supply of way station equipment, control telephones and batteries is not included in this schedule). [Wire PVC 3/0.75mm & 16/0.2mm copper, MS clamps for fixing arrangements, PVC tubes 25mm dia for interconnections and all other miscellaneous items required for the work shall be supplied by the Contractor]	Nos.	4333.50	2	8667.00
76	10_420	Supply and installation of Signal post telephone with facility of paging and talk-back including voice communication equipment with suitable switching arrangement at the Signal post and at SM's room as per specification enclosed in this document. This includes drawal of tail cable through GI pipe 25mm dia and 2 mtrs long duly clamped to Signal post with bend as required at site, termination of tail cable at one end in the apparatus case and other end in the console. In the SM's room, console shall be fixed on a table top. The wiring shall be done using wire PVC 16/0.2mm copper.[Talk-back equipment complete including housing box, wire PVC 16/0.20mm and all other miscellaneous materials required for the work shall be supplied by the Contractor].	Nos.	9345.00	2	18690.00
77	10_421	Excavation of pit and construction of masonry platform as per drawing No. SG/CN/02/12 with country bricks of size 220mmx 100mmx60mm (app) at the foot of signal post telephones as per the instructions of KRIDE representative at site.[Country bricks of size 220mmx100mmx60mm (app),cement, river sand and all other miscellaneous materials required for the work shall be supplied by the Contractor].	Nos.	2896.80	2	5794.00
78	10_426	Supply of 2 pin socket - 5A with switch, fixing the same on the hardwood plank available and extending the 110VAC using wire PVC 3/0.75mm copper, in all the apparatus cases, as per the instructions of KRIDE representative at site. [2 pin socket - 5A with switch, wire PVC 3/0.75mm copper and all other miscellaneous materials required for the work shall be supplied by the Contractor].	Nos.	398.00	40	15920.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
79	10_427	Testing and commissioning the entire signalling installations jointly with the KRIDE representative at site at the stations/ LC gates covered under various schedules of the Contract, and ensuring that all the signalling gears are installed and adjusted as per the existing rules. The work also involves supply of required number of bound registers with good quality papers with all updated details of cable meggering, relays, batteries, block joints, route cancellation, relay room key entries, block instrument key, earth resistance etc., and handing over to KRIDEs.(Supply of 'As makes' is not covered in this schedule).				
		Testing and commissioning of LC gates	per LC	8128.50	4	32514.00
80	10_501	Releasing of existing relay racks/ cable termination racks along with all the terminals, fuse blocks, relays,with jacks, holding clips etc., 50 way boards,terminals, connecting wires, cables etc., carefully without causing any damage, accounting and stacking them neatly at a place as instructed by KRIDE representative at site. After releasing, the floor shall be levelled and cement plastered.	Per rack	1068.75	20	21375.00
81	10_502	Releasing of existing Route Indicators of different types including tail cables, carefully without causing any damage, accounting and stacking them neatly at a place as instructed by KRIDE representative at site.	Nos.	833.25	10	8333.00
82	10_503	Breaking of concrete and releasing of STOP board/Warning board/ LEGEND boards along with rails, accounting and stacking them neatly at a place as instructed by KRIDE representative at site. Also the resultant pits shall be re-surfaced and consolidating by ramming and levelling.	Nos.	854.25	10	8543.00
83	10_507	Releasing of existing apparatus cases (Full/ Half/Quarter size) without damage after releasing the shelf planks, Terminal blocks, Fuse Blocks, Terminal Boards, Relays of all types EKTs, Secondary Cells, power equipments, 'E' type locks, etc., and breaking the concrete foundation. After releasing, the resultant pits are to be closed and consolidated by ramming and levelling. The released materials shall be accounted and stacked at a place as instructed by KRIDE representative at site.	Nos.	1625.25	100	162525.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
84	10_508	Breaking of concrete and releasing the existing cable termination boxes, after releasing the base plank, Terminal blocks, Fuse Blocks, Terminal Boards, cut rails, pipes, etc., closing the resultant pits and consolidating it by ramming and levelling. The released materials shall be accounted and stacked neatly at a place as instructed by KRIDE representative at site.	Nos.	1083.75	40	43350.00
85	10_509	Releasing of existing SM's control panel including base plank, and other gadgets connected very carefully without causing any damage to the panel, accounting and stacking them neatly at a place as instructed by KRIDE representative at site. The resultant pit in the flooring shall be removed of all cable bits, levelled and cement plastered.	Set	2841.75	1	2842.00
86	10_510	Dismantling and releasing of existing Colour light Signals complete (upto 4 aspects) with or without Route Indicators, calling on signals, shunt signals etc., carefully without any damage to the gadgets, accounting and stacking them neatly at a place as instructed by KRIDE representative at site. The work includes breaking the concrete foundation, closing the resultant pit and resurfacing it by ramming and levelling.	Nos.	1666.50	25	41663.00
87	10_511	Dismantling and releasing of existing Point machines (all types) including ground connections and other accessories available complete without any damage to the gadgets, accounting and stacking them neatly at a place as instructed by KRIDE representative at site.	Nos.	1458.75	15	21881.00
88	10_512	Dismantling and releasing of ground lever frame along with all connected gadgets like lever locks, 'E' type locks, HP locks, etc., accounting and stacking them neatly at a place as instructed by KRIDE representative at site. The work also involves breaking and removal of concrete foundation and the resultant pit shall be filled and consolidated by ramming and levelling.	Set.	3000.00	4	12000.00
89	10_513	Releasing of Secondary cells and battery stands available in the battery room along with connecting strips, wires and terminal boxes carefully without causing any damage to the batteries, accounting and stacking them neatly at a place as instructed by KRIDE representative at site. After releasing any holes in the walls/ flooring shall be filled with cement mortar and plastered.	Set	2916.75	1	2917.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
90	10_514	Releasing of existing Block Instruments (all types),Block counters, batteries, block filter, block bell equipment etc., carefully without any damage,accounting and stacking them neatly at a place as instructed by KRIDE representative at site.	Nos.	958.50	6	5751.00
91	10_516	Releasing of all the S & T gadgets at LC gates like SM slide instruments, illuminated diagram board,block counter, termination box, telephones, emergency key box, etc and concerned wiring,accounting and stacking them neatly at a place as instructed by KRIDE representative at site. After releasing any holes on the walls/ floor are to be filled with cement mortar and plastered.	Set	5166.00	4	20664.00
92	10_517	Releasing of existing ground type shunt signals along with surface base, signal post etc carefully without any damage, accounting and stacking them neatly at a place as instructed by KRIDE representative at site. The work also includes breaking and removal of concrete foundation and refilling of the resultant pit by ramming and levelling.	Nos.	1187.25	2	2375.00
93	10_518	Releasing of existing TLD boxes with stumps and terminals after releasing all the bond wires. The released materials shall be accounted and stacked neatly at a place as instructed by KRIDE representative at site.	Nos.	86.10	100	8610.00
94	10_519	Releasing of all power equipments including equipment stands, terminal boards, power panel etc., in the power room carefully without causing any damage to the equipments after disconnecting all the supply wires. The released equipments shall be accounted and stacked at a place as instructed by KRIDE representative at site. After releasing any holes in the walls/ flooring shall be filled with cement mortar and plastered.	Set	6832.50	1	6833.00

