



इरकॉन इंटरनेशनल लिमिटेड
(भारत सरकार का उपक्रम)
IRCON INTERNATIONAL LIMITED
(A Govt. of India Undertaking)
An integrated Engineering and Construction Company



सोन भवन (प्रथम तल), दारोगा प्रसाद राय पथ, पटना - 800 001, फोन : 0612-2506446, फैक्स : 0612-2506888
Sone Bhawan (First Floor), Daroga Prasad Rai Path. Patna - 800 001, Phone : 0612-2506446, Fax : 0612-2506888

LETTER OF ACCEPTANCE

No: IRCON/2066/S&T/EI/BPPL/277

Date: 28/02/2023

M/s Baba Projects Pvt. Ltd.
Qrt. No.2K/74, Bariatu Housing Colony,
Bariatu Road, Ranchi-834009, Jharkhand

Kind Attn: Shri Ram Lakhan

Sub: Design, Supply, Installation, Testing and Commissioning of Electronic Interlocking based signalling system at Tal Jn, Rajendra Pul, Hathidah Link & Rampur Dumra station of Danapur Division of EC Railway.

Ref: 1. Tender No. IRCON/2066/S&T/RDUM-TAL-RJO/TENDER/1(R) Dated: 11.01.2023.
2. Corrigendum No.1 dated 28.01.2023.
3. Your Technical Bid Opened on 01.02.2023
4. Your Financial Bid Opened on 23.02.2023.

Dear Sir,

1. In reference to the above, your offer for above referred tender has been accepted by the Competent Authority at a total cost of **₹41,55,75,511.00** (Rupees Forty-One Crore Fifty Five Lakh Seventy Five Thousand Five Hundred Eleven only) including GST @18% and all taxes & duties.
2. **Scope of Work:**
Design, Supply, Installation, Testing and commissioning of Electronic Interlocking System conforming to specification No. RDSO/SPN/192/2005 with latest amendments including all Indoor, Outdoor S&T works at Tal Jn, Rajendra Pul, Hathidah Link & Rampur Dumra station of Danapur Division of EC Railway, in connection with Additional Bridge & Doubling of EC Railway. For detailed scope of work refer clause 2.0 of SCC.
3. **Bill of Quantities (BOQ)**, indicating the quantities and rates of the items is enclosed as Annexure - A.
4. **Taxes and Duties:** For compliance refer clause no 7.0 of SCC.
5. **Price Adjustment/Price Variation Clause:** Price adjustment shall be as per clause 46A the provisions given in IR GCC of April, 2022.

Baba Projects Pvt. Ltd.
Director

जिकृत कार्यालय : सी-4, डिस्ट्रिक्ट सेंटर, साकेत, नई दिल्ली . 110017, भारत
Registered Office : C-4 District Centre, Saket, New Delhi - 110017 (INDIA)
Tel.: +91-11-29565666 Fax : +91-11-26854000 : E-mail : info@ircon.org : Web : www.ircon.org
CIN : L45203DL1976GO1008171



6. **Completion Period:**

The entire work shall be completed within fifteen (15) months from the date of issue of Letter of acceptance (LOA). You have to submit detailed program for each major element of the work using modern network technique for project monitoring for approval of the engineer. For compliance refer clause 10.0 of SCC.

7. **Defect Liability Period:**

Defect Liability Period will be 12 months from the date of issue of completion certificate by the Engineer. For compliance refer clause 11.0 of SCC

8. **Insurance:**

For compliance refer clause 12.0 of SCC.

9. **Performance Guarantee & Security Deposit/Retention Money:**

- i. Performance Guarantee in the form of irrevocable Bank Guarantee (BG) on the Proforma annexed as Annexure-IX from any Scheduled Bank for an amount of 3% (Three percent) of the contract value i.e. **₹1,24,67,266.00 (Rupees One Crore Twenty Four Lakhs Two Hundred Sixty Six)** to be submitted within 21 (Twenty-One) days with the validity of seventeen (17) months from the date of issue of Letter of Acceptance (LOA).
- ii. Additional Performance Guarantee in the form of irrevocable Bank Guarantee (BG) on the Proforma annexed as Annexure-IX from any Scheduled Bank for an amount of 3% (Three percent) of the contract value i.e. **₹2,89,32,472.00 (Rupees Two Crore Eighty Nine Lakhs Thirty Two Thousand Four Hundred Seventy Two)** to be submitted within 21 (Twenty-One) days with the validity of seventeen (17) months from the date of issue of Letter of Acceptance (LOA).
- iii. Retention money for all contracts shall be recovered from on account/ final bills of the Contractor @ 10% of gross value of each bill after adjusting EMD amount till the amount so recovered including EMD amount adds upto 5% of the contract value of the work.

10. Contract Agreement shall be signed between you and IRCON INTERNATIONAL LIMITED within 28 days from the date of issue of LOA. You have to submit a non-judicial Stamp Paper of **₹1000** and attend the office of Project Director/Patna, IRCON INTERNATIONAL LIMITED, 1st Floor, Sone Bhawan, Daroga Prasad Rai Path, Patna – 800001 for Signing of Contract Agreement as per clause 16.0 of SCC.

11. You have to sign the Integrity Pact at the time of signing Contract Agreement and submit a non-judicial Stamp Paper of ₹1000 for signing the Integrity Pact as per para 10.0 of Instructions to tenderers.

12. Terms of Payment: (As per Clause 27 of SCC):

12.1. **Payment for Supply of material:**

- i) Payment @ 80% of BOQ rates shall be made on delivery of material at specified location on Project, acceptance by Engineer and submission of following documents:
 - a) Original Inspection certificate issued by Inspecting Officer.



- b) 100% Tax Invoice with detailed packing List in duplicate.
- c) A certificate that the materials supplied are as per the contract and the amount claimed in the invoice is correct as per terms of the contract.
- ii) 10% payment at the accepted rate for the quantity shall be made after installation of the material on complete station/section.
- iii) Balance 10% payment at the accepted rate for the quantity shall be paid on successful commissioning and issue of Completion Certificate.
- iv) Also 10% payment against supply of material supplied for installation but not installed due to non-requirement of employer, due to change in design, drawing, scope of work etc. subsequent to the award of work, shall be paid after issue of Completion Certificate for the work and handing over the materials to the client.

12.2. Payment for Installation:

- i) Payment @90% of BOQ rates for the quantity shall be made after installation of the items, duly verified by IRCON's Engineer for individual item.
- ii) Payment @10% of BOQ rates for the quantity shall be paid on successful testing and commissioning of the work by contractor for the station including opening of traffic and issue of completion certificate, and submission of all as-built documents as per the **Contract**.

12.3. Payment for Deployment of skilled Manpower:

Payment @ 100% BOQ rates for the man month as per actual deployment of staff duly certified by employer or his representative.

12.4. Payment for Provision of Vehicle:

Payment @ 100% BOQ rates for the quantity executed each month shall be made at the end of the month after verification of necessary records like logbook etc.

12.5. Payment of Composite items involving both supply and installation:

On certification by IRCON's Engineer, such items shall be paid as under (only on production of documents as per clause 27.2.1 (i) above)

- i) Payment @ 70% BOQ rates of the item shall be made on delivery, submission of documents mentioned at clause 27.2.1 (i), and acceptance of material by Engineer.
- ii) Payment @ 30% BOQ rates of the item shall be made on successful installation of the materials/equipment duly certified by IRCON's Engineer.
- iii) For items which could not be installed because of valid reasons, balance payment @ 30% of BOQ rates shall be made on issue of completion certificate for the work.

13. The Accounting unit for this project shall be Project office of IRCON at Patna, Bihar.

14. The contractor shall not claim any undue benefit arising due to any calculation/ printing error in the LOA. In case any calculation/printing error is detected in the LOA, the same shall be corrected at the time of Signing the Contract Agreement.

15. Until a formal agreement is executed, acceptance of this LOA by you shall constitute to be a binding of contract.

16. All other terms & conditions shall be as per the Tender Documents accepted by you, which shall form an integral part of this contract and shall be binding on you.
17. Two copies of this LOA are being sent herewith. Kindly acknowledge receipt as a token of unconditional acceptance and return one copy of the LOA, duly signed, and stamped by your authorized representative on each page, to this office within one week of issue of this LOA.

Thanking you,

DA:- Annexure A- BOQ

for and on behalf of
Ircon International Ltd.


(Sanjay Kumar)
CGM/Electrical/Patna.


Baba Projects Pvt. Ltd.
Director

BILL OF QUANTITY

Name of Work: - Design, Supply, Installation, Testing and Commissioning of Electronic Interlocking based signalling System at Tal Jn, Rajendra Pul, Hathidah Link & Rampur Dumra station of Danapur Division of EC Railway.

Bill of Quantity

SN	Description of Item	Unit	Qty	Rate (₹)	Amount Without GST
	SUPPLY-Signalling Materials				
	General Note: -				
i	The Materials which are to be inspected by RDSO should be supplied from RDSO Approved Firms/Suppliers (RDSO approved vendors and RDSO vendors for Developmental Order). If RDSO's Approved Firms/Suppliers are not available then from any other reputed manufacturer/firm as approved by IRCON.				
ii	All critical items as per RDSO guidelines will be inspected by RDSO as per instruction contained in Board's letter No. 74/RS(G)/379/2Pt.dated;4/3/91 and 18/6/91				
iii	The materials, which are procured from RDSO Approved vendors with RDSO specification and if the cost of the material is over Rs. 5 Lakh, the inspection shall be carried out by RDSO.				
iv	Inspection in respect of order below Rs.5 lakh may be got done by RITES/Consignee, subject to supplies being from sources listed by RDSO.				
v	Signalling items which are not inspected by RDSO/RITES shall be inspected by Consignee.				
vi	Current RDSO/TEC specifications are mentioned here. However, while procuring only the LATEST RDSO/TEC SPECIFICATION will prevail and material to be supplied & inspected as per latest specifications.				
vii	Some of items will be carried out in phase-2 work as non-schedule which are not identified.				
	Electronic Interlocking System				
1	Design, Manufacture and Supply of Electronic Interlocking System (hot standby configuration) confirming to RDSO's specification No. RDSO/SPN/192/2019 Ver.2.0 and directive issued by Railway Board and RDSO as applicable at the date of supply/installation complete as per the Signalling Interlocking Plans (SIPs) enclosed for Tal Jn., Hathidah Link, Rajendra Pul and Rampur Dumra station. EI at all stations shall be complete with but not limited to:				
a)	Microprocessor Equipment (having hot standby system provided with facility of automatic changeover), other cards and assemblies/sub-assemblies.				
b)	All type of interface Relays such as TPR's, WKR's, ECR's (suitable for LED signals), Point operation Relays, point group relay, other interface Relays etc. and any other relay to be required to make the given EI and associated system functional. All the indoor relays shall be provided to suit 25 KV RE. Details of these relays are given in Technical Specifications.				
c)	Industrial grade Operator Console with 55" VDU (2 Nos each per station) & Industrial grade Maintenance console with 42" VDU as per latest RDSO. Guideline & technical advisory note (TAN), online Dot matrix printer with power supply etc. Also the furniture like table etc required for mounting the VDU shall be provided by the contractor.				
d)	Equipment racks, Relay racks, Rack fixture mounting arrangements and accessories.				



e)	Interconnecting cables and interfacing equipment required for interfacing the EI with outdoor gears, Data Logger system, Block proving Axle counter system, monitoring of Power Supply for IPS system etc.				
f)	Optical cables along with interfacing equipment etc.				
g)	Protective Devices like Fuses, Lightning arrestors (Class- A) and surge protection arrangement, equipotential bonding as per latest RDSO guidelines, etc.				
h)	All the consumables, wiring materials, fixtures, mounting arrangements and necessary accessories to install and make the EI system functional.				
i)	Supply of Software as per design for Electronic Interlocking System confirming to RDSO's specification No. RDSO/SPN/192/2005 or latest to suit Signalling Interlocking Plans (SIP's) enclosed including FAT.				
j)	Station master is to be provided with 2 VDU only. However, SM Room & Equipment rooms may be situated in two different buildings and therefore may be required to be provided with augmented surge protection /optical interface by EI manufacture.				
k)	Supply of documents/manuals (six set per station) as per RDSO Specification no. RDSO/SPN/192/2019				
l)	Supply of 10 % spares for the items such as relays, group relays, wire, terminals, cards/modules as recommended by OEM, connectors/ couplers, fuses minimum of one for use in the complete SSI / EI system.				
m)	Supply & installation of Ring Earth for EI system shall be done by the OEM as per latest TAN and guidelines issued by RDSO.				
n)	All accessories necessary to make the system functional shall be provided by the contractor even if the same is not mentioned in the BOQ.				
1.1	Rampur Dumra	Nos.	1	2,95,02,849	2,95,02,849
1.2	Rajendrapul	Nos.	1	1,74,94,610	1,74,94,610
1.3	Tal	Nos.	1	2,32,67,802	2,32,67,802
1.4	Hathidah Link	Nos.	1	2,59,61,958	2,59,61,958
	Notes				
a)	The EI equipment offered shall cater for 20% increase in field input quantities in future. The necessary hardware provided shall be such that it shall be possible to incorporate 20% increase in field input quantities without requirement of any additional hardware other than relays, cables.				
2	Supply of portable workstation to run along with EI configuration tools, data inputs, simulation and functional testing, diagnostic, troubleshooting & commissioning of EI System as per Technical Specification of the tender document.NOTE: Workstation should be capable of reconfiguring the system in case of any alterations in the yard or interlocking in future. Hardware configuration to be approved	Nos	4	1,37,093	5,48,372



	by IRCON before supply.				
3	Supply of powder coated Main Cable Termination Rack complete with scaffolding, fixtures & accessories including square bars for mounting wago terminals, ladder, string rods, frame, base assembly, insulators, J bolt, nut/bolts & fasteners, bakelite sheet, etc..	Nos.	12	51,591	6,19,092
4	Supply of Wago/phoenix screwless 4 conductor disconnecting terminal suitable for copper wire of 0.5 sqmm to 4 sqmm as per spec no. RDSO/SPN/189/2004 ver 1.2. This also includes end stopper, End plate, Carriage Rail, Marker Strip etc. for the fixing of terminals.	Nos.	28000	88	24,64,000
5	Supply & Installation of Universal Earth Leakage Detector 12 Channel AC/DC as per RDSO/SPN/256/2002 or latest amendment.	Nos.	4	1,70,091	6,80,364
	Relays				
6	Supply of Relay AC immune miniature plug in neutral line tractive armature 24 V DC, Contacts front & back contacts metal to carbon complete with plug board retaining clip & connectors confirming to BRS -931 A and as per RDSO Specn.No. IRS-S-34, IRS-S-23 IRS-S-60/78 or latest RDSO Specification.-QNA1 (Contact configuration 12F/4B).	Nos	50	4,064	2,03,200
7	Supply of Relay AC immune miniature plug in neutral line tractive armature 24 V DC, Contacts front & back contacts metal to carbon complete with plug board retaining clip & connectors confirming to BRS -931 A and as per RDSO Specn.No. IRS-S-34, IRS-S-23 IRS-S-60/78 or latest RDSO Specification.-QNA1 (Contact configuration 8F/8B).	Nos	50	4,064	2,03,200
	Datalogger:				
8	Supply of Microprocessor based data logger with 512 Digital & 32 Analog Inputs as per RDSO specification No. IRS:S 99/2006 (amdt. 3) with latest amendments and shall be suitable to work with electronic interlocking system. It includes all interfacing equipment like protocol converter unit etc. It also includes design, supply and installation of all software required as standard practice of ECR and as per RDSO specification no. IRS:S 99/2006 or latest. Digital input to be taken from EI through protocol converter and in addition one digital input card to be provided for digital input of important interface relays. This also includes supply of Leased line MODEM for networking of Datalogger, power supply of adequate capacity, battery and fault diagnostic software for failure analysis. Complete Data Logger &	Nos.	4	4,44,929	17,79,716

	Processor Module shall be placed in President/Rittel rack of suitable size to be supplied. This also includes supply of one no. of Computer, Computer Table (Godrej make), UPS, Printer and one no. Operator Chair (Godrej make) as per Technical Specification Tal Jn., Hathidah Link, Rajendra Pul and Rampur Dumra Station. It is also includes-Supply of Door Proximity switches along with 2 way rigid connector for wire termination between proximity switches and Datalogger Tag blocks as per specification.				
9	Supply of Door Proximity switches along with 2 way rigid connector for wire termination between proximity switches and Datalogger Tag blocks as per specs.	Nos.	4	588	2,352
	Power Supply:				
10	Supply of SMPS Based Integrated Power Supply System (6 Lines) including supply of 110V/300AH Low Maintenance Lead Acid (LMLA) stationery battery for S&T installation as per IRS: S-88/2004 or latest and with SMPS charger as per RDSO Specification No. RDSO/SPN/165/2012 with latest amendment with wooden battery rack for LMLA Batteries, remote indication panel, 05 nos. spare batteries and spares with tool kit as per RDSO list. Tentative drawing of IPS is attached with this tender document but current/voltage ratings of different modules may change as per actual load requirement.	Set	4	12,05,534	48,22,136
	Block Working				
11	Supply of UFSBI (2 nos. as per RDSO/SPN/147/2005 or latest), SM's Panel for Single line (2 nos as per RDSO/S/32019 or latest RDSO specification), block telephone & Relay Rack completely wired fully with all relays required for Block working with Axle Counter in RE area.	Set	1	8,58,544	8,58,544
12	Supply of Block Proving with Digital Axle Counter using UFSBI & Block Panel as per RDSO Specification No. IRS:S-105/2012 (Ver.0) with latest amendment for Double Line operation, block telephone & Relay Rack with due locking & sealing arrangement completely wired fully with all relays required for Block working with Axle Counter & suitable for RE area	Set	4	11,16,521	44,66,084
	NOTE: The entire system shall work on OFC/Quad. The block telephones also provided shall have the provision of working on OFC/Quad.				