SL. NO	SOR No.	Description of work	Unit	Rate	QUANTITY	AMOUNT
95	10_520	Releasing of existing control equipments - complete including way station equipments, telephones, power supply for way station equipment and telephones, along with all wiring, accounting and stacking them neatly at a place as instructed by KRIDE representative at site.	Set.	3249.75	1	3250.00
96	10_521	Transportation of Signalling materials by road as per the instructions of KRIDE representative at site. The work also includes loading and unloading of the materials.				
		Transportation more than 100 Kms.	per ton.KM	7.52	15000	112800.00
97	10_522	Engaging mechanical excavators like JCB or other machineries for regarding and levelling the formation, dismantling any infringing structures, clearing and removing debris etc., with all leads and lifts etc., complete and as per the instruction of KRIDE representative at site.	per hour	650.00	80	52000.00
Total for Schedule A (97 items)						15159430.00
Tenderer's / Contractor's Percentage (Above/Below/At par) in figure						
Tenderer's / Contractor's Percentage (Above / Below / At par) in Word						
Please Ensure there are no over writings. If there is any discrepancy in figures and words , then word will be taken for consideration.						

**Seal & Signature of the Bidder**

**NAME OF WORK :** -Signalling outdoor works at Anekal Road, IBS, Maranayakanahalli and Hosur with MSDAC, Integrated power Supply and interlocking of LC Gates in connection with doubling of BAIYAPPANAHALLI-HOSUR section of Bangalore Division