13	Supply of Automatic Media changeover System of modem working on redundant channels for data transmission on OFC/ Quad for seamless operation of UFSBI over multiple media as per RDSO specification no. RDSO/SPN/147/2005 with Amendment 1 or latest.	Pair	1	32,009	32,009
14	Supply of Modem compatible with existing UFSBI System to work on backup media. The back media can either unframed 2 Mbps E1 Channel from STM or on VF-channel from P-Mux or direct dark Single mode optic Fiber Cable upto 30 Km.	Pair	1	65,959	65,959
15	Supply of High Availability Single Section Digital Axle Counter (HASSDAC) System with DUAL track sensor devices (relays, surge protection devices, clamping & mounting arrangement, cables & other accessories) conforming to RDSO spec no. RDSO/SPN/177/2012 (ver.3) or latest guideline by RDSO letter no. TE/E/AC/Digital/Genl dated 27.07.2011 Dual redundant should be done as per Dual track sensor inputs fed to different channels of HASSDAC as per latest guideline issued by RDSO for the same.	Pair	9	9,78,470	88,06,230
16	Supply & installation of VF transformer (1120/470) as per IRS Spec. No. TC-22-1976 or latest with suitable fixtures and wiring. Supply of all the fixtures and wiring materials will be done by contractor	No.	12	854	10,248
	Signals				
17	Supply of FRP CLS Unit 2 Aspect (without lenses and lamps) as per spec. no. RDSO/SPN/194/2006 Ver 2.0 or latest. This includes: a. Signal post 140 mm dia 4.6 / 3.6 mtrs. long to IRS-S-6-81.=1no b. Signal Base C I 140 mm dia. to drg. No.S-2011.=1no c. CLS ladder complete with platform and Signal front staging as per Drg,Base 4.5 / 3.5 mtrs. long to drg.No.SA-23153 (Adv.) Alt 1.= 1no d. FRP CLS unit 2 aspect complete to drg. No SA - 23003 A/M to C/M (Adv.), without Lamps, transformer, Lamp holder & lenses =1no e. 4 nos of Anchor bolt complete with nut washer etc as per Drg no 116 A/H. f. Supply of Universal lock with key (hand cuff) & signal number plate.	Nos.	26	41,742	10,85,292


Baba Projects Pvt. Ltd.
Director



18	Supply of FRP CLS Unit 3 Aspect (without lenses and lamps) as per spec. no. RDSO/SPN/194/2006 Ver 2.0 or latest. This includes: a. Signal post 140 mm dia 4.6 / 3.6 mtrs. long to IRS-S-6-81.=1no b. Signal Base C I 140 mm dia. to drg. No.S-2011.=1no c. CLS ladder complete with platform and Signal front staging as per Drg, Base 4.5 / 3.5 mtrs. long to drg.No.SA-23153 (Adv.) Alt 1.= 1no d. FRP CLS unit 3 aspect complete to drg.No SA – 23003 A/M to C/M (Adv.), without Lamps, transformer, Lamp holder & lenses =1no e. 4 nos of Anchor bolt complete with nut washer etc. as per Drg no 116 A/H . f. Supply of Universal lock with key (hand cuff) & signal number plate.	Nos.	37	49,516	18,32,092
19	Supply of FRP CLS Unit 4 Aspect (without lenses and lamps) as per spec. no. RDSO/SPN/194/2006 Ver 2.0 or latest. This includes: a. Signal post 140 mm dia 4.6 / 3.6 mtrs. long to IRS-S-6-81.=1no b. Signal Base C I 140 mm dia. to drg. No.S-2011.=1no c. CLS ladder complete with platform and Signal front staging as per Drg, Base 4.5 / 3.5 mtrs. long to drg.No.SA-23153 (Adv.) Alt 1.= 1no d. FRP CLS unit 3 aspect complete to drg.No SA – 23003 A/M to C/M (Adv.), without Lamps, transformer, Lamp holder & lenses =1no. e. 4 nos of Anchor bolt complete with nut washer etc as per Drg no 116 A/H . f. Supply of Universal lock with key (hand cuff) & signal number plate.	Nos.	10	51,992	5,19,920
20	Supply of FRP Route Indicator 3 way (without lenses and lamps) as per RDSO Spec. no. RDSO/SPN/194/2006 Ver 2.0 with latest amendments.	Nos.	3	41,465	1,24,395
21	Supply of FRP Route Indicator 2 way (without lenses and lamps) as per RDSO Spec. no. RDSO/SPN/194/2006 Ver 2.0 with latest amendments.	Nos.	6	37,319	2,23,914
22	Supply of FRP Route Indicator 1 way (without lenses and lamps) as per RDSO Spec. no. RDSO/SPN/194/2006 Ver 2.0 with latest amendments.	Nos.	6	33,587	2,01,522
23	Supply of FRP Calling on signal (without lenses and lamps) as per RDSO Spec. no. RDSO/SPN/194/2006 Ver 2.0 with latest amendments.	Nos.	12	4,112	49,344



24	Supply of FRP Shunt signal Dependent type complete along with offset bracket (without lenses and lamps) as per RDSO Spec. no. RDSO/SPN/194/2006 Ver 2.0 or latest.	Nos.	32	7,933	2,53,856
25	Supply of FRP Shunt signal Independent type complete as per RDSO Spec. no. RDSO/SPN/194/2006 Ver 2.0 or latest with steel post & CI base along with anchor bolts as per RDSO drawing (without lenses and lamps). This includes supply of Hand cuff Locks & signal number plate.	Nos.	20	13,240	2,64,800
26	Supply of LED Signal Lighting Unit (Red) for Main Signals as per RDSO Specification No. RDSO/SPN/199/2010 (Rev 1.0) dated 11.04.14.	Nos.	73	11,180	8,16,140
27	Supply of LED Signal Lighting Unit (Yellow) for Main Signals as per RDSO Specification No. RDSO/SPN/199/2010 (Rev 1.0) dated 11.04.14.	Nos.	77	11,180	8,60,860
28	Supply of LED Signal Lighting Unit (Green) for Main Signals as per RDSO Specification No. RDSO/SPN/199/2010 (Rev 1.0) dated 11.04.14.	Nos.	46	11,180	5,14,280
29	Supply of LED Signal Lighting Unit for Route Indicator as per RDSO Specification No. RDSO/SPN/153/2011 (Rev 4.1).	Nos.	123	7,283	8,95,809
30	Supply of LED Signal Lighting Unit for Calling On Signals as per RDSO Specification No. RDSO/SPN/153/2011 (Rev 4.1)	Nos.	12	7,283	87,396
31	Supply of LED Signal Lighting Unit for Shunt Signals as per RDSO Specification No. RDSO/SPN/153/2011 (Rev 4.1).	Nos.	124	7,283	9,03,092
32	Supply of LED Signal Lighting Unit for Shunt Signals as per RDSO Specification No. RDSO/SPN/153/2011 (Rev 4.1).	Nos.	259	7,283	18,86,297
Point Machine					
33	Supply of Electrical point operating machine - IRS Type, 143 mm throw (AC immunity 160 V AC), non trailable to operate on 110 V DC with lock & detector slides, Cable terminal box conforming to IRS: S-24/2002 or latest RDSO specification & for Motor IRS: S37/82, Assy Drg RDSO-S:10800 & S:10910 with complete Ground connection for 143 mm throw IRS type machine with latest amendments.	Nos.	86	86,548	74,43,128
34	Supply of Key Lock Relay with different ward combinations (one extra set of ward plates for Point Machine to be supplied with each relay) as per Railway Practice.	Nos.	47	6,296	2,95,912
Multi-section Digital Axle counter (MSDAC)					
35	Supply of Multi-section Digital Axle Counter conforming to spec RDSO/SPN/176/2013 (VER 3) with latest amendments, equipped for required hardware, Central Evaluator, Reset Box, LV Box, necessary fitting / fixtures, Wheel	DP	230	5,89,831	13,56,61,130

	Sensors / Detection Points (DP) and Vital relays etc. as per extant RDSO specs for Tal Jn, Rajendra Pul, Hathidah Link & Rampur Dumra station. This includes all material required for installation as per OEM's installation manual. The Equipment should be fully wired, configured and equipped to work in redundant mode as per approved SIP of station. The rates are inclusive of earthing if required.				
	NOTE: 1. Offered MSDAC equipment above shall cater for 10% increase in field as well as Central Evaluator equipment for future requirement and 10% spare cards for central Evaluator and field equipments. 2. The Equipment must also include but not limited to: (i) Surge protection Device (ii) Installation materials.				
36	Supply of MSDAC Tool Kit, as recommended by OEM. Tentative list of each set is as under: a. Portable Data Analyzer(Downloading Event Logger Data for analysis and report generation) - 1 No. b. Pure Sine Wave Digital Multimeter Fluke Make(Model-1871) or Rishab Make(Model-28S)- 1No. c. Train Simulator Mode 11TS267P)- 1 No. d. Extender Card- 1 No. e. Dummy Wheel- 1 No. f. Ring Spanner- 1 No. each g. Open End Spanner- 1 No. each. h. Socket Spanner with handle- 1 No. i. Torque Wrench (Jaicom JPR 65 or equivalent 88NM)- 1 No. j. Screw Driver no.902- 1 No. k. Screw Driver no.935- 1 No l. Marking Jig for drilling as applicable. m. Dummy Load to check Power Supply(Resistive)- 1 No.	Set	2	2,16,579	4,33,158
	Location Boxes				
37	Supply of Apparatus Case full Case as per Drg Nos WS-8842/A with latest alteration along with miniature 'E' type locks with keys (1 key per 5 location boxes and handle) of ward Nos. 42 (E type lock & key as per spec. Nos IRS S 30 & RDSO Drg.Nos. SA 3376/M & 3377/M respectively with latest Amendment) on both the doors, duly painted with red oxide. This item also includes i) Supply of Hylam sheet (Bakelite industrial laminated paper based sheet), resin bonded 10 mm thick, grade P3 in standard size of 1.22 x 1.22 mtrs. as per specn. No. IS 2036 of 1974. - as per requirement for termination of cables and for shelf for fixing equipments.	Nos.	120	21,229	25,47,480

38	Supply of Apparatus Case Half Case as per Drg Nos WS-8842/A with latest alteration along with miniature 'E' type locks with keys (1 key per 5 location boxes and handle) of ward Nos. 412(E type lock & key as per spec. Nos IRS S 30 & RDSO Drg.Nos. SA 3376/M & 3377/M respectively with latest Amendment) on both the doors, duly painted with red oxide. This item also includes i) Supply of Hylam sheet (Bakelite industrial laminated paper based sheet), resin bonded 10 mm thick, grade P3 in standard size of 1.22 x 1.22 mtrs. as per specn. No. IS 2036 of 1974. -as per requirement for termination of cables and for shelf for fixing equipments.	Nos.	60	17,126	10,27,560
39	Supply of HRC Fuses 2A / 4A / 6A (RDSO Spec. No. IRS:S-78/92) with Fuse Block (RDSO Spec. No. IRS:S-75/2006 (Rev.2) and drg. no. SA- 23748 (Alt.4)).	Nos.	480	254	1,21,920
40	Supply of 5 Amp switch, 3 pin socket , lamp holder along with 110Volt/15W LED lamp (Anchor make).	Nos.	100	464	46,400
41	Supply of M6 type ARA terminals Block made of PBT as per IRS Drg. No. SA 23741/A Alteration 4 or latest & spec. No. IRS:S-75/2006 (Rev 2) (latest) with latest amendments with disconnecting links.	Nos	150	277	41,550
Earthing					
42	Supply and installation of Normal Earth Electrode for earthing of S&T installations with all the associated assembly/materials as per EC railway practice conforming to drawing no. TCA 565 as mentioned in the technical specifications.	Per Earth	213	3,271	6,96,723
43	Supply and installation of MAINTENANCE FREE EARTHING AND BONDING SYSTEM (Two Earth Pit) as per specification no: RDSO/SPN/197/2008 or latest RDSO specification consisting: a. Earth electrodes made of high tensile low carbon steel circular rods, molecular bonded with copper on outer surface as per RDSO spn - 2 no. b. RDSO approved Earth Enhancing compound. c. (MEEB) Main equipotential earth busbar of Copper of 300x25x6 mm(Min) and (SEEB) Sub equipotential earth busbar of copper 150x25x6 mm(Min). d. Multistrand single core PVC insulated copper cable as per IS:694 -(i) of size 10 sqmm to connect individual equipment to SEEB using copper lugs with stainless steel nuts and bolts,(ii) of size 16 sqmm to connect SEEB to MEEB using copper lugs	Set	40	49,841	19,93,640

	with stainless steel nut and bolts (iii) of size 16sqmm to connect Surge protection devices(SPD) to MEEB using copper lugs with stainless steel nut and bolts (iv) of size 35 sqmm(duplicated) to connect MEEB to main earth electrode. e. Copper tape of size 25x2mm to connect the two earth pit. f. Earth pits x 150 mm to terminate on earth electrode. g. Construction of earth pit and making of earth as per RDSO specification no. RDSO/SPN/197/2008 or latest RDSO specification.				
	Supply of cables protection material				
44	Supply and fixing of RCC cable route marker engraving of Signal/Telecom cable one side and Zonal Rly on other side as per ECR Railway Practice and painting on both sides of marker with numbering with black paint . The markers should be fixed for a maximum of 30 mtrs to locate the Signaling/Telecom cable path and the marker should be visible about one feet above the ground for the clear visibility, the remaining portion of marker should be buried in the ground. Wherever track crossing are available, RCC markers are to be provided on both sides of the track for easy identification. All required materials (Supply, painting, transportation to site and fixing) are to be arranged by the Contractor.	No	900	1,170	10,53,000
45	Supply of DWC pipe with one snap fit coupler and 'O' ring conforming to RDSO/SPN/204/2011 Ver. 1.1or latest RDSO specification , Nonmetallic, corrugated, multiwalled, normal duty, pliable, without protection against chemical attack and Non flame propagating in 6 meter length of size 120 mm outer dia & 102 mm inner dia.(Permitted tolerance in dia = +/- 2 mm).	Mtr	1000	271	2,71,000
46	Supply of SPLIT DWC pipe conforming to RDSO/SPN/204/2011 Ver. 1.1 or latest RDSO specification, NonNonmetallic, corrugated, multiwalled, normal duty, pliable, without protection against chemical attack and Non flame propagating in 2 meter length of size 200 mm outer dia & 175 mm inner dia.(Permitted tolerance in dia = +/-2 mm) (TWO half round pipe constitute one split pipe)	Mtr	28000	336	94,08,000
47	Supply of Galvanized Iron pipe 100 mm dia medium grade with screw end both side and fitted with sockets as per spec. No.IS-1239, part 1 / 1990 or latest in length of approx. 6 meters	Mtr	800	1,166	9,32,800
48	Supply of RCC pipes 150mm dia, 2 Mtr long along with collars as per Spec. No.	Mtr	800	169	1,35,200

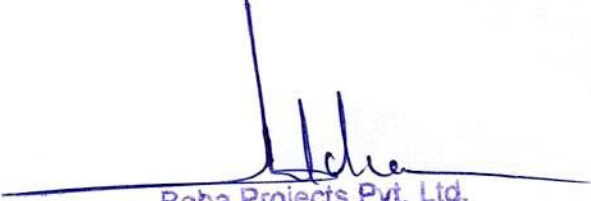


	IS/458/1971 or latest for use near OHE Substation for cable protection.				
49	Supply of integrated Electronics Cable route tracer/locator with high power transmitter for effecting long distance locating 04 active frequencies (512 Khz, 33 Khz, 133 Khz) depth range upto .9mtr passive power frequency , current and resistance measurement in both transmitter and receiver. Super induction mode, with capability of electronics marker locating (both passive and RFID) and sheath fault locating in a single equipment, weight less than 2.5Kgs for transmitter as well as receiver. Signal current measurement in cable as per technical specification No. TEC/GR/TX/TIE-07/02, March 2014.	Nos.	1	6,12,024	6,12,024
50	Supply of RFID Electronics Marker with capability of saving the user specific data inside the marker memory chip later readable by locator during locating (10cm diameter with floating coil to keep detection of circuits always horizontal for better detection) which can be buried upto a depth of 5' for signalling & telecom cable as per technical specification No. TEC/GR/TX/TIE)07/02 March 2014.	Nos.	400	3,870	15,48,000
	Operational assistance for Maintenance staff				
51	Supply of Office furniture set for relay room consisting of chairs, office table, Airy revolving & tilting cushion chair, steel almirah, steel stool of Godrej make. This includes	Nos.	4	62,879	2,51,516
a)	Office chairs of model no CH-1007 of Godrej or equivalent model of same make. - 2 no				
b)	Office tables of model no T9 of Godrej or equivalent model of same make. with 3 drawers on left hand side & one locker on the right hand side. Olive brown/green with duplicate keys. -1 no				
c)	Airy revolving & tilting working cushion chair with arm rests of model no PCH 7002 of Godrej make or equivalent of same make. -1 no				
d)	Supply of steel almirah - office storvel of Godrej make or equivalent model of same make. Size 1980 x 915 x 486 approx. with 4 shelves making 5 compartments without locker having locking door. -1 no				
e)	Steel stool Godrej make or similar ST-2 or equivalent -4 no.				
	Fire protection & Alarm system				
52	Supply, Installation, Testing and commissioning of Automatic Fire Detection & Alarm System (AFDAS) for Signalling installations as per RDSO specification no. RDSO/SPN/217/2016 Version No. 1.0 or latest consisting of probe type bimetallic heat	Per Station	4	11,60,114	46,40,456



	detector with base, UV & IR flame detectors with base, heat & smoke multisensor with base, aspirating type smoke detectors with base, linear heat sensing (LHS) cables, LHS interface module, LHS cable end of line box with modular junction box, monitor module for LHS cable alarm input to fire panel, addressable hooter, fire alarm control panel with sufficient input ports for connecting various sensors/detectors along with their interfaces, if any, and shall have sufficient output ports for controlling fire extinguishing system, operating/switching off electrical units and having provision for remote monitoring network along with software, intelligent addressable Manual call points, audio visual alarm, fire survival circuit integrity cables etc. The AFDAS shall also consist of fire suppression system as per RDSO specification. The fire alarm panel should also consist of switched mode power supply system, battery backup and charger, display board which will have character display with touch key pad, RS-232/485 Networking Circuit, USB 2.0 Port, Programmable inputs, NAC's and Programmable relays, and loop card circuits, necessary software for display of fire alarm, necessary interconnecting cables etc. Power supply Board will have SMPS fully protected board, battery backup with built in charger as per RDSO spec. This also included Supply of required number of CO2 Based Fire Extinguisher (Squeeze Grip Type) - 4.5 Kg				
	Note:- The tenderer should indicate total cost of Automatic Fire Detection & Alarm System (AFDAS) along with breakup of total cost indicating separately unit rates, quantities and total cost of each type of equipment, modules, sensors, detectors, Cables, assemblies/sub assemblies etc. as an Annexure 'C'. This list of material will be only indicative. Contractor has to supply the complete material for the commissioning of Automatic Fire Detection & Alarm System.				
	Tools & Plants				
53	Signalling Tools as per Annexure-1	Set	4	1,16,607	4,66,428
	Signalling & Telecom Cables				
54	Supply of PVC Insulated Armoured, Unscreened, Underground, Railway Signalling Cable 12 core X 1.5 sq. mm (Copper Conductor), as per Spec No; IRS:S-63/2014 (Rev.4.0) including latest amendments.	KM.	330	2,44,320	8,06,25,600
55	Supply of PVC Insulated Armoured, Unscreened, Underground, Railway Signalling Cable 6 core X 1.5 sq. mm (Copper	KM.	5	1,57,027	7,85,135