**SCHEDULE "B"**

SL.NO		DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
1	1a	Non-Deteriorating type of fuse holders and fuse links of following rating. (a) Fuse Holder 20A capacity. IRS Spec.S.75/91 (IRS-S78/Tentative) or latest.	NOS	158.33	800	126664.00
	1b	Non-Deteriorating type of fuse holders and fuse links of following rating. (b) Fuse Link 20 Amps IRS Spec.S.78/92 or latest.	NOS	22.57	120	2708.00
	1c	Non-Deteriorating type of fuse holders and fuse links of following rating. (c) Fuse Link 10 Amps IRS Spec.S.78/92 or latest.	NOS	20.75	180	3735.00
	1d	Non-Deteriorating type of fuse holders and fuse links of following rating. (c) Fuse Link 2 Amps IRS Spec.S.78/92 or latest	NOS	17.67	500	8835.00
2		Relay Rack universal type as per Drg.No.SK/SC/CN/51/94 with MS Frame of suit 'Q' series relays scaffolding, POWER COATED with stainless steel nuts and bolts for fixing the racks and cable ladder made out of MS angle 65mm x 65mm x 6mm for fixing the rack. Supporting angles, frame mounting triangle base with J bolts and insulation of required number complete to suit QNI/K-50 prewired tag block. (a) 1 Way.	NOS	5294.00	4	21176.00
3		Cable termination racks size 880mm x 2 meters made out of 50mm x 50mm x 6mm thick MS angle Power Coated with stainless steel nuts and bolts for fixing the racks with suitable holes for hylem sheet complete as per standard practice with tripod bases and reel insulators. Cable ladder of 400mm x 2000mm be provided at both sides with angle size 40mm x 4mm x 5mm with supporting flate of size 25mm x 5mm (for K rack and P rack).	NOS	5308.00	10	53080.00
4		Basic material to construct Unit Maintenance Free Earth as per RDSO Spec. No.RDSO/SPN/197/2008 and as per schedule specification.	SET	17767.86	25	444197.00
5		Basic material to construct Unit Maintenance Free Ring Earth with Four Pits for achieving less than one Ohm as per RDSO Spec.No.RDSO/SPN/197/2008 or latest and as per Specification.	SET	60000.00	10	600000.00
6		35 sq mm Multi strand single Core PVC insulated copper cable as per IS:694 for connecting main earth electrode to MEEB in the equipment room in duplicate.	M	348.00	400	139200.00
7		PVC wire coils of size 10 sq mm multi strand (Green-100%) each coil of 100 mtrs. length as per IRS Spec. 76/89. Amdt 3 or latest.	NOS	9750.00	3	29250.00
8		Steel Alamairah (Mode: Godrej Store well/slimline 4S).	NOS	17720.00	1	17720.00

SL.NO		DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
9		Navtal locks Godrej make 75mm with 2 Keys.	NOS	500.00	2	1000.00
10		Track Feed Battery charger as per RDSO Spec. IRS:S-89-2013 ver. 1.0 or latest.	NOS	4820.00	20	96400.00
11		Flex printing with sun board fixing of various drawing with colour (power board diag, relay index chart, station rule diagram, battery history, DG set history etc.,).	SFT	350.00	200	70000.00
12		Printed and bounded registers including maintenance registers for SSDAC, point machine, track circuit etc., (100 Pages each of 75 gms paper).	NOS	170.00	200	34000.00
13		Earth Leakage detector 12 channel (110V DC, 24V DC, 12V DC, etc.,) as per RDSO Spec. No.256/2002 or latest with 6 digital counter.	NOS	102400.00	1	102400.00
14		10 pair CT box with Wago terminals of Phonix make or similar.	NOS	2100.00	7	14700.00
15		20 pair CT box with Wago terminals of Phonix make or similar.	NOS	3233.33	7	22633.00
16		Step ladder aluminum made of BATHLA make App.5 feet height.	NOS	7115.00	2	14230.00
17		Supply of permanently solid lubricated HDPE Telecom pipe of size 40/33mm as per Spec. TEC. GR No.G/CDS-08/01 Dec.99 or latest.	KM	69500.00	10	695000.00
18		Supply of joint kit conforming to RDSO Spec. No.IRS-TC 77/2006 Revision or latest for quad cable.	NOS	3034.50	50	151725.00
19		Supply of RFID Electronic marker for S&T underground cables with programmable memory for saving the user specific data inside the RFID Electronic marker locator during locating (10 CM diameter with floating coil to keep detection circuit always horizontal for better detection) which can be barrier up to a depth of 5 ft.	NOS	2688.00	150	403200.00
20		Supply of soil lubricated HDPE/PVC duct (pipe) of dia 110mm, thickness 6mm with end plug sealing arrangement as per Spec. No.IS 4983.	M	526.40	2000	1052800.00
21		Preparation of station working rules, CRS papers etc as practice in Railways for yards/LC Gate/IBH	per application	15688.00	8	125504.00
Total for Schedule B (21 items)						4230157.00
Tenderer's / Contractor's Percentage (Above/Below/At par) in figure						
Tenderer's / Contractor's Percentage (Above / Below / At par) in Word						
Please Ensure there are no over writings. If there is any discrepancy in figures and words , then word will be taken for consideration.						