	Conductor), as per Spec No; IRS:S-63/2014 (Rev.4.0) including latest amendments.				
56	Supply of Underground Railway Jelly filled 6 Quad Cable of size 0.9 mm dia for Signalling and Telecom Installations as per Spec. No.IRS:TC-30/2005 (Ver-1) with Amdt.5. including latest amendments.	KM.	61	3,88,112	2,36,74,832
57	Supply of polythene insulated sheathed jelly filled telecom cable 20 pair 0.63 mm with poly-Al moisture buried dia as per IRS:TC 41/97	KM.	4	1,34,886	5,39,544
	SUPPLY-Telecom Materials				
	Telecommunication items				
58	Supply of 24 fibre Armoured Optic fibre Cable as per spec. IRS:TC:55/2006 Rev-1 Amd. 2 or with latest amendment:	Km	15	86,610	12,99,150
59	Supply of loose tube pigtail with FC-PC connector at one end each of minimum 10 mtrs. Length as per TEC Specification No. G/OFJ-01/03 JUN 99(with latest amendment) compatible with STM given above.	Nos	20	2,169	43,380
60	Supply of HDPE duct 40/33 mm permanently lubricated in lengths of 500 mtrs and accessories including end caps for every drum length as per RDSO Spec. no. RDSO/SPN/TC/45/2013.Rev.2.0 Amendment 1.0, including latest amendment. This includes the loading, unloading and transportation at the site of work. This also includes supply of HDPE Duct Accessories like 2(two) END PLUG, 1 (one) Cable sealing plug and 1 (one)Plastic coupler-slip fit push type for every 500m of HDPE supplied.	Km	15	71,601	10,74,015
61	Supply of managed Expendable rack type STM-1 ADM L 1.1 as per Technical Spec. No. TEC GR No. GR/SDH-04/02 Mar 02 with amendment 1 , 2 ,3 & 4 or latest RDSO specification with STM-1 aggregate interface , 21 E1S and 4 Numbers of 10/100 Base T Ethernet Port order wire, power supply unit, sub rack installation material and accessories manual etc. The equipment should be fully wired for its ultimate capacity and provide redundancy for power supply and synchronization and other detail as given in chapter 3 (model - TJ 100 MC1)	Nos.	4	2,26,908	9,07,632


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62	Supply installation testing & commissioning including earthing of 42 u 19" covered racks for housing SDH and P- MUX equipment , DDF , FMS,MDF, using krone module etc. Complete with all fittings , wired and equipped with integrated protection modules for all channels and adequate numbers of cooling fans ,AC/DC power supply distribution panels , U Link panels and other hardware like runway , ladders etc. It should be possible to lock all the equipments with only order wire telephone remaining outside the rack ..The rack should be of APW President/Rittal make . The components of the rack are specified below. Broad description of rack is detailed below .Rack size 2200(mm) H X 600(mm) W x 600(mm) D .Fixed side panels 42 U X 600 (mm) D front glass door plain 42 U X-600 (mm) D rear MS door plain 42 U X 600 (mm) D leveling screws - 4 numbers .Fan directly mounted on top 48 V DC 90 CFM - 2 Nos. earth connectivity kit - 1 No. Cable manager with cable loops-2nos.	Nos.	4	58,320	2,33,280
63	Supply and installation of rack mounted 24 fibre Fibre Distribution Management System part no FMS - 1U 24 FS 24 FP Raychem make including 24 Nos 0.2 db SC/PC adaptors and 24 Numbers. 900 micron 1.5 meter SCPC Pigtaills RDSO Specification no. : RDSO/SPN/TC/037-2000(Rev.3) or latest.	Nos.	4	29,897	1,19,588
64	Supply and installation testing and commission of 2 Mb programmable primary digital drop insert multiplexer with conference facility as per specifications IRS: TC/68/2012 Rev. 0 Amendment 1 or latest RDSO specification. fully wired for 30 channels complete with power supply unit , remote control supervision facility and all other accessories installation materials, manuals etc. It should have facility to accommodate data interface cards in multi drop mode and should be able to support card needed for video conference. Installation of managed expandable rack and krone type MDF are covered in the scope of the work.The MUX shall be equipped with following interface Cards.a) 4 wire , E & M, VF interface cards (4 Circuits per cards): Qty-4b) Subscriber loop interface cards (4 Circuits per cards): Qty-1c) Exchange loop interface cards (4 Circuits per cards): Qty-1d) G 703, 64 kbps data interface cards (4 Circuits per cards): Qty-1e) Hot Line interface cards (4 Circuits per cards): Qty-1	Nos.	4	2,23,195	8,92,780
	Power Supply				

65	Supply of SMPS based battery charger for telecom use of 230 V AC/48 V DC 25 Amps capacity. This shall be consisting of 3 modules of 12.5 Amp each in 2+1 configuration with automatic switching between the modules as per RDSO spec no RDSO/SPN/TL/23/99 (Ver-4) with latest amendment suitable for VRLA Batteries. This includes 1 sq mm copper wire in Red & Black colour for interconnecting charger to battery and equipment. This also includes surge lightening Class B, Class C & Class D protection arrangement along with other features including Annexure 1,2,3,4,5 given in RDSO spec no RDSO/SPN/TL/23/99 (Ver-4) with latest amendment.	Nos	4	81,241	3,24,964
66	Supply of SMF-VRLA Battery set of rating 48V/200 AH precharged complete with intercell connectors consisting of 24 cells of 2V 200AH each as per RDSO SPEC No IRS:S-93/96(A) Amdt 1 or latest if any. This includes supply of all necessary interconnecting cables & connectors.	Set	4	73,403	2,93,612
Control Communication					
67	Supply of Pulse/tone switchable push button telephone pulse/tone switchable Telephone set with Redial, Mute, Pause, Flash Tone / Pulse Facility as per TEC Spec No GR/TEL-02/04 Sept 02 with Amendment 2 including latest amendment.	Nos	20	670	13,400
68	Supply of way station control equipment as per spec No IRS:TC:60/2007 with latest amendment with 4 wire Control Telephone as per Spec No IRS:TC:38/97 with Amendment No 1 including latest amendment with necessary mounting arrangement as decided by site engineer.	Nos	12	6,817	81,804
69	Supply of Power Supply unit (2 Amps) with 12V/7AH MF Battery as per RDSO Spec No IRS:72/97.	Nos	8	5,335	42,680
70	Supply and installation of Class 'B' & 'C' class SPD prewired in IP 65 Polystyrene enclosure of Hensel make or better consisting of (i) MCD 50-B 320 OS (Lightning Impulse- Limp- 50 KA) Line to neutral-1 No- Indication mandatory.(i) Supply of MCB 32 AMP.(ii) MCD 125-B / NPE (Lightning Impulse Current- Limp-125 KA)- neutral to protective earth.- 1 No.(iii) V20-C/1 320V FS (Maximum discharge current - I _{max} -40KA)- Line to neutral- 1 No.- Indication & Potential free contact Mandatory.	Nos	4	20,668	82,672
71	Supply of Ultra Isolation transformer of 230 VAC/230 VAC, 1.5 KVA capacity, with MOVR protection on either side to provide "X" protection and supply of crow bar surge protection circuit for 48 V DC side to provide "Y" protection.	Nos	4	19,579	78,316

	GPS Based Clock				
72	Supply of GPS Synchronised Double face Digital Clock (RED colour LED) for platform area with GPS synchronised to operate in stand alone mode as per RDSO Specification no RDSO/SPN/TC/62/2008 Rev 3.0 (Latest amendments) (It is inclusive of GPS receiver and connecting RF cable).	Nos	4	54,216	2,16,864
73	Supply of GPS Synchronised Single sided Digital Clock (RED colour LED) for platform area with GPS synchronised to operate in standalone mode as per RDSO Specification no RDSO/SPN/TC/62/2008 Rev 3.0 (Latest amendments) (It is inclusive of GPS receiver and connecting RF cable).	Nos	4	12,268	49,072
	Public Address System				
74	Supply & Installation of Power amplifier with output 250W Make: Ahuja or similar.	Nos	4	17,250	69,000
75	Supply & Installation of Microphone Make: Ahuja or similar.	Nos	8	2,196	17,568
76	Supply of tinned copper wire, shielded screened two core size 24/0.2mm ATC, PVC insulated & PVC sheathed.	mtr	2000	67	1,34,000
77	Supply & installation of one wooden frame cabinet with rack for keeping amplifier and battery covered with melamine board of 18mm glass door with locking facility and size 4'x3'x1.5'.	Nos	4	11,044	44,176
78	Supply & Installation of Unit Column Speaker 15 Watt & 100 V Line with LMT taps of 15 watt, 10 watt and 5 watt (all fixing material shall be supplied by the contractor)	Nos	8	1,798	14,384
79	Supply & Installation of Unit Horn Speaker 25 Watt & 100 V Line with LMT taps of 25 Watt, 15 Watt, 10 Watt and 5 Watt (all fixing material shall be supplied by the contractor)	Nos	8	2,144	17,152
	VHF Communication System				
80	Supply of Digital TDMA (2 slots) based Fixed/Mobile Radio, synthesized transceiver with display, operating in 136-174 MHz frequency Band, 25 Watt with Fist Mic, Power Cable, 160 channels comprising of Ruggedised body meeting IP 54 standard with Channel Announcement Features. This shall include 0 dB Ground Plane VHF Antenna with UHF female connector, 30 mtr RG-213 RF cable with connectors, 12 V DC Power Supply Unit 10 Amp with battery revert & BNC Male to UHF female Connector. MAKE of VHF sets shall be: Motorola / Kenwood	Nos	4	24,065	96,260
81	Supply of VRLA Maintenance free battery of 12V/75 AH.	Nos	4	10,481	41,924

82	Supply of Digital TDMA (2 slots) based digital handheld Radio, synthesized transceiver, operating in 136-174 MHz frequency Band, comprising of switchable RF power output upto 5 W with helical Antenna, Ruggedized body meeting IP 54 standard, 16 programmable channels, 2150 mAH Li-ion battery with battery charger, Channel Announcement & canned messaging features, backward compatible with conventional VHF radios. Also 1(one) set of additional battery as spare shall be supplied along with the handheld sets. Make of VHF sets shall be MOTOROLA/KENWOOD	Nos	20	19,114	3,82,280
83	Single unit rapid battery charger, drop in type suitable for 5 W VHF Handheld set above.	Nos	20	5,725	1,14,500
Ducts and Accessories for OFC					
84	Supply of OFC Joint Enclosure for straight through joint with modification for 24 fibre OFC as per TEC specification no. GR/OJC-02/02 SEP 2003 (with latest amendment) or latest. It includes splicing of optical fibre cables (24 Fibre) and testing.	Nos	6	14,099	84,594
85	Supply of Thermoshrink jointing kit for Jelly filled Six quad cable conforming to RDSO Spec. IRS:TC-77/2006(Rev 1) with latest amendment.	Nos	15	5,784	86,760
86	Supply and fixing of VF Tapping Transformers (1120:470) as per the Spec. IRS TC 22-76 or latest RDSO specification.	Nos	20	853	17,060
87	Excavation for Jointing pit and provision of joint chamber of 1.2 mtr dia of 60 cm height with 2 piece cover on top and bottom cover with holes for drainage. This includes water cooling of chamber, backfilling and ramming of trench after laying and consolidated of soil as well as disposal of soil as per plan as advised by site engineer.	Nos	6	5,661	33,966
88	Supply and fixing of 20 pair CT Box and fixing on Hylam board on wall and termination of quad/ telecom cable at station/ SP/ SSP/ TSS/ LC gate/ Relay room/ office/ residences as per requirement and details given by engineer at site. The CT box after termination shall be sealed by pouring paraffin wax.	Nos	8	4,906	39,248
89	Supply of Switch board cable 5 pair for indoor wiring.	Km	1	17,655	17,655
90	Supply of UPT CAT-6 Cable (4 pair) as per TIA/EIA 568.2-1 Cat-6 specification length of box not less than 1000 feet (305 mtr) make - Finolex/systimax/D-Link/Tyco. Accepted Make: D-Link. Standard IRS condition with latest amendment will be applicable.	Mtr	4000	21	84,000
91	Supply and Installation of 2 Inch dia PVC conduit pipe /casing casing superior quality with ISI mark.	Mtr	0	44	-



92	Supply and Installation of Desk type Electronic Magneto Telephone as per spec No IRS TC:36-97 or with latest Amendments.(Amndt.1)	Nos	24	3,416	81,984
93	Supply and installation of Emergency Socket box made of FRP material as per Spec. No. RDSO/SPN/TC/44/2002 Ver.2 Amdt 1 to 3 (including latest amendments).	Nos	15	8,405	1,26,075
94	Supply and installation of 6 pin Emergency Socket as per RDSO Spec. No. IRS:TC:42/87 Amdt No. 3 including latest amendments.	Nos	15	487	7,305
95	Supply of 4/2 wire emergency light weight portable control telephone as per Spec. no. IRS-TC:78-2000 with amendment No. 3 including latest amendments with 6 pin flat plug to specn no. IRS-TC-42/87.	Nos	4	2,703	10,812
96	Supply of 50 pair Krone terminal complete with mounting arrangements.	Nos	8	2,457	19,656
Execution of Signalling & Telecom Works					
General Instructions: -					
i)	For trenching, cable laying, provision of RCC/DWC/GI/RCC hume pipe/ HDD method for track/ road/ platform/ culvert/ bridge etc. to be followed as specified in tender documents.				
ii)	All the surfaces shall be repaired and brought back to its original condition, as the case may be.				
iii)	The standard ratio of cement, sand, 25mm stone chip shall be 1:3:6 respectively, wherever concreting and foundation of signal, location, etc. is involved.				
iv)	All the sundry materials will be provided by the contractor at site like:- cement, sands, 25 mm or 1" stone chips for concreting, nuts, bolts, washers, sal wood shelves planks, S.W. strips, ferrules, anti corrosive/Red oxide/ Weather proof/Acid proof paint, MS plates/ angles/ flats, anchor(foundation) bolts, MS clamps, screws, eyelets, PVC bunching tape, buttons, condensor, resistance, varnish, fevicol, soldering/ welding material, copper lug, charcoal, salt, salmomiatic, 6 SWG GI- wire, MS pin, boss pin, 6mm rivet, split pin, angle cleats, 1" dia GI pipe, 6/8- SWG soft bond wire, flexible wire, channel pin, heat shrinkable tape, suitable compound for fixing lead wire, 1.5" GI/HDPE pipe for point machine/ axle counter, 3/4" thick sal wood boards, transparent sheet for box, lock for box make Godrej or similar, insulated strip, sulphuric acid, distilled water, cup board, sunmica, cable fixing clamps, power sockets, plugs, connectors etc. so as to complete the individual job as per schedule description.				
v)	All the materials of Supply Schedule will be got issued by the contractor from stores and transported to the site as per the requirement. Rest all sundry materials will be supplied by contractor at site to complete the execution of work.				
vi)	The contractor has to conduct detailed site survey of the cable route, prepare a plan to get approval of the Railway, putting white lime powder marking before excavation of earth under supervision of railway/employer's authorized representative.				
vii)	GI-Pipes to be supplied by the contractor must be as per specification IS 1239, Pt-1, 1979 (grade medium).				
viii)	For trenching, cable laying, provision of RCC/DWC/GI/RCC hume pipe/ HDD method for track/ road/ platform/ culvert/ bridge etc. to be followed as specified in tender documents.				
ix)	Any charges required to be paid to site PWD/Municipal authority to be borne by the contractor for cutting of public roads etc.				
x)	Guarding of cables/HDPE pipe, relaying of cables/HDPE pipe and rejoining of cable/HDPE pipe in case of thefts or otherwise to be borne by the contractor's at his own cost till commissioning.				
Electronic Interlocking System					
97	Installation, wiring, testing & commissioning of complete indoor EI system and other associated equipment as supplied in item no. 1. It shall consist of the following but not limited to: 1. Grouting, cutting of floors, walls etc. refilling of same, re plastering, required CC/ masonry				

	works. 2. Termination of indoor cables on disconnecting terminals on Din rail, painting/lettering on Equipment Rack, Relay Rack/Termination Rack. 3. Fixing of racks PBT terminals Disconnect Type/Wago terminals, ND Fuses, Bus Bars, Eyelets, hylam strips of required thickness (12mm, ISI mark) as per length required at site etc. 4. Fixing of VDU, all types of Relays, Wiring and testing as per wiring diagram. 5. Installation, wiring & testing of Relay Rack/Equipment Rack/CT Rack. 6. Testing of earthing arrangement as per latest RDSO guideline/Technical advisory Note. 7. Contractor organizing testing of wiring as per wiring diagram with Ircon/Railway. The testing includes -Functional testing, selection table testing with contractor's simulation panel. 8. Commissioning of Electronic Interlocking system after interfacing of indoor equipments with outdoor gears in association with Railway Personnel during Non-Interlock working. Competent Engineer of manufacturer must be available during Pre NI, NI and Post NI. 9. EI system shall be design, Installation, wiring, testing & commissioning considering the complete requirement of Ph-1 and Ph-2 .				
a	Rampur Dumra	Stn.	1	7,11,335	7,11,335
b	Rajendrapul	Stn.	1	7,11,335	7,11,335
c	Tal	Stn.	1	7,11,335	7,11,335
d	Hathidah Link	Stn.	1	7,11,335	7,11,335
NOTE:-					
	1. The quoted rate includes the rate for Complete work. 2. Testing and commissioning of SSI/EI system at a station for outdoor gears. 3. All Engineers, Artisan Staff and labours required for testing and commissioning of SSI/EI with MACLS work shall be provided by contractor for indoor and outdoor work. 4. Testing equipment such as simulation panel, signal and point operation simulation arrangement, multimeter etc. shall be provided by contractor at his own cost. 5. Testing shall be carried out by contractor in presence of engineer-in-charge up to his satisfaction and necessary alterations shall be done. 6. Testing & commissioning of overall circuits & ground gears, signals & commissioning of approved interlocking arrangements. 7. Contractor shall depute sufficient staff to carryout outdoor work during commissioning for completion of work within stipulated time. 8. All installation & wiring material shall be supplied by contractor & shall be procured from RDSO approved sources, wherever applicable. 9. Pre-commissioning check list for installation of SSI/EI signed jointly by OEM representative and IRCON's representative and have to be submitted along with OEM Certificate as per RDSO guidelines.				
98	Preventive and periodic maintenance/breakdown maintenance & supervision of SSI equipment within the period of maintenance for one year	Per Station	4	3,88,654	15,54,616
99	Training Consisting of training of Railway Personnel for EI system. This also includes supply of Hard and soft copies of course materials.	Man weeks	4	24,858	99,432