**Seal & Signature of the Bidder**

**NAME OF WORK** : -Signalling outdoor works at Anekal Road, IBS, Maranayakanahalli and Hosur with MSDAC, Integrated power Supply and interlocking of LC Gates in connection with doubling of BAIYAPPANAHALLI-HOSUR section of Bangalore Division

**SCHEDULE "C"**

SL.NO		DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
1	1a	Erection of relay rack with scaffolding suitably concreting tri-pod bases and reel insulators with 'J' bolts and nuts. Tripod and other supporting are to be painted in 2 coats with enamel. (a) One Way.	NOS	325.00	4	1300.00
	1b	Erection of relay rack with scaffolding suitably concreting tri-pod bases and reel insulators with 'J' bolts and nuts. Tripod and other supporting are to be painted in 2 coats with enamel. (a) CT Rack.	NOS	3000.00	10	30000.00
2		Fixing relay bases on relay frames erected in the relay room wiring of all types of relays by drawing various sizes of wires/multi core cable, fixing of condensers, resistance, 6 way/1 way terminals, ND type fuses, LED indications with push button type switch etc., and wiring duly slandering the same as per the approved circuit diagram, testing point to point before soldering and after soldering, bunching and lacing as per technical specification. This work includes wiring of contacts for data logger and terminating them in the tag block.	1PER RELAY	166.50	100	16650.00
3		Provision of 2 machine cut grooves in parallel to a separation of 8 cms each to depth of 150mm in the platform surfaced/tiled floor for laying cable.	MTR	461.25	80	36900.00
4		Installation of single earth pit as per RDSO specification No.RDSO/SPN/197/2008 or latest and as per technical specification.	SET	8442.86	25	211072.00
5		Installation of Ring Earth Pit as per RDSO specification No.RDSO/SPN/197/2008 or latest and as per technical specification.	SET	30000.00	10	300000.00
6	6a	Generator, foundation and installation. Excavation of pit, casting concrete foundations as per Drg. No.SG/Proj/SK/DG/01/08 for installation of DG set as per the direction of KRIDE Engineer.	NOS	11550.00	1	11550.00
	6b	Generator, foundation and installation. 1st service of the DG set (2 Nos) as per the manufacture's instruction.	LS	1713.00	1	1713.00
7		Digging of cable trench to a depth of not less than 30cm in rocky terrain, concreting the trench with 150mm thick concrete in the ratio 1:2:4 and after proper curing ,back filling with excavated soil.	RMT	157.75	1000	157750.00

SCHEDULE "C"						
SL.NO	DESCRIPTION OF ITEMS		UNIT	RATE	QUANTITY	AMOUNT
8	Strengthening of foundation of signals, Full/Half location boxes, by carrying out the earth work around the foundation, ramming of the earth, carrying out masonry work from bottom of earth work using country stones and cement masonry to prevent the earth from slipping down the bank.		NOS	3175.00	100	317500.00
9	Excavation of pit, erection of cable termination boxes and concreting as per Drg. No.SG/CN/02/8, drilling of suitable holes in the box, fixing of 2 Nos. of GI pipes 32mm dia and 300mm long at the bottom with clamp nuts - 12 mm thick, one at the inner side and another at the outer side for each pipe for cable throughing and one GI pipe 150mm long 32mm dia for drawal of jumper wires for Point machines etc., fixing of hardwood plank 37mm thick on the bottom, provision of one EWS lock, and painting the boxes inside and outside with one coat of red-oxide and two coats of aluminum paints.CT. boxes, [Cement, river sand, stone jelly of size 20/25mm, paint, varnish , GI Pipes 32mm dia - 300mm long - 2 Nos and 150mm long - 1 No., clamp nuts - 12mm thick - 2 Nos. for each pipe, fixing bolts and nuts with washers, EWS locks, paints and all other miscellaneous materials shall be supplied by the Contractor].		NOS	3625.00	35	126875.00
10	Installation, testing and commissioning of earth leakage detector 12 channel.		NOS	27067.00	1	27067.00
11	Fixing of 10 pair CT box with wago terminals of phnonix make or batter and termination of cable at the station/ LC gates etc., This includes fixing of quad/PIJF cables and CT box on the wall.		NOS	1833.33	3	5500.00
12	Fixing of 20 pair CT box with wago terminals of phnonix make or batter and termination of cable at the station/ LC gates etc., This includes fixing of quad/PIJF cables and CT box on the wall.		NOS	2100.00	3	6300.00
13	Releasing of Diesel Generators in the existing room along with all other gadgets without causing any damages.		NOS	5333.33	6	32000.00

SCHEDULE "C"						
SL.NO		DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
14		Provision of normal joint of Heat Shrinkable type complete for 6 quad cable. After the jointing the through cable has to be tested for insulation resistance and loop resistance in presents of KRIDE Engineer and in case of any defects the jointing has to be re-done free of cost by the contractor.[Heat Shrinkable jointing kit conforming to RDSO specification No.IRS-TC 77/2006 covered in the supply portion has to be used for this purpose. The Contractor should supply all other small items free of cost which are required for making a joint.Only gas blower to be used for blowing].	NOS	2433.14	50	121657.00
Total for Schedule C (14 items)						1403834.00
Tenderer's / Contractor's Percentage (Above/Below/At par) in figure						
Tenderer's / Contractor's Percentage (Above / Below / At par) in Word						
Please Ensure there are no over writings. If there is any discrepancy in figures and words , then word will be taken for consideration.						