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100	Preparation & Submission of 'as planned' and 'as made' documents for EI. It includes but not limited to: 1. Equivalent Circuit of Application logic 2. Interface circuits. 3. Selection table/Route Control Chart. 4. Video Display Diagram. 5. SWR & SWRD 6. Signal Interlocking Plan modification if required It should be done as per extent practice of EC Railway. The documents shall be supplied as per technical specification of tender document.	Set Per Station	4	2,63,252	10,53,008
101	Preparation & Submission of 'as planned' and 'as made' of all outdoor drawings for outdoor signalling work. It should be done as per extent practice of EC Railway. The documents shall be supplied as per technical specification of tender document.	Set	4	1,45,466	5,81,864
102	Installation, complete wiring Testing and commissioning of operating VDU including supply of station masters console for fixing telephones, Block instrument, Reset box & other equipments.	Per Station	4	41,756	1,67,024
103	Carrying out alteration to the existing Relay wiring at Relay rack/Location box as per the circuit Diagram. The work includes releasing the existing unused wires and wiring the relays using PVC 16/0.2 mm copper. (Wire PVC 16/0.2 mm copper for the work shall be supplied by the contractor)	Per Relay	4	537	2,148
104	Testing of point-to-point insulation / continuity test for all laid out cables, Measuring Parameters and preparing the records	Per Station	4	57,380	2,29,520
105	Patching of new CT Rack with existing CT Rack. This includes patching of cable cores from existing CT Rack from Relay Room to CT Rack of new Relay Room which includes Termination of cable cores on terminals at cable termination rack. This includes all associated works of pulling out the cable from underground, peeling off insulation, dressing of cable core supported on sting rod with contractors own material. The work shall be done as per instructions of engineer at site.	Nos.	1000	12	12,000
	Datalogger				
106	Installation, wiring, testing, and commissioning of Data Logger with 512 Digital & 32 Analog Inputs as per spec. IRS: S-99/2006 with Amendment-2 or latest. This also includes but not limited to the following: 1. Supply and loading of diagnostic software for failure analysis. 2. Interface wiring between Relay Rack to Datalogger for all the digital & Analog inputs as per standard Railway practice.	Nos.	4	26,745	1,06,980



	3. Relay Room Door locking checking arrangement, commercial power supply monitoring arrangement & DG Sets, 4. Interlinking & Networking of Datalogger. 5. Modification in Software & Hardware if required and networking with other Data Loggers along with fault logic design at Control Centre. 6. Training as per Railway Practice. 7. Software programming of Datalogger to enable Preventive maintenance of all S&T assets, 8. Failure analysis, GUI of Yard Layout, extract of report in common language, accident analysis as per RDSO Guideline. 9. All installation & wiring material including supply of Relay Room Door locking checking arrangement shall be supplied by contractor & shall be procured from RDSO approved sources, wherever applicable.				
	NOTE: Data Logger will be installed, wired, tested, and commissioned by OEM's engineer as per guidelines issued by RDSO. The Pre-commissioning checklist issued by RDSO for Data Logger System will be prepared by OEM's engineer and signed jointly with Employer's Site Engineer. Before commissioning of Data Logger, OEM will submit Site Installation Certificate to Employer by mentioning that Data Logger has been installed, wired tested and commissioned by approved vendor of RDSO (i.e., by OEM).				
	Power Supply				
107	Installation, Wiring, Testing & commissioning of SMPS based Integrated Power Supply system conforming to Specn. No. RDSO/SPN/165/2012 (Ver. 3.0) or latest and to suit pre-commissioning Check List issued by RDSO. This includes installation & commissioning of 55 Nos. Battery for S&T installations as per IRS: S-88/2004 along with installation of Remote Indication Panel in SM/ASM's room. Any masonry work, if required, will be carried out by contractor's own material. The contractor will fix exhaust fan in IPS room & Battery Room including hole on wall (if not available), wire mesh and flap cover to protect the room against dust. All wiring will be done by using flexible multi strand copper wires of suitable size as recommended by RDSO. This includes extending various power supplies (by connecting pwer cables etc) up to bus bars in relay room and up to battery room. IPS should be connected to Ring earth of EI. This also	Nos.	4	2,34,163	9,36,652

	includes supply of all types of wires / distribution Board required for interconnection from IPS to Relay rack, CT Rack etc. as per RDSO/ECR guidelines Note:- IPS will be installed, wired, tested and commissioned by OEM's engineer as per RDSO guidelines. Pre commissioning checklist of RDSO for IPS will be prepared by OEM's engineer and signed jointly with Site engineer. Before commissioning of IPS, OEM will submit Site installation Certificate that IPS has been provided by approved vendor of RDSO				
	MSDAC				
108	Installation, wiring, Testing and commissioning of Multi-section Digital axle counter System including but not limited to: Fixing of Track Transducers on the rails, drilling of holes ,installation of Electronic Junction Box in Location Box, termination of cables and wiring. Installation of Evaluator. Fixing of relays, bus bar & fuse. Installation, wiring, testing & commissioning of reset box/Line verification Box etc. RDSO check list for Installation are to be complied by Manufacturer's engineer. Installation to be done by OEM/Authorised Representative of OEM & pre-commissioning check list should be duly signed by OEM/ Representative of OEM & Railway/IRCON representative.				
a	Track side electronic Unit inclusive of evaluator & earthing if required.	Nos	230	16,648	38,29,040
	Block Working				
109	Installation, wiring & testing of axle counter based block panel for one complete block section along with other accessories. The work involves supply of wiring material and wiring right from telecom DP to block Panel and Block Panel to relay room and connection with power supply including fuse wiring. This work may be involved along with releasing of complete existing SL/DL block instrument and its accessory and its transportation to new location for further use. Note: Installation, testing & commissioning of UFSBI shall be done by RDSO approved equipment manufacturer and Pre-commissioning check list should be signed jointly by representative of OEM's & Engineer at site as per guidelines issued by RDSO.	Pair	5	62,024	3,10,120
110	Installation, wiring, testing & commissioning of new Digital axle counter system (HASSDAC). Outdoor work includes : Fixing of track transducers on the rails. Drilling of holes in rails. supply and laing of HDPE pipe, Laying of track transducers cable from rail to HASSDAC unit in HDPE pipe, digging/trenching as per instruction of Site Engineer. Installation of HASSDAC/SSDAC unit in location box. Termination of cables & wiring of HASSDAC unit. Indoor work includes: Installation of Reset Box, wiring and termination of quad cable.	Pair	9	1,29,799	11,68,191



	Laying & termination of cable from C.T.rack to Reset Box. Fixing of relays, bus bars & fuses. Installation, wiring, testing & commissioning of reset box & line verification box in SM room / cabin. This includes: Fixing of reset box/line verification box on Wooden/hylam sheet. Supply & fixing of MS angles. RDSO Check list for installation are to be complied by manufacturer's engineer.				
	Signals				
111	a) Excavation of pit, fixing of foundation scaffolding, casting & plastering of concrete foundation, removal of scaffolding, water curing and earth filling for Colour Light Main Signal and Casting of cement concrete foundation for signal ladder as per ECR practice. This includes : Supply of cement, sand, stone chip & mixing in the ratio 1:3:6. b) Erection of Multi aspect colour light signals. This includes : Erection of surface base, signal post, signal unit, junction type route indicator, and shunt signal on OFF set bracket, calling on signal, ladder with guard & platform, fixing of P/C/G marker, supply & fixing of Heat enameled signal number plate & blanking-off signals as per the requirement. Making of holes in CLS post, supply of other minor material like clamps, nuts & bolts, wiring material etc. Fixing of signal lamps/LED's with accessories on 2/3/4 aspect signal unit, shunt, route, calling on unit as per the requirement. Termination of the tail cable in the signal units, wiring of signal and testing, focusing of signal etc.	Signal	73	16,511	12,05,303
112	a) Excavation of pit, fixing of foundation scaffolding, casting & plastering of concrete foundation, removal of scaffolding, water curing and earth filling for Independent Shunt Signal as per ECR practice. This includes: Supply of cement, sand, stone chip & mixing in the ratio 1:3:6. b) Erection & wiring of shunt signal. This includes: Erection of surface base, shunt signal post, shunt signal unit. Supply & fixing of Heat enameled signal number plate, fixing of lenses, signal/LED lamp, supply and fixing of antitheft protection etc., where ever required. Termination of the tail cable, supply of wire & wiring of signal unit. Focusing and testing of shunt signal.	Signal	20	5,103	1,02,060
113	Supply and installation of Goods Warning Board/Caution Board/Stop Board/Block Section Limit Board (BSLB)/Shunting Limit Board/Calling on Board/Change of Signalling	Nos.	11	19,509	2,14,599

	territory board etc. as per ECR practice. All the above said boards will be supplied, in sizes and dimensions as mentioned in Signal Engineering Manual & GR with luminous strips yellow as well as black. This includes burying of post at least 1.2 mtrs and concreting of size 0.5 mtr x 0.5 mtr x 0.5 mtr with cement concrete in the ratio 1:3:6. All material will be supplied by the contractor.				
114	Supply and Fixing of 'P', 'C', 'A', 'G', 'AG' etc marker conforming to RDSO Drg no. SA 23476 ADV as per standard practice (as per ECR drg.) with contractor's complete material including fixing of clamps. The work shall be done as per instructions of Rly engineer at site. Wooden white cross-arms (1000x100 mm) to be provided by the contractor till the signals are commissioned with contractor's own material.	Nos.	11	778	8,558
	Note: The above signal items includes supply and installation of petty materials for fixing, clamping & mounting arrangement including wiring material (different sorts of wires etc).				
	Point Equipments				
115	Installation, Wiring, Testing & Commissioning of Point Machines including wiring of point JB, fixing of GI Pipe, Ground Connections and other work related to functioning of Point Machine. The work shall be done as per existing practice of ECR & the instruction of Engineer.	Nos.	86	19,792	17,02,112
116	Fixing of Key Lock Relay AC immunized with different ward combinations (Two extra set of ward plate for Point Machine to be supplied with each relay) of RDSO approved Make working on 60/24V DC or functional equivalent.	Nos.	47	1,521	71,487
117	Supply & Fixing of Pre-wired Crank Handle cum key lock relay box along with LEDs, push buttons, 8-way terminal strips, string rod, etc. suitable for 6 crank handle relay per box. It includes supply of any minor bracket, nuts, bolts, teakwood, sunmica, lock, drilling holes as directed by engineer at site.	Nos.	8	11,827	94,616
	Location Boxes				
118	Excavation, casting, concreting, curing and plastering (above ground level) of Apparatus case foundation as per practice of ECR & erection with contractors own Metal Sheet frame, cement, anchor bolts with nuts & washers and other materials. The items also include additional earth work if required as per instruction of Rly. Engineer at site for :-				
a	Full Location Box as per ECR Drg	Nos.	120	12,256	14,70,720
b	Half Location Box as per ECR Drg	Nos.	60	7,120	4,27,200