**Seal & Signature of the Bidder**

**NAME OF WORK :** -Signalling outdoor works at Anekal Road, IBS, Maranayakanahalli and Hosur with MSDAC, Integrated power Supply and interlocking of LC Gates in connection with doubling of BAIYAPPANAHALLI-HOSUR section of Bangalore Division

**SCHEDULE "D"**

SL.NO	DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
1	Supply and fixing of retro reflective type CALLING ON/STOP/BSLB/Un-insulated trolley phohibited board as per practice & SEM.	NOS	4853.67	20	97073.00
2	Supply and fixing of Crank Handle box/emergency key box made of teak wood with glass fronted door as per drawing 03/91. Polishing on all exposed surface and for with EKT inside the box. Micro push switch of L&T make with 2NO+2NC contacts and veeder counter non reset type and wire them as per the approved circuit diagram. Clamp and terminate the cable in the cable termination box in ASM office and in the Relay room. Bunching and lacing with lacing thread ad interlock the EKT key with Crank handle by nickle coated dog chain/welded. The box should have hinges and pad locking arrangements with one No.40mm Navtal lock duplicate keys and key chain with label. (All materials except EKT are to be supplied by the contractor).	NOS	4640.00	10	46400.00
3	Fabrication and fixing of MS frames to suit Q series relays to accommodate 6 nos in each set duly drilling required holes for relay bases (all materials such as frames, bolts, nut and washers to be supplied by contractor)	NOS	305.00	50	15250.00
4	Supply and provision of power supply change over arrangement at SM room. CLS panel of size 800 x 500 x 275mm powder coated of MS sheet thickness 1.6mm as per RDSO specification No. TI/SPC/PSI/CLC/0020.	NOS	45730.00	1	45730.00
5	Supply and fixing of PVC casing and capping/PVC pipe of minimum 25 mm size of higher as per requirement at site on the wall/floor etc., using bends, coupler and T joints and flexible pipe wherever necessary with fixture in the OFC room from equipment rack to common termination and from OFC room to SM room/reservation office/data logger/FOIS room etc., (All required materials for fixing to be arranged by the contractor),	MTR	41.68	100	4168.00

SCHEDULE "D"						
SL.NO		DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
6		Preparation of Cable Route Plan, Cable Core Plan,Cable Termination Rack Particulars, Location Box Particulars, Power Supply Diagram, Track Circuit Bonding Diagram and/or any other drawing on AutoCAD in A2/A3/ A4, etc. size (as per instructions of Engineer in-charge). Initially Contractor shall submit 2 sets of 'AS PLANNED' documents complete for approval of KRIDE/Railways. One set is returned either duly approved for making a fair copy or for re-submission for approval after incorporating the changes as required by KRIDE/railways. After preliminary approval, execution of work shall be carried out at site. After Completion of work, 2 sets of 'AS MADE' Check Prints are submitted for Administarative approval. KRIDE/Railways will return one set to the contractor duly approved with Iterations/corrections if any. The contractor shall incorporate KRIDE/Railways alterations/corrections in the tracings without any deviation and submit all tracings complete in all respect along with its soft copies in USB Pen Drive and 6 sets of final completion drawings in properly bound booklets. [For Centralized Electronic Interlocking Stations/Small Stations]	Station	98035.00	3	294105.00
7		Termination of main, tail, signalling and power cables and internal wiring on terminal/fuse block in cable termination rack at relay room. The work includes fixing of all new cables by teak wood clamp on teak wood base plank, fixing of phynolic synthetic industrial fibre base fine weave cotton fibre board 6mm thick for terminal board, varnishing all teak wood items, fixing of terminals/fuse blocks on the terminal board , drilling of necessary holes, termination of cables wiring identification of cables using aluminum tags with letters punched neatly as per approved circuit diagram and cable plan, painting of particulars on sleeves, After terminations are over cable entry at the bottom shall be closed with , cement plastered the inter space filled with river sand up to base level and the bottom surface shall be sealed with sealing compound. Cable armour to be soldered to earth. (Supply of cable termination racks is not included in this schedule).[All bolts and nuts with washers cement sand stone jelly teak wood base, paints and all other miscellaneous materials required for the work shall be supplied by contractor].(a) Termination o 25/60mm PBT terminals	PER TERMIN	112.80	6000	676800.00
8		Supply installation testing and commissioning of copper plate earthing system complete with provision of (i) Copper plate 300 x 300 x 3mm, (ii) Earth pit 8 to 10 ft. depth filled up with charcoal 10 Kgs and salt 25 Kgs in layers, (iii) Water funnel on GI pipe of length 8 ft., (iv) Cast iron top plate 12 inch x 12 inch, (v) Drawing of copper - earth from earth t location with 25mm x 3mm copper strip for termination (All miscellaneous materials to be supplied by the contractor).	NOS	15702.30	60	942138.00

SCHEDULE "D"						
SL.NO		DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
9		Supply and Installation of Pre-wired Crank Handle Cum Key Lock Relay Box (of MS Sheet) along with LEDs, with approved type push buttons, Wago or similar Disconnecting type Terminal Blocks including DIN rail etc., as per tentative drawing enclosed. Installation, fixing and wiring of boxes for Key Lock Relays to be carried with Contractor's wiring and fixing material. The work shall be carried as per the instructions of site engineer.	nos	34673.00	1	34673.00
10		Supply installation testing wiring and commissioning of complete Integrated power supply systems(SMPS based) with battery set 300AH, hydrometer suitable for EI/PI/RR1 and including charging of batteries, supply of battery wires, fabrication and fixing of fuses/terminations on power distribution panel.	set	1126900.00	1	1126900.00
11		Supply installation testing wiring and commissioning of complete Integrated power supply systems(SMPS based) with battery set 200AH, hydrometer suitable for suitable for midsection LC gate/IBH/auto huts and including charging of batteries, supply of battery wires, fabrication and fixing of fuses/terminations on power distribution panel.	set	899160.00	4	3596640.00
12		Track Crossing by Horizontal boring method based on the RDSO report No.BS-105. This also includes insertion of HDPE duct (pipe)_ of 110mm dia in the bore drilled. (Supply of HDPE duct (pipe) is not included).	MTR	1774.58	2000	3549160.00
13		Supply and installation of De-ioniser plant (Aqua-Ion Model No. ACAMB 4 Bed Type).	NOS	43374.00	1	43374.00
Total for Schedule D (13 items)						10472411.00
Tenderer's / Contractor's Percentage (Above/Below/At par) in figure						
Tenderer's / Contractor's Percentage (Above / Below / At par) in Word						
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**Seal & Signature of the Bidder**

**NAME OF WORK** : -Signalling outdoor works at Anekal Road, IBS, Maranayakanahalli and Hosur with MSDAC, Integrated power Supply and interlocking of LC Gates in connection with doubling of BAIYAPPANAHALLI-HOSUR section of Bangalore Division

**SCHEDULE "H"**

SL.NO	DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
1	Supply of Adjustable Track Feed Resistance, Disc type, 30 Ohm, with phenolic moulded base, as per Drg.No.SA-20166/M(Adv.) or latest	NOS	295.00	20	5900.00
2	Supply of 20 pair Krone box with modules and mount assembly wall mounting type powder coated with surge and lighting arrester and locking facility.	NOS	1545.00	7	10815.00
3	Supply of Telecom termination panel with WAGO type disconnecting terminals blocks of size 1500mm x 500mm x 200mm thickness 1.6mm (16 SWG) 150 numbers of disconnecting terminal block with accessories. (The box should be divided in to two compartments 500mm from TOP with door arrangements including locking and bottom 1000mm closed fully with screws WAGO terminals 280-870 suitable for cable dimensions maximum of 2.5 sq mm. Provision of easy and ensuring aesthetics.	NOS	38000.00	3	114000.00
4	Installation of 100/50/20 pair Krone box duly fixing the same on wall as directed by KRIDE representative.	NOS	550.00	3	1650.00
5	Fixing of Telecom Termination Panel and termination of cables on WAGO/KRONE connectors as per the instructions of the site Engineer.	NOS	4500.00	3	13500.00
6	Supply and Laying of PVC Warning Tape colour Orange, width of 250mm (10") by printing with black letters 'Indian Railway Signal/Telecom/OFC Cable' on both sides	km	42600.00	8	340800.00
7	Supply and installation of wire insulator for wire operating level crossing, lifting barriers/ signals as per specification No.IRS: 541-74 flnsnction:	NOS	2918.00	20	58360.00
8	Supply and installation of insulator of point rodding at function end and lever end and lever end as per instruction of site engineer.	NOS	2624.00	10	26240.00
9	Supply of single phase air cooled silent DG set (CPCB compliant) of 10KVA	NOS	267300.00	1	267300.00