	Note: The above item includes supply and installation of petty material for fixing, clamping & mounting arrangement, fabrication and fixing of Hylam sheet in location box, by providing all fixtures as per railway drawing including fixing of PVC coated string rods at the back side for cable support with contractor's own material. The work shall be done as per as per instructions of Engineer Incharge.				
	Cable Laying				
119	Digging of cable pit (minimum inside size of 2m x 2m x 1m) and construction of brick wall in the pit, width of the wall shall not be less than 200mm as per instructions given by engineer in charge. It includes supply and filling of sand before and after coiling of cables, covering top of the cable pit by stones and brick masonry work for sides and thereafter plastering.	Nos.	4	18,976	75,904
120	Excavation of trenches at the depth of 1.0 Mtr. deep and 300 mm wide at the bottom of the trench including clearing of roots, bushes, or other obstruction etc. for all types of soils including Murrum, soft rock, hard soil mixed with boulders etc. as per cable route plan. This also includes complete back filling the trench after laying required quantity of cable, protection pipes/bricks, route marker etc and ramming and consolidation of soil as well as disposal of extra soil .	Km	32	73,650	23,56,800
121	Excavation of trench as per cable route plan, 1.2 mtr deep, 300mm wide at the bottom along main line in normal soil, This work includes covering of cable laid in trenches by loose soil for a layer of 50 mm thickness approximately before covering by shahabad stone/bricks, clearing of route, bushes etc and refilling of the trench by excavated soil and ramming after laying of the required quantity of cables as per instructions of Engineer at site. If it is not possible to reach the required depth at any location, then the contractor shall obtain prior approval of Engineer-in-charge before commencement of cable laying process and only then shall the proportionate payment be made to the contractor.	Km	5	76,227	3,81,135
122	Excavation of cable trench of 1 m. depth & 300 mm. wide across the track crossing, road crossing, level crossing, platform & refilling after laying DWC pipe with collars .This does not include provision of Tiles etc in case of Platform.. The work shall be done as per existant practice of East Central Railway & Instruction of Engineer.	Km	1	75,657	75,657
123	Horizontal direction drilling/boring without damage of surface of road /Track formation. It includes supply, transportation and insertion of	Mtr	400	2,747	10,98,800

	self lubricated HDPE pipe (Inner dia 103.5mm and outer dia 120mm). The depth of horizontal boring should be min. 1m from rail flange/road level.				
124	Preparation of cable Duct 150mm wideX300mm deep for laying of cable in rocky area and refilling the duct(after cable laying) with concrete mixture of proportion 1:3:6 and grouting the ends at either side of the rocky portion using concrete mixture with contractor's own materials and excavated earth to its original condition.	Mtr	200	695	1,39,000
125	Laying & Installation of 100 mm B Class perforated GI pipe for Cable Protection at culverts/Bridges including cutting, suitably concreting at both ends, GI clamps, flats etc. All material to be supplied by Contractor. The work shall be done as per instruction of Engineer.	Mtr	800	54	43,200
126	Laying of Signalling/Power/Telecom Cables of various cores in trench and meggering of main and tail cables. This includes loading/unloading & transportation of cables to site. Whenever several cables are to be laid separation of cables should be as advised by site engineer. This also includes unwinding of cable drum using proper jigs without causing damage to cable.	km	410	6,074	24,90,340
127	Transportation & Laying of DWC/RCC pipes along with collars in trenches at required locations as per the instruction of engineer at site.	km	1.8	44,302	79,744
128	Placing of half round (Split DWC) pipe over the laid cable in open trenches in yards between Home signal to Home signal and tying pipe with cable with loose armouring	km	28	3,940	1,10,320
129	Laying HDPE duct in already made trenches and through DWC/GI/RCC pipes wherever necessary	km	15	10,923	1,63,845
	Painting				
130	Cleaning, scraping. Painting & lettering of all newly installed and existing gears by the contractor. including supply of all materials for the work by contractor.				
a	Tal, Hathidah, Rajendrapul and Rampur Dumra station.	Nos.	4	45,152	1,80,608
	MISC.				
131	Supply & Installation of Air conditioners (Capacity:1.5 Ton, Split type, 5 star) with stablizer of at least 4 KVA, 10 Amps capacity for Relay room. Make of Air conditioner shall be O- General/Voltas/Hitachi or Similar make.	Set	12	36,152	4,33,824
132	Filling earth around location Boxes/Signal posts	per cum	100	122	12,200
	Telecom Items				



133	Blowing/drawing of OFC cable in the HDPE pipe duct and in protective works already provided. This includes transportation, loading/unloading of OFC from the stores to the work site with care, sealing of the duct by sealing/caps plugs. This also includes testing of cable drums in the store premises before transportation and submissions of results thereof. The cable drums with unused cable at site to be returned by the contractor from site to stores depot.	Km	15	14,262	2,13,930
134	Transportation, installation of optical fibre joint enclosure and splicing of Optical fibre cable (24 fibers) and testing, Optical fibre cable splicing shall be done in the presence of IRCON's representative. Only joint closure shall be issued by IRCON. All other tools/ test equipments required shall be arranged by the contractor. This also includes excavation of earth for construction of masonry pit of bricks (inside complete plastered), the inner size of pit 1.2m x 1.2m (depth 0.75 m) in all types of soils for keeping cable coils at the location of OFC joints, filling the pit with sand after jointing of cables, ramming and covering with RCC slab as per instructions of site in charge of IRCON.	Nos	6	20,749	1,24,494
135	Transportation and execution of joints on Quad cable/PIJF cable using Thermo shrink jointing kit (with installation of VF transformer wherever required and advised by Engineer in Charge). This also includes excavation of cable joint pit of size 1.2mx1.2mx1.0m in all types of soil for jointing of copper cables, backfilling and ramming after jointing.	Nos	15	2,023	30,345
136	Installation, wiring, testing and commissioning of Primary digital drop insert Multiplexer, SDH add/Drop-Multiplexer (main stream) with all accessories and power supply connection, surge and lightning protection arrangement, racks including indoor Krone box. ladder etc. in cable hut including wiring of all the equipments up to Krone box of outdoor quad/ derivation cables. The installation shall be done as per instructions of engineer.	Nos	4	39,767	1,59,068
137	Installation, wiring, testing and commissioning of battery and battery chargers. This also includes grouting on the floor.	Nos	4	2,283	9,132
138	Installation, wiring, testing & commissioning of Digital Clock with GPS Synchronization.	Nos	8	7,391	59,128
139	Installation, wiring, testing & commissioning of VHF System.	stn	1	14,366	14,366



	Dismantling work				
140	Dismantling & releasing complete indoor/outdoor S&T material. The work includes loading, unloading & transportation of released material to the store of IRCON/Railway SSE/Sig store or any other store, division and properly stacking the same in the store	stn	3	97,547	2,92,641
141	Shifting/ lifting of existing location boxes/ signals/Track lead boxes, junction boxes etc along with foundation to adjacent place to facilitate earth work/ clearing infringement etc at stations including IBH, LC gates etc.	Stn	2	27,664	55,328
142	Loading, unloading and transportation of additional/balance Signal and telecom materials after completion of work or during execution of work, to and from Railway/Ircon other stores depot to and from the site of work. Note: This does not include transportation of material from nominated depot to site and back or from site to site, which is to be done by contractor free of cost.	Per 100 Ton/ Km	71	593	42,103
	PROJECT MANAGEMENT CONSULANCY				
	Technical and Design Consultant and Project Construction Manager to be provided by the Contractor as per the following plan:-				
143	Resident Engineer/ S&T- 1 Personnel	Man months	15	1,34,635	20,19,525
144	S&T Expert/ S&T- 1 Personnel	Man months	15	79,556	11,93,340
	VEHICLE				
145	Provision of Two no. of dedicated 7-seater passenger SUV for movement of Ircon S&T Engineers on the project site, with min. & max. running limit of 3000Km & 4000Km respectively per month. The above shall include cost of driver, fuel, etc. with availability as per Ircon Engineer's requirement.	Per KM/Per Vehicle	45,000	20	9,00,000
	Grand Total (without GST in ₹)				
	GST @18% in ₹				8,02,44,145
	Grand Total Inclusive of GST in ₹				52,60,44,950
	Quoted Rate @21% below (Discount).				11,04,69,440
	Awarded Amount in ₹				41,55,75,510


Baba Projects Pvt. Ltd.
Director


Signature Not Verified

Digitally signed by MALAY BHADRA
Date: 2023.04.28 11:18:18 IST
Location: eProcurement System for
Central PSUs