SL.NO	DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
10	Supply and Placing of Polyolefin Cable channel of size, Width 240/340 mm, Height 155/230 internal/external, length 1 m produced of polyolefin with Fire protection class k-1 in accordance with DIN-53438 Part II for laying Signalling/ Telecom cables, channel attachable to each other with malefemale swallow tail connectors and having suitable detachable cover	MTR	2521.00	3000	7563000.00
11	Excavation of cable trench in hard rocky areas/hard soil including clearing of roots of trees, rocks, bushes etc., to a depth of 0.6 mtrs., and to a width of 0.5 mtrs., and refilling of cable trench 0.6m depth by 0.5m with throughout, with earth after laying of cables, and consolidation the trench by ramming and leveling. Laying of cables is not included in this schedule.	MTR	80.00	300	24000.00
12	Supply and laying of Split DWC pipe of 120/103 mm dia, 2 meter long in already dug cable trenches. The unit of RMT means two split pipes of 1 Mtr each. Material shall be supplied as per specification RDSO/SPN/204/2011 or latest" {Per Unit-RMT}	per unit	284.00	12000	3408000.00
13	Laying of PLB HDPE Duct, 40/33 mm Dia, in the trenches and in the protective works already provided including in HDD portion and supply pulling of Nylon rope through it at different places as per direction of engineering charge or site engineer.	km	10360.00	14	145040.00
14	Duct Integrity test for PLB HDPE Duct, 40/33 mm Dia, as per specification	km	1287.00	14	18018.00
15	Supply and Provision of Mid-Section OFC Joint including Splicing (24 Fibre) inside already prepared jointing pit. This does not include provision of Joint chamber, top plate and back filling. The joint Enclosure shall be as recommended in the Technical specification.	Nos.	10302.00	12	123624.00
16	Blowing of OFC cable(24F as per RDSO specn.TC 55-2006 Rev.1 with amendment 1.1) in already laid PLB HDPE Duct, 40/33mm Dia, by using Blowing machine, providing the sufficient loops in loop/joint chambers and other sociated works.	KM	14793.00	14	207102.00

SL.NO	DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
17	Supply Installation testing and commissioning of Multi section Digital Axle counter (MSDAC) as per RDSO specification no.RDSO/SPN/176/2013 version.3 with latest amendments. a) The tenderer shall design the scheme for provision of required number of Evaluator, track side junction Box, detection points etc. b) MSDAC application in the yard will be in place of track circuits with single detection and dual detection for Block working with SSBPAC (c) length of cable required for each track devised-5/10/15 mtrs.	Per DP	530000.00	60	31800000.00
18	Supply of essential 10% spare for MSDAC. Detailed cost and quantity wise break up of spares should be given.	Set	1163000.00	2	2326000.00
19	Design of axle counter circuit, indoor installation, testing and commissioning of Multi section digital,axle counter	per Stn	135000.00	3	405000.00
20	Outdoor equipment installation, testing and commissioning of Multi section digital,axle counter	Per DP	15000.00	60	900000.00
21	Tool set for wheel sensor mounting and maintenance of MSDAC consisting of torque wrinch, ratchet, testing plate, measuring tape, scew driver, hand gloves & multi meter fluke115	Nos	105000.00	2	210000.00
Total for Schedule H (21 items)					47968349.00
Tenderer's / Contractor's Percentage (Above/Below/At par) in figure					
Tenderer's / Contractor's Percentage (Above / Below / At par) in Word					
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**Seal & Signature of the Bidder**

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**SCHEDULE "J"**

SL.NO	DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
1	Supply of Outdoor signaling cable - 2 core X 2.5 sq.mm. in drum length of 1 km	Mtrs	77.60	3000	232800.00
2	Supply of Outdoor signaling cable - 12 core X 1.5 sq.mm. in drum length of 1 km	Mtrs	162.00	15000	2430000.00
3	Supply of Outdoor signaling cable 30 core x 1.5 sq.mm in drum length of 500 mtr	Mtrs	360.00	8000	2880000.00
4	Supply of Outdoor signaling cable 24 core x 1.5 sq.mm in drum length of 500 mtr	Mtrs	280.00	8000	2240000.00
5	Supply of Outdoor signaling cable - 19 core X 1.5 sq.mm. in drum length of 500Mtr	Mtrs	233.00	10000	2330000.00
6	Supply of Aluminium Conductor Power cable 2 Core X 25 sq.mm.	Mtrs	77.00	19000	1463000.00
7	Supply of Aluminium Conductor Power cable 2 Core X 35 sq.mm.	Mtrs	99.90	8000	799200.00
8	Supply of Underground Jelly filled 0.9mm dia , 6 Quad cable	Mtrs	213.00	36000	7668000.00
9	Supply Tele cable 10 pair 0.63mm PIJF	Mtrs	68.64	1500	102960.00
10	Supply of 24 fibre armoured Optic Fibre Cable	Mtrs	66.00	14000	924000.00
11	Supply of LED Signal Unit for RED aspect integrated type	Nos	8452.00	30	253560.00

SCHEDULE "J"					
SL.NO	DESCRIPTION OF ITEMS	UNIT	RATE	QUANTITY	AMOUNT
12	Supply of LED Signal Unit for YELLOW aspect integrated type	Nos	8452.00	35	295820.00
13	Supply of LED Signal Unit for GREEN aspect integrated type	Nos	9380.00	25	234500.00
14	Supply of calling on LED 110V AC	Nos	6699.00	8	53592.00
15	Supply of Junction type route indicator LED 110VAC		5880.00	45	264600.00
16	Supply of shunt signal LED 110V AC	Nos	5880.00	25	147000.00
17	Electrical point operating machine IRS Type 220 mm throw with lock & detector slides cable termination box and clamp lock arrangement with ground connection for thick web switches	Nos	172369.00	10	1723690.00
18	Electrical point operating machine IRS Type 143 mm throw with lock & detector slides cable termination box and clamp lock arrangement with ground connection for thick web switches	Nos	80111.00	22	1762442.00
19	Supply of Relay QN1 8F/8B configuration	Nos	4200.00	300	1260000.00
20	Supply of key lock Check relay	Nos	11210.00	6	67260.00
21	Supply of Relay QNA1 8F/8B configuration	Nos	4170.00	300	1251000.00
22	E-Type lock	Nos	907.00	20	18140.00
23	Supply of Data Logger - Remote Terminal Unit in 64 digital and 16 analog inputs	Nos	261219.00	4	1044876.00
Total for Schedule J (23 items)					29446440.00
Tenderer's / Contractor's Percentage (Above/Below/At par) in figure					
Tenderer's / Contractor's Percentage (Above / Below / At par) in Word					
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<b>SCHEDULE "K" - Item of miscellaneous works</b>					
<b>SI No.</b>	<b>Description of Item</b>	<b>Unit</b>	<b>Qty</b>	<b>Rate</b>	<b>Amount</b>
1	<b>a.</b> Providing Toyota Innova Crysta / Toyota Corolla Altis / Honda Civic or similar approved road vehicle(s) as per relevant special conditions	per month	18	54000.00	972000.00
	<b>b.</b> Providing Toyota Yaris G CVT / Honda City 2020 / Hyundai Verna 1.6 CRDI SX(O) / Skoda Rapid 1.5 TDI CR Ambition AT or similar approved road vehicle(s)	per month	18	48000.00	864000.00
	<b>c.</b> Providing Maruti Swift DZIRE / Toyota Etios or similar approved road vehicle(s)	per month	18	40000.00	720000.00
2	Extra payment for providing any of the vehicles mentioned in item no. 1(a) /1(b)/1(c) as per the criteria/ stipulations/specifications/conditions mentioned therein including the notes and in the ASC, with Driver(s) cum Attendant(s) beyond 12 hours a day	Vehicle Hours	432	150.00	64800.00
3	<b>Extra</b> payment for extra distance run, over and above 3000 km per month on certification by the user official				
	<b>a.</b> For the class/type of the vehicle mentioned in item no. 1(a)	Vehicle KM	720	15.00	10800.00
	<b>b.</b> For the class/type of the vehicle mentioned in item no. 1(b)	Vehicle KM	720	13.00	9360.00
	<b>c.</b> For the class/type of the vehicle mentioned in item no. 1(c)	Vehicle KM	720	12.00	8640.00
4	Extra payment for extra days of run, over and above 26 days per month on certification by the user official				
	<b>a.</b> For the class of the vehicle mentioned in item no. 1 (a) with all conditions therein	Vehicle day	72	2100	151200.00
	<b>b.</b> For the class of the vehicle mentioned in item no. 1 (b) with all conditions therein	Vehicle day	72	1900	136800.00

SCHEDULE "K" - Item of miscellaneous works					
SI No.	Description of Item	Unit	Qty	Rate	Amount
	c. For the class of the vehicle mentioned in item no. 1 (c) with all conditions therein	Vehicle day	72	1600	115200.00
5	Extra payment for extra distance run, over and above 3000 km per month on certification by the user official	Vehicle KM	4000	2.5	10000.00
Total for Schedule K (5 items)					3062800.00
Tenderer's / Contractor's Percentage (Above/Below/At par) in figure					
Tenderer's / Contractor's Percentage (Above / Below / At par) in Word					
